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The Aging Population of Sri Lanka

It has been stated that Sri Lanka's decreasing rates of fertility and mortality have been responsible for tipping the scale of the population age-balance, enhancing the relative proportion of elderly persons. While reduction in mortality may largely be due to our improved healthcare system, the specific reasons for the decline in fertility is not explained.

Apart from the economic considerations resulting from increasing dependency of an aging population, the observed epidemiological shift from the prevalence of communicable diseases to non-communicable diseases with the need for life long medical care, is indeed a cause for much concern.

However, a recent (2008) World Bank Report on Aging in Sri Lanka states that evidence from developed countries shows that increase in elderly population, if accompanied by prevention and active care of non-communicable diseases, could cause no alarm for a possible increase in the burden of disease.

This same Report states that in about two decades time, Sri Lankan population will grow to be as old as Europe or Japan of today (2008), for which Sri Lanka would need a spectacular growth in per capita income, to deal with dependency. This report makes a wide variety of policy recommendations that range from expanding social welfare and care services, to improved income support programmes, to increasing capacities of nursing homes, to harmonizing and integrating retirement schemes, to increasing participation rates of old workers by adjusting inflexible retirement age rules, and to improving the productivity of the labour force by enhancing skills of older workers through life long learning.

Although Sri Lanka is known world over, as a country that provides the most comprehensive social security system in South Asia, referring especially to schemes such as Samurdhi, it is clear that the coverage of these support services should be expanded to ensure that the most deserving are not left out even by oversight.

A hidden aspect of aging is the increasing sense of insecurity and the consequent affliction of psychological problems. In this context it is consoling to note that many of the causal factors of such psychological disorders are the result of misconceptions, and could be easily resolved through scientific counseling.

M. Asoka T. De Silva

The Amazing World of ANTS

Harindra Amarasinghe

Ants are the most conspicuous group of terrestrial insects ranging over virtually all the land out side the polar region. They are also numerically the most abundant and have successfully invaded the natural, agricultural and urban environments in the world.

They are eusocial insects of the family Formicidae, and along with the related families of wasps and bees, belong to the Order Hymenoptera. An ant can be easily distinguished from other insects by having elbowed antennae, narrow waist with one or two joints (nodes) between the thorax and the abdomen.

Ants inhabit in well organized communities, a way of life that offers significant advantages for survival, and maintain a sharp division of labour among them. A colony of ants includes several castes such as the queen, males and sterile female workers. During development they undergo complete metamorphosis passing through the egg, larvae, pupae and the adult stages.

Adults can be winged or wingless depending on their assigned caste. Workers comprise the wingless caste, while the queen and males emerge from pupae as winged reproductives. Usually the colony revolves around a single queen, which is the only sexually mature female and is the only individual capable of reproducing. Once a year the queen produces sexually mature male and female ants within the nest, and the male ants are responsible for fertilizing the queen. After participating in the nuptial flight where mating takes place, the queen sheds her wings and initiates a new colony. Males die soon after mating.

Ants are the most conspicuous group of terrestrial insects in any landscape due to their large colony size, ubiquitous presence in numerous habitats and the painful sting they inflict. There are about 15, 000 living ant species in 296 genera and 16 subfamilies in the world, of which 9 subfamilies including 2 endemic genera are recoded from Sri Lanka. The huge diversity, dominance in biomass and the presence in almost every habitat in an eco system made them the best indicators of habitat quality.

The wingless female worker ants are the most common and abundant form in an ant colony, and morphologically workers may be of one or several forms; monomorphic, dimorphic or polymorphic depending on the ant species. Many ants have monomorphic workers, but sub castes are called according to their sizes; minor, media, major workers. The worker polymorphism is well developed among the Marauder Ants (*Pheidologeton* sp.), where the super major workers are enormously sized (Fig. 1) and approximately about 50 times larger than the tiny minors.

Fig 1: Pheidologeton sp. (Super major worker)

The larger headed forms with powerful jaws termed soldiers, aid in defense of the colony, while minor forms or true workers perform a variety of duties for the colony; foraging, nest maintenance, building tunnels and food storage.

The length of the growth phase of the colony is highly dependent on environmental factors such as temperature, humidity etc. Growth of the colony ends when the colony is

large enough to produce alates, males and new queens. Most ant species have a single queen per colony but some species have multiple nests for at least one part of their life cycle.

Ants, as highly social animals, possess a complex system of internal communication that enables the colony to carry out its collaborative activities in nest building, food gathering, care of young and defense against enemies. Ants have proven to be the richest source of alarm pheromones (Chemical communication) among the social insects. Chemical releasers of alarm behavior have been identified among species belonging to the Subfamily Ponerinae, Dorylinae, Pseudomyrmecinae, Myrmicinae, Dolichderinae and Formicinae. They are released by the workers in an emergency situation to give clues about the danger, and defense against attackers will be carried out by the soldiers of the colony. Some ants leave scent trails that others can follow to the discovered food source.

Ants attack others while defending themselves in many ways. Some species are capable of inflicting painful bites or stings, while ants that belong to the sub family Formicinae eject highly acidic fluid (formic acid) in defense against their enemies.

Fig 2: Nest of Pheidole sp.

The nest morphology is often species specific, and the nesting site could be varied from a simple cavity in soil to extremely complex subterranean excavations. For instance, while *Pheidole* sp. and *Meranoplus* sp. form small solitary nests (Fig. 2) *Myrmecaria brunnea* (Fig. 3) produces large super colonies (Fig. 4) comprising hundreds of nests interconnected by underground

Fig 3: Myrmicaria brunnea (Kuru Koombiya)

Fig 4: Nest of Mymicaria brunnea

Fig 5: Nest of Oecophylla smaragdina

Fig 6: Nest of Camponotus sp.

passages over several kilometers in area. The Weaver ant, *Oecophylla smaragdina* is also known as the living sawing machines because of their ability to build large arboreal nests by weaving the living tree leaves together using the silk produced by its larvae (Fig. 5). The nest of *Camponotus* spp. is characterized by its crescent-shaped structure with a small nest hole at the centre (Fig. 6).

Lophomyrmex quadrispinosus forms a cluster of nests in loose dry soils exposed to intense sunlight (Fig. 7).

Fig 7: Nest of Lophomyrmex quadrispinosus

Usually ants have a wide variety of food preferences; plant seeds, nectar, honey dew secreted by sap sucking insects and fungus, but most are generalized or specialized carnivores that can exert an enormous control on the invertebrate populations in their vicinity. For example, the Trap-Jaw Ants, *Odontomachus* sp. (Fig.8) and *Diacamma* sp. are popular for their voracious predatory activities. The Shielded Ant, *Meranoplus bicolor* (Fig.9) and the Big-Head Ant, *Pheidole* sp. (Fig.10) are well known seed harvesters and play an important ecological role in seed dispersal. The Leaf cutter ants *Atta* sp. and *Acromyrmex* sp. in South America exclusively feed on a special fungus which cultivates inside their colonies. Thus they continually collect leaves and cut into pieces for the fungus to grow. They are referred to as the "fungus gradeners" and act as a serious pest in agriculture.

Fig 8: Odontomachus haematodus

Fig 9: Meranoplus bicolor

Fig 10: Pheidole sp. (Major worker)

According to the most recent work of Dias (2002), ants belonging to 9 subfamilies and 58 genera have been recorded from Sri Lanka, and this includes two endemic genera ; *Aneuretus* in the monotypic subfamily *Aneuretinae* (Wilson 1956) and *Stereomyrmex* (Bingham 1903) in the subfamily *Myrmicinae*. The Sri Lankan relict ant *Aneuretus simoni* Emery, is the sole surviving representative of one of the world's 14 ant subfamilies, and restricted to a few sites in Gilimale (a primary forest) and "Pompakelle" in the Ratnapura District. Among the recorded subfamilies in Sri Lanka, Myrmicinae is the largest with 30 genera and 201 species.

While conserving the threatened and endemic ant species is of urgent concern, invasive ants have become a world-wide problem because they feed on and contaminate human foods, infest structures and are able to inflict painful bites and stings. The most commonly encountered pest ant species are as follows.

The Red Imported Fire Ant, (*Solenopsis invicta*) (Fig.11) and the Black Crazy Ant, (*Paratrechina longicornis*) are considered as tramp species; introduced by human commerce to islands or continents of which they are not natives. They have proven to be outstandingly successful at

Fig 11: Solenopsis invicta

spreading within their new range, either in areas disturbed by human activity, including towns and cities, or in natural habitats. *Monomorium destructor* is the renowned tramp ant transported around the world via human commerce and trade. *Tapinoma melanocephalum* (Ghost Ant) is another nuisance pest species in houses and greenhouse environments. *Pheidole megacephala* is a serious threat to biodiversity due to displacement of most native invertebrate fauna and a pest of agriculture, and is the most species rich ant genus in the world. The Yellow Crazy Ant, *Anoplolepis gracilipes* (Fig.12) is associated with human-modified environments and is among the first hundred invasive species listed in the web. The Carpenter Ant, *Camponotus* sp. (Fig.13) is one of the largest and most heterogenous ant genera in tropical and neotropical regions, and does a serious damage to wooden structures excavating nest galleries inside.

Fig 12: Anoplolepis gracilipes (Ambalaya)

Fig 13: Camponotus sp. 1 (major worker)

Ants appear to be an ideal candidate for use as an indicator group because of their diverse, numerical and biomass dominance in almost every habitat throughout the world. In addition they are sensitive to environmental changes and the stationary nesting habitat allows them to be resampled over time. Furthermore, they play an important ecological role in terrestrial eco-systems as pests, predators, seed harvesters, fungus cultivators, soil turbators, pollinators, facultative and obligate symbionts, social parasites and vectors of diseases which make them the best indicators of habitat quality. Yet, very little work has been done on ant fauna of Sri Lanka. Hence, further studies on ants will add more significant data to the research world.

Deep underground is a little ant town…

From egg, larva, pupa to the adult that you see
My head, thorax and abdomen make up me
I have a hard exoskeleton; I'm soft inside
I dig under the soil where I live, eat and hide

I'm an ant, I'm an ant, ants come from eggs
I'm an ant, I'm an ant, and I have 6 legs
I'm an ant, an insect with 2 antennae
I'm an ant, I'm an ant. I work all day

My mom, the queen, is in charge of the nest
In thousands, we work with so little rest
I'm weak if alone, but in groups I can fight
To protect my nest all day and all night

I eat other insects, sweets, and seeds
I store honey in my stomach from flowers and trees
When I walk, I leave a smelly trail for my friends
So they can find my path from beginning to end

Deep underground is a little ant town.
Jennifer Fixman

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The Psychology of Aging

Dr B.D.D. Pathirana

What is Aging?

Aging is one of the most normal and regular processes that affect humans both positively and negatively. Along with physiological and physical changes aging brings out many psychological changes in individuals. Although aging takes place throughout life, the primary importance of aging is felt during the transition from middle to old age, and this could be considered as the most important stage of aging.

Processes that explain aging in humans

According to WHO, the world's greying population has been growing steadily with the decrease of fertility rates and longer life expectancy. Considering that aging is part of everyone's life, it is important to understand the psychological changes that can occur during different stages of life when age becomes more than just a number.

Age could be considered as largely psychological in that some people who have a negative attitude towards life may tend to feel older even before they reach their 40s, whereas others consider themselves old only when they reach 60 and beyond. Individuals feel age as a measure of health and physical manifestations such as graying of hair, wrinkles of skin or weakness of muscles.

Since most of us identify ourselves with our body, aging of the body naturally brings about aging of the mind. Moreover, with declining physical strength there may be a decline of psychological strength. Poor psychological health in turn affects the physical well being of an individual. Although life expectancy of individuals have gone up considerably in the last few years suggesting an improvement in global health, individuals still tend to remain apprehensive about the changes in life that age will ultimately bring about.

In psychology, Erik Erikson delineated certain stages of psychosocial development as applicable to adulthood or middle age as well as old age. As the individual continues to grow throughout life, psychosocially, the focus may be on generativity versus stagnation during middle age when individuals tend to contribute to their careers and family. People who choose generativity would be successful in using their skills at work or family or both. With stagnation they can feel unproductive and unrelated with the world. The last stage of Erikson's psychosocial development that occurs in old age brings out the dimension of integrity versus despair in which individuals look back at their achievements and accomplishments and may develop a sense of pride and integrity or may develop feelings of despair. According to Erikson, old age is a period of self- reflection and will generally bring in a feeling of hopelessness or satisfaction.

However, some scholars consider middle age as primarily based on materialistic or worldly needs, and old age primarily based on spiritual and existential needs. Whereas middle age is about 'living' and living properly with individuals focusing on increasing assets, properties and savings for the future and also focusing on achievements. Old age is about 'surviving' with the primary concern about health, illness and death related issues. In certain cases thoughts of

dying can become very prominent in certain individuals, and they may want to hold on to life through family or creative work, which remains even after a person's death.

Aging cannot be considered strictly a chronological process but rather a psychological process where there is a negative rather than a positive force that justifies a person's existence. Even a child goes through the process of aging and grows up to an adult, but since the child is stepping into the world and expanding horizons the process of aging for a child is positive, while the primary aging phenomenon is through 'knowing' as a child grows up to know and contribute as an adult. Developing an identity becomes the primary motivation for life, and with young adulthood, individuals quickly switch on to the 'achieving' mode as young adulthood is all about using the knowledge gained to achieve money, fame or even enlightenment for that matter. The 'living' stage comes next in middle adulthood as I have discussed, and at this time not only the fruits of achievements begin to reveal but the future is also secured with financial and emotional security provided by laying the foundations of family and professional life in the earlier stage. All these stages of knowing, achieving and living are positive phases although all these stages may have specific dilemmas, yet the final stage of surviving is primarily motivated by a fear of death, and this negative force brings about the real process of aging. Thus it is easily understood why aging is primarily a psychological process. The fear of death reinforced in old age brings out a negative force in life, and if this negative force is somehow overturned or made positive, the process of aging will no longer be seen as something negative or detrimental.

The major psychological myths/misconceptions about aging

1. Getting old is a dead end - that there is no growth or potential for being actively engaged. Aging is not all loss and decline inevitably leading to sadness/depression. It does happen to some, but not to all. Most seniors are very much engaged.

2. Decline in mental function. This is the most frightening myth for most people. Fear of loss of independence in this way (or because of physical ailment) is at the root of all our myths and misconceptions about aging.

3. Old people are abandoned by their families. Not the norm at all. Most seniors have frequent contact with their children, siblings and friends.

Why do these myths/misconceptions arise?

- They arise because we know of someone to whom such things have happened. As is human nature, we then tend to focus on that negative aspect. We tell ourselves, "That's what it's like to be old" when we see someone who has had a stroke, suffers from dementia, is in a wheelchair, etc.

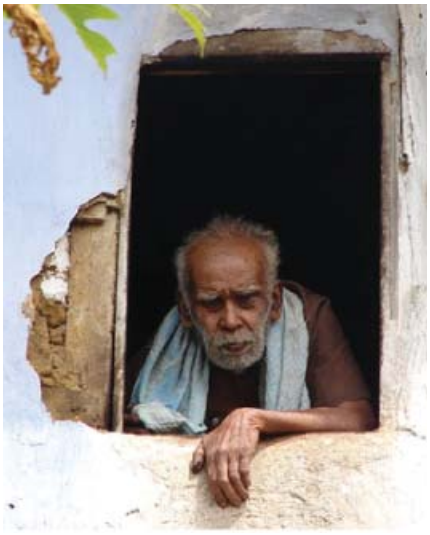
- We have a tendency to lump all seniors into one demographic group. But the term senior can cover a span of 40 or 50 years. We would not dream of generalizing about the period of birth through age 50, so we should not do the same with seniors. They are a very diverse group. In fact, as people grow older, they get more different from each other due to individual milestones; being widowed or other changing family circumstances, personality is more entrenched, etc. There is no common denominator among a given group of seniors other than age.

- There is the myth of mental decline. We forget things even when we are younger. When we are younger however, we accept/dismiss it as just having too much on our mind at a given time. But when we're old and forget things, we automatically blame age.

- "Environmental/societal" factors contribute to the myths as well, like a crosswalk where even a very able-bodied person has trouble crossing before the light changes. The senior that holds up traffic trying to cross does not have a problem - the light just changes too fast for anybody. Things like too-small print on packaging, dim lighting in public areas, and grey-on-grey elevator buttons all set seniors up to "fail."

Why do we treat getting old as a problem as opposed to a natural part of life?

Society responds to situations or intervenes only when there are problems - when someone is in need. Therefore, if an individual is in need of some type of assistance and he/ she is old, then aging is seen as the problem that has caused you to be in need. In other words, if you have a "need" for public intervention, then you must have "a problem."



Of course, it is important to understand how the process of aging could be turned into something positive. The vast amount of literature, articles, TV programs, radio shows and newspaper columns highlight the process of aging as something largely physiological and something that has to be accepted, at best in a positive way or hidden (e.g. dying ones hair, smoothing ones wrinkles). It is as if aging is something negative but will have to be looked at positively. I would suggest that the process of aging being primarily psychological as explained by the fear of death, it is only caused by a negative force, but it is not inherently negative and can become a positive process. I am not suggesting cosmetic surgery or turning back time in terms of body image, but moving beyond body image and developing a 'soul identity' that could actually completely overturn the process of aging significantly. Identifying oneself with the soul as sages do, and developing a spiritual potential within could go a long way in actually preventing psychological, and in turn the physiological aspects of aging. During ancient times, people led deeply spiritual lives and lived longer and looked younger than we do. Soul searching helps in overcoming fear of death, and if old age is seen as a step towards one's ultimate spiritual completion and the right time to explore other creative dimensions of life that have been ignored earlier, old age can become the most fruitful and the most positive phase in one's existence.

Is there "ageism" in our society?

- Yes, and it is incredibly insidious. It is rooted (like all "isms") in devaluing the aging population – they are past their prime.

- You can see ageism in action in things like unemployment rates among seniors and resource allocation (i.e. cutbacks to long-term care facilities, etc.).

- Abusing the aged - abandoning older people on roadside

Cognitive factors associated with aging

Memory

A lot of what is called memory "loss" is really just a slowing down of the ability to retrieve material. When individuals age their memory is still there, but they are not as quick at accessing it as it used to be. Due to aging verbal fluency may slow down (e.g. individuals may find it a difficult task to find names). However, there is some debate over whether it is harder for older people to solve new tasks. With aging people gain a lot of accumulated knowledge, skill and understanding, and may find it a difficult task to remember all of them.

What can be done to help keep our memory in top condition?

Memory "Toning" - Reading, doing crossword puzzles, and other such activities are good to keep the mind "vigorous."

Culture and psychology of aging

How do different cultures differ in their views on aging?

- North American culture places a very high premium on youth. In Fountain of Age Betty Friedan noted a Harris Poll that reported only 8 percent of Americans over 65 finding the term "old" being an acceptable label for describing themselves. A majority also objected to the use of terms such as "older American," "golden-ager," "old-timer," "aged person," even "middle-aged person." Barely half accepted the terms "senior citizen," "mature American," or "retired person" for themselves. Friedan noted how some senior citizen clubs fine their members if they use the word "old." .

- Throughout Asia, a large proportion of older people live with their children, but as financial and health status improves, this pattern is less common as it used to be. However, comparatively it can be said that Asian culture is very reverential and respectful of seniors. They are valued for their knowledge and experience.

- Psychology of Aging - Sri Lankan Profile - Sri Lanka is aging. It is assumed that one out of every four individuals would be above the age of 60. Elders in Sri Lanka are still respected and traditional family care practice is kept even during present times to a large extent, though in danger of it fast disappearing. Despite the limited access to elder care services in Sri Lanka, most of the elders are able to live with their families at home due to Buddhist traditions (e.g. respect elders, care of parents, concept of sharing, donation etc.)

Psychological problems associated with aging

Depression

How common is depression among seniors?

It depends on how you define depression. There are two types:

1. The "serious illness" is clinical depression. Approx. 2-5% of those over 65 is affected (not dissimilar to the general population). In nursing homes or hospitals, that population can be affected up to 25%.

2. Individual depressive symptoms are much more common. 15-20% of healthy seniors can have one or two symptoms, but that does not qualify them for clinical depression.

Previously unaffected seniors can develop "late onset" depression. A person could have been totally fine until a very advanced age, and then become depressed. Often when this happens there is an underlying medical cause.

Strokes

The most common cause of psychological problems among older people is the disability caused by strokes. Most strokes are blood clots that get stuck in the small blood vessels (capillaries) in the brain that supply neurons with oxygen and other necessities. When this happens, many neurons die for lack of oxygen. If this happens often enough, the person may develop what is called multi-infarct dementia. They may become confused and disoriented; some may take to wandering off and getting lost; some may have difficulty forming new memories; many develop emotional problems such as anxiety and depression.

Alzheimer's Disease

Alzheimer's disease, a disorder of pivotal importance to older adults, strikes 8 to 15 percent of people over the age of 65 (Ritchie & Kildea, 1995). Alzheimer's disease is one of the most feared mental disorders because of its gradual, yet relentless attack on memory. Memory loss, however, is not the only impairment. Symptoms extend to other cognitive deficits in language, object recognition, and executive functioning.

Behavioral symptoms—such as psychosis, agitation, depression, and wandering—are common and impose tremendous strain on caregivers. Diagnosis is challenging because of the lack of biological markers, insidious onset, and need to exclude other causes of dementia. The diagnosis of Alzheimer's disease not only requires the presence of memory impairment but also another cognitive deficit, such as language disturbance or disturbance in executive functioning. The diagnosis also calls for impairments in social and occupational functioning that represent a significant functional decline (DSM-IV).

What is the best thing about aging?

- The majority of seniors report that they are happy despite health problems that may be present. People adjust their goals and adapt to circumstances as they age.

- Things take on different priorities - things that may have caused you stress 20-30-40 years ago may not be as important to you. Seniors' accumulated wisdom allows them to accept that there are things you just can not change.

What is the most important ingredient for healthy aging?

- Attitude!! Having meaning and purpose in life (and it does not matter what it is that gives your life meaning - it could be stamp-collecting – it is not a value judgment).

- The only thing that separates people like Rick Hansen or Terry Fox from the rest of us is their attitude towards life. If you have a good, positive attitude, it can more than compensate for a number of other things that may be lacking.

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Warning Signs

When to Begin to Limit Your Driving

What are the warning signs when someone should begin to limit driving or stop altogether? You need not experience them all!

- You feel less comfortable and more nervous or fearful while driving
- You sometimes have difficulty staying in the lane of travel
- You experience more frequent "close calls" (that is, almost crashing)
- You've noticed an increase in dents and scrapes on your car or on fences, mailboxes, garage doors, curbs and so forth
- You occasionally have trouble judging gaps in traffics at intersections and on highway entrance/exit ramps
- Other drivers honk at you more often; likewise, you have an increase in instances when you are angry at other drivers
- Friends or relatives don't seem to want to ride with you
- You get lost more often
- You notice a slight difficulty seeing the sides of the road when looking straight ahead (that is, cars or people seem to come "out of nowhere" more frequently)
- You have a bit of trouble, sometimes, paying attention to signals, road signs and pavement markings
- You realise you have a slower response to unexpected situations; once in a while, you experience trouble moving your foot from the gas to the brake pedal or find you've confused the two pedals.
- You are easily distracted or find it hard to concentrate while driving
- It has become more difficult to turn around to check over your shoulder while backing up or changing lanes
- If you're truthful, you would have to acknowledge that medical conditions or medications may be affecting your ability to handle the car safely
- You have received more traffic tickets or "warnings" by traffic or law enforcement officers in the best year or two than you have received in the past

Source: *Internet*

Demographic, Social and Economic Factors Affecting Aging

Dr Deepthi Perera

Sri Lanka is now considered a country with an aging population as the proportion of the elderly age group in the country is increasing (Table 1). Those who are 60 years of age or more are referred to as elderly persons based on the age of retirement in Sri Lanka (55-60 years for both public and private sectors).

The decreasing rates of fertility and mortality have led to an increasing proportion of elderly persons. Improvements in healthcare, family planning services, education, nutrition, sanitation, and economic well being have contributed to decreasing fertility and mortality. Compared to other South Asian countries, the proportion of elderly population is higher in Sri Lanka (World Population Prospects, 2004 Revision, United Nations).

Age and sex structure

Age and sex structure of the population (either in absolute numbers or proportions) when plotted graphically will produce an age pyramid. The base of the pyramid indicates the segment of the population in the youngest ages, while the top indicates the oldest ages. The proportion of the people in various ages of the structure, changes because of the continuous functioning of the population growth components, namely, mortality, fertility and migration.

The Sri Lankan population will undergo major changes in its age structure in the coming decades (De Silva 2007). The population pyramid in year 2001 shows that the proportion of children younger than 15 years (<15 yrs) of age was higher than the elderly population. (60+yrs). The proportion of working age population (15-59 yrs) was significantly higher than the proportion of the combined magnitude of children (< 15 yrs) and the elderly persons (60+ yrs). Thus the total dependency is shown to be at the lowest level in 2001. By the end of the present century, the pyramidal shape of the population structure would modify greatly and a high dependency pattern is expected with its largest component being in the older age groups. This is illustrated in Figure 1, for year 2001, 2026, 2051 and 2101.

Population by broad age groups

The future trends of the aging population can be analyzed by focusing on specific age groups, as analyzed by W.I de Silva (2007).

Child population (<15 years):

The proportion of the child population (< 15 yrs) is declining year by year. It has dropped from 39.0% in 1971 to 26.3% in 2001 and is expected to decline steadily thereafter.

Table 1 - Percentage Distribution of Population by Selected Age Groups, Sri Lanka 1971-2071

Year	Age groups			Total
	< 15 yrs	15-59 yrs	60+ yrs	
1971	39.0	54.7	6.3	100
1981	35.2	58.2	6.6	100
2001	26.3	64.5	9.2	100
2011*	22.8	64.7	12.5	100
2021*	19.4	63.9	16.7	100
2031*	16.1	63.2	20.7	100
2041*	15.2	60.0	24.8	100
2051*	14.9	56.3	28.8	100
2061*	14.4	54.3	31.3	100
2071*	14.7	52.0	33.3	100

** projected proportions*

Source: Data from 1971-2001 are from the census Reports in the Dept. of Census and Statistics, data for 2011-2071 are from De Silva (2007)

Working age population (15 - 59 years):

In contrast to the child population, the working age population will continue to increase numerically until 2026, and show a decline thereafter. However, when viewed as a percentage, the highest was seen in 2006 which is expected to decline gradually.

Elderly population (60+ years):

The elderly population is expected to increase significantly, with the decrease of the under 15 population. The elderly population of

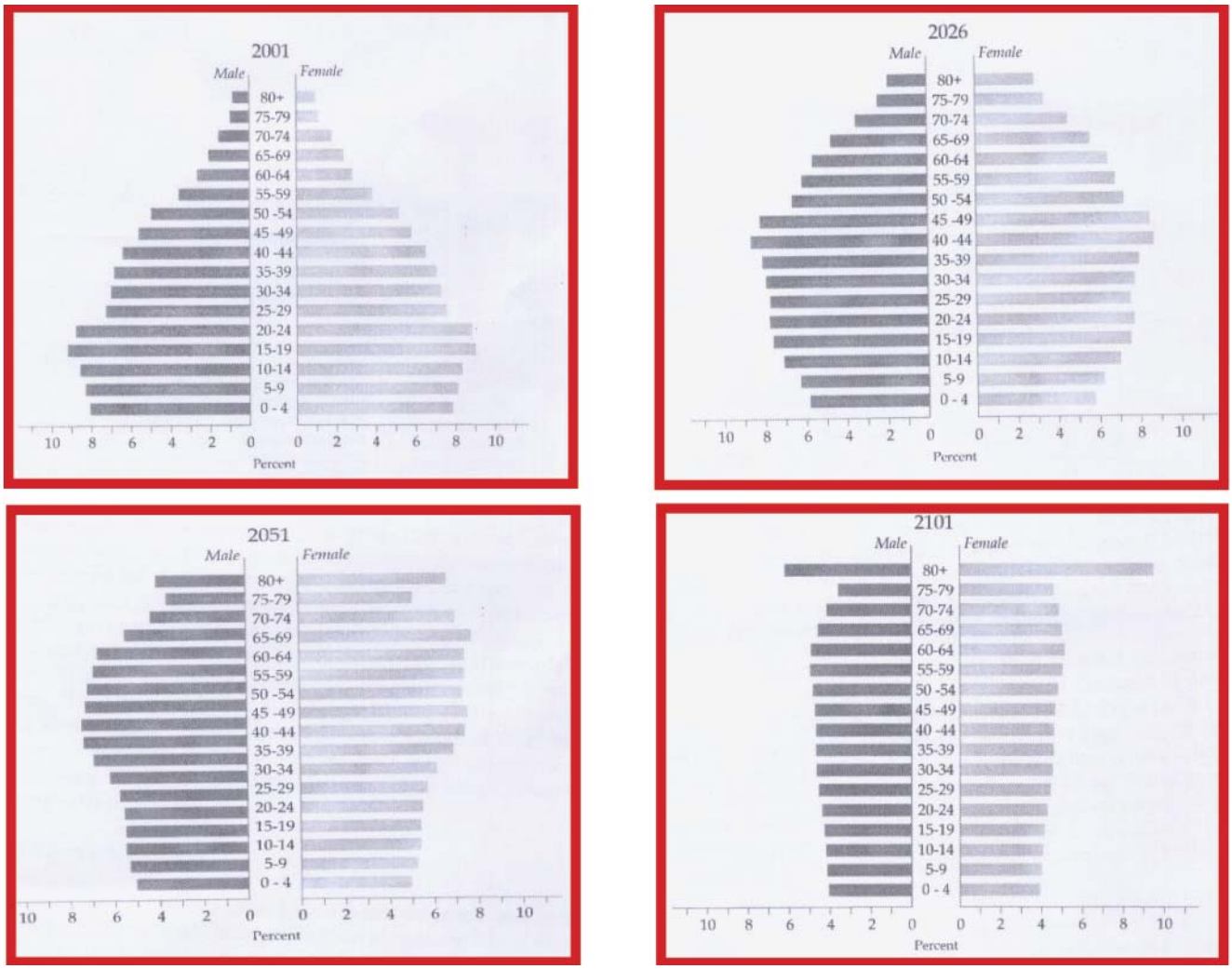


Fig 1: Projected Changes in Age-Sex Structure of the Population, 2001,2026, 2051 and 2101
Source - *De Silva, W.I, A Population Projection of Sri Lanka, (2007), Institute fro Health Policy, Sri Lanka*

1.7 million enumerated in 2001 is expected increase to 3.6 million by 2021. This means that this population will be doubled during the immediate 20 year period. Consequent to the declining trend in fertility and mortality in the coming years, particularly between 2031 and 2061 periods, there will be 4.5 million and 6.3 million respectively of elderly people. By 2041, one out of every four persons in Sri Lanka is expected to be an elderly person. Although aging of the Sri Lankan population continues, even at 2021 the proportion of elderly in the population will be outnumbered by the children. In the year 2024 the child percentage (< 15 yrs) and the elderly (60+ yrs) percentage in the Sri Lankan population would be in equilibrium at 18% (Fig 2). However beyond 2024 the percentage of elderly will increase significantly and the percentage difference between elderly and children will become wider in favour of the elderly.

Gender aspects

Among the older age groups the proportion of females would be significantly higher than that of males. In 2001, for every 100 females in Sri Lanka there were only 98 males. In the coming decades the female favoured sex ratio is expected to increase further primarily due to greater improvement in female than male life expectancy. For instance as the standard projection highlights, when the Sri Lankan population reaches its peak in 2031, the sex ratio would be 94.4 males per 100 females.

Median age of a population

In demographic studies, an increase in the mean or median age of the population is called the aging of the population. A rapid rise in the median age of the population is an important feature which reflects the aging pattern of the population and the future demographic trends in Sri Lanka. In 2001 the median

age was 27.9 years, which means that half the population was below that age. The median age is projected to rise to 39.6 years by 2031 because of the rapid decline fertility and mortality.

Demographic, social and economic implications of aging

While doubling of the proportion of the 60+ age group took place in developed countries over a span of 100 years, and when the same changes take place in Sri Lanka over a short period of 25 years, it will inevitably mean that the country will have much less time to prepare and adjust to the consequences of aging. This includes the impact of aging on the economy, increased healthcare needs, and the changes on social relations. Furthermore this adjustment will be required within the constraints of very limited resources (WHO, 2002 'Active Ageing; A Policy Framework').

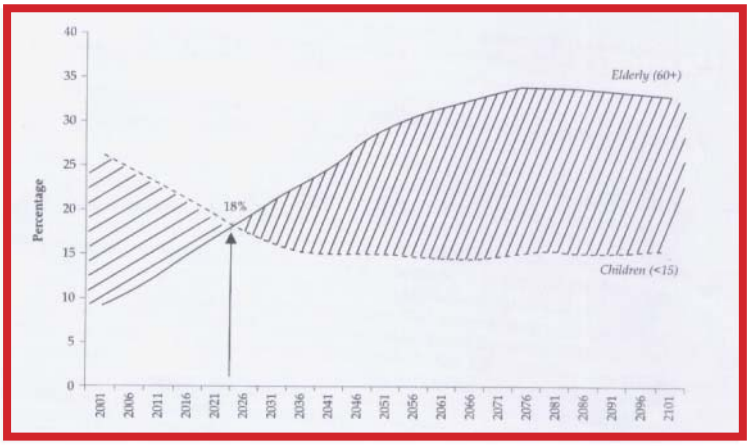


Fig 2: Projected Relative Size of Children (<15 yrs) and Elderly (60+ yrs) Populations, 2001-2101
Source - ***De Silva, W.I, A Population Projection of Sri Lanka, (2007), Institute for Health Policy, Sri Lanka.***

The age-sex and marital structure of the elderly population are important variables to consider when planning to meet the demand for social services, as observed by De Silva, Boyagoda and Ranagalage (2007).

Demographic bonus

As pointed out by Abeykoon and Sandaratne (2007), the change in the population age structure has also brought about a higher proportion of adolescents and youth in the population. Currently there are more than five million young people in this age group, which is the largest number in the country's demographic history. This is termed as the 'Demographic bonus' which is a one- time bonus.

The present demographic structure in Sri Lanka is conducive to economic expansion. It is also important to note that the dependency ratio at present is at its lowest level, and is expected to rise once again in the future due to population ageing. As Sri Lanka has made a significant investment in human development in the last five decades, we should take advantage of this opportunity. The failure to ensure appropriate economic policies for rapid economic growth could waste opportunities created by the demographic 'bonus.' Therefore the next two decades must be seen as a period of economic and social adjustment to the realities of demographic transition. It is a period that provides opportunities to make qualitative improvement in education and health services as well as to mobilize resources for economic development. It is also the time to prepare and meet the new challenges of population aging.

"Young Old" and "Old Old":

The elderly are grouped into two categories; the 'young old' (aged 60-74 yrs) and the 'old old' (aged 75+). The proportion of the 'old old' will continue to increase year by year due to declining fertility and mortality rates.

The "old old" (75+ yrs) would be especially vulnerable to visual, hearing and mobility impairment. They are

also more affected with physical disabilities arising as a result of arthritis, fractures and stroke, and will be more susceptible to conditions such as Alzheimer's disease, dementia etc needing more attention of care givers. As such, the needs of this sub-group have to be identified separately, as family support may not always be sufficient to cater to their needs.

The 'young-old' (60-74 yrs) will not only be in a better position to look after themselves, with minimum support of carers, but also be a resource to the younger family members, and be caregivers to the "old old".

Epidemiological transition

The demographic transition is associated with epidemiological transition, showing a shift from communicable to non-communicable diseases. As the population of older persons increases, there is often an increase in the proportion of population experiencing chronic illnesses (e.g. arthritis, diabetes, hypertension, myocardial infarction, stroke, cancer) and disability. The persons affected with such diseases need lifelong treatment and halfway homes for patients until they improve from disability. This will be an added burden to the government health services.

Responsibilities of the family members

Social changes such as migration (internal and external), urbanization, increased female labor force participation, mean that the elderly persons get distanced from the family members/children or left unto themselves in rural areas. With more urbanization, the living space in urban residences has become a critical factor to accommodate the requirements of the elders as well. As such more and more families are finding it difficult to care for their elderly members, unlike in the past. However, it is observed that the majority of elders live with their children and are also willing to stay with them, even with difficulties. Therefore, an important policy issue is, how best to provide economic and social support for the elderly.

Transition of the family from being extended to being nuclear, and more and more females who have traditionally been identified as the care givers for the elderly, are entering the labour force, leaving people with little time to take care of two dependent generations at the same time (World Bank 1994). As such when a choice has to be made, it is obviously the younger dependents who gain prominence. Within the context of the increasing trend of female labour force participation, is also identified their migration for employment to distant places within the country, and in some cases to foreign destinations. This in addition to the limited space available in housing units, especially in urban areas, where increasing cost of living and changing attitudes points to the need to strengthen the social protection mechanisms, so that the elderly can lead a life of dignity and quality, without having to be a burden on the family.

Hired caregivers

In the absence of family caregivers, there is an increasing need for the services of hired care givers for homecare of the elderly. Families who look after ailing elderly will be further burdened due to additional requirements such as the cost of hired caregivers, the need for additional living space and toilet facilities, the necessary aids and appliances, and the cost of drugs. In such situations, neglect and abuse of older persons is likely to occur.

The need of hired caregivers will also be an issue for those at institutions such as elders' homes, hospitals, and nursing homes. This is emerging as a potential source of employment, which can be handled by the private sector. Ministry of Social Services and the Ministry of Health should take steps to ensure proper training of caregivers, and steps should also be taken to ensure minimum professional standards through regulations, and supervisory and monitoring mechanisms. Implementation of such measures should be entrusted to provincial level.

Affordability of hired trained caregivers is another issue. As an option, training a family member to take care of the older person affected with a specific illness will also needs to be considered, as a cost-effective and a more practical measure.

Widowhood

Widowhood is more prevalent among women than among men. The proportion of widows of 60-64 years of age is about five times that of widowers in the same age group. This could be mainly attributed to husbands being generally older than wives and higher life expectancy of females.

It needs to be recognized that the category of widows living alone will lack security, care and companionship. They will also find it difficult to undertake responsibilities such as maintenance of house, banking, and payment of monthly bills while seeking appropriate medical attention for themselves.

Housing and other utilities

Special attention needs to be given to housing and other facilities for elders to become independent or to live with minimal assistance. Lack of care givers or the inability to afford such services makes this more important. Accessibility to houses and buildings (especially public places such as offices, shops, banks, religious places etc) will be a critical requirement to the rising population of elderly, and wheel chair accessibility also need to be considered when designing buildings. The living environment such as the pavements, slopes etc. also have to be carefully designed. Kitchen utensils, bathroom fittings, taps, door and window locks need to be elderly-friendly promoting accessibility, reachability, usability and safety.

Social protection schemes

Though Sri Lanka has several social protection schemes, there are only a few social protection mechanisms, especially targeting the elderly. The main mechanisms in Sri Lanka are the public sector pension schemes specifically for the government sector workers. Employees Provident Fund (EPF) and Employees Trust Fund (ETF) are other social security schemes concentrating on the private and public corporation sector employees. In addition, some voluntary contributory schemes have also been introduced by the government for farmers, fishermen, and self-employees. However, there are only a few comprehensive social protection mechanisms specifically focusing on elders in Sri Lanka, compared to developed countries with similar or higher levels of ageing (Jegarajasingham & Karunaratne 2007). Banks and insurance companies also have introduced pension schemes, where a person is entitled for a pension after paying an agreed number of premium installments.

Government coordination framework

Sri Lanka has implemented various important programmes for the betterment of elders under the Ministry of Social Services and Social Welfare, by setting up in particular a National Council for Elders and a National Secretariat for elders. The main objectives of the Council are to promote and protect the rights of elders, and to assist the elders to live with self respect independently and with dignity. The National Secretariat for Elders has been established to implement the decisions taken by the National Council.

A Maintenance Board for Elders has been initiated to look into their interests, and determine the claims for maintenance of parents who have been neglected by their children. Elders are issued special identity cards which assure many benefits for them such as priority in obtaining services from the government and private institutions, a 5% discount in purchasing medicine at the State Pharmaceutical Corporation, and higher interest rates for fixed deposits in the National Savings Bank, and Commercial Bank etc.

Elders' Committees at village and divisional levels have been arranged to establish for the social, economic, cultural and spiritual development of elders, protection of their rights, and encouraging the implementation of services for their welfare.

Day centers for elders are conducted to enhance the opportunities to actively participate in exchanging views, self-employment, lectures and discussions on various subjects, religious activities, exercise and recreational activities etc.

The primary healthcare staff in provinces have been trained by the Ministry of Health to improve community healthcare for elders, and to work in collaboration with other governmental and non-governmental agencies and community leaders in the respective areas. Awareness programmes on common health problems of the elderly, and screening for early detection and referral for treatment conducted at community level, needs further expansion. Converting an under utilized hospital in each district for rehabilitation of elderly needing long-term care, is an important step initiated by the Ministry of Health.

Dr Deepthi Perera,
Director – Unit of Youth,
Elderly Persons with Disability,
Ministry of Health

Next issues of Vidurava Science Magazine

- June, 2009
  Vol. 26, No. 01
  Theme: **Science and National Security**

- December, 2009
  Vol. 26, No. 02
  Theme: **Science Journalism**

Getting Old

20-30

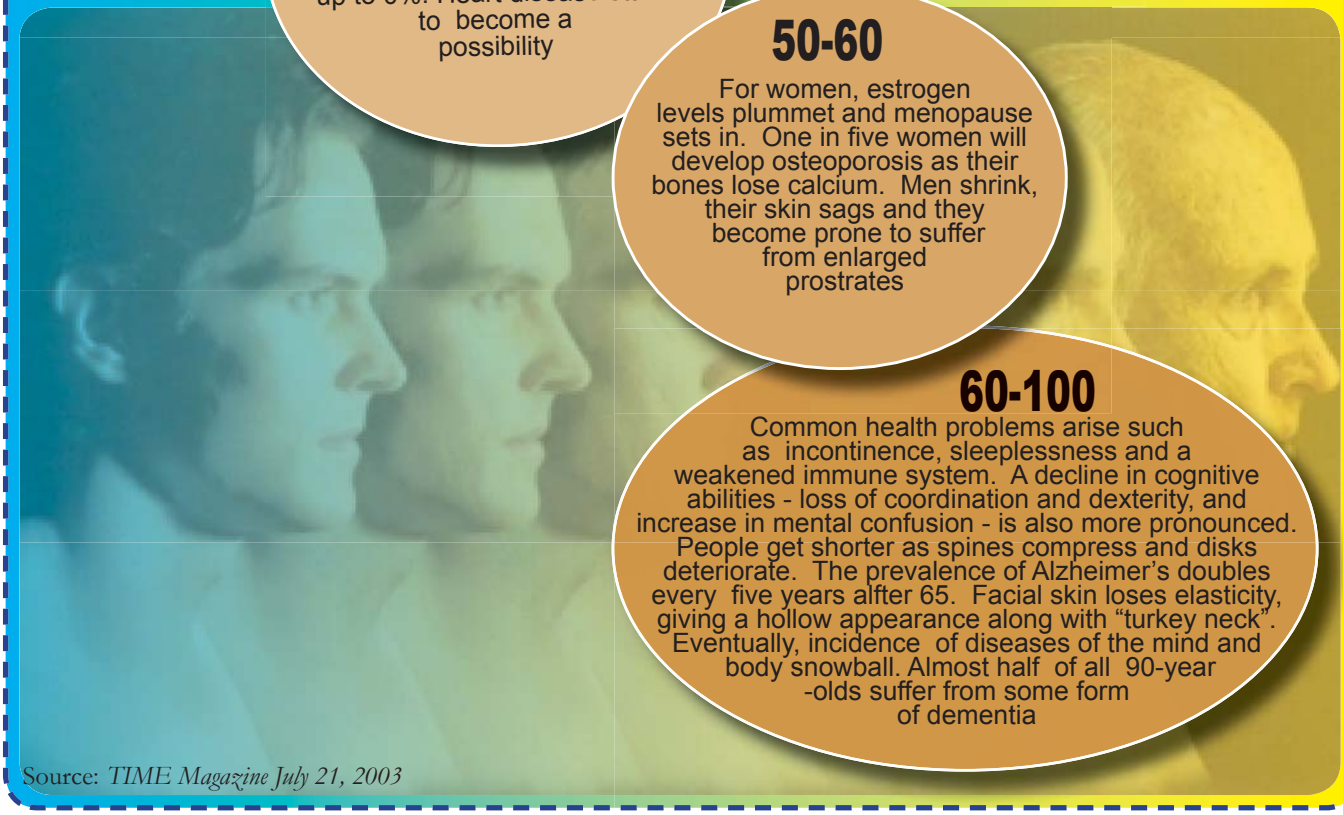
Metabolic and biological functions peak, with men producing their maximum amount of the sex hormone testosterone between 17 and 26. But it's mostly downhill from here. The brain is already beginning a long, slow decline, shrinking in weight and volume by about 2% every decade. Muscle strength begins to fade, imperceptibly at first, at about 25

30-40

It's women's turn to peak sexually, but the first outward signs of aging appear as skin starts thinning and wrinkles emerge. Female fertility drops off at age 37. Men genetically predisposed to male-pattern baldness begin to lose their looks

40-50

Metabolism slows markedly and the battle against fat truly begins; waists thicken and thighs bulge. Without exercise, heart and lung capacity decline by up to 0%. Heart disease starts to become a possibility



50-60

For women, estrogen levels plummet and menopause sets in. One in five women will develop osteoporosis as their bones lose calcium. Men shrink, their skin sags and they become prone to suffer from enlarged prostrates

60-100

Common health problems arise such as incontinence, sleeplessness and a weakened immune system. A decline in cognitive abilities - loss of coordination and dexterity, and increase in mental confusion - is also more pronounced. People get shorter as spines compress and disks deteriorate. The prevalence of Alzheimer's doubles every five years alfter 65. Facial skin loses elasticity, giving a hollow appearance along with "turkey neck". Eventually, incidence of diseases of the mind and body snowball. Almost half of all 90-year -olds suffer from some form of dementia

Source: *TIME Magazine July 21, 2003*

Oral Health: A MUST

Dr R.D.F.C. Kanthi

There are a number of common problems in relation to oral hygiene among Sri Lankans today. Dental caries, periodontal diseases, oral cancers, dental fluorosis, and dental distortion are some of them. Most of these are preventable

"Complacent Smile" on the face of Sri Lankan people has become famous all over the world. A smile on a face reflects many things to others. Anybody can have a nice smile if he/she has a healthy and neatly arranged set of teeth. There are many among us who are unable to gesture with a smile, although many would be happy to do so. The reason behind this is the unhealthy and incorrectly located teeth. It is therefore, fortunate to have healthy and well set teeth.

There are a number of common problems in relation to oral hygiene among Sri Lankans today. Dental caries, periodontal diseases, oral cancers, dental fluorosis, and dental distortion are some of them. Most of these are preventable. Maintaining good oral hygiene is not a complex issue, and it needs only a commitment. Oral diseases cause physical strain to some people, while for a few other people, oral diseases create psychological as well as sociological problems. It should be noted that Sri Lanka has a well organized country-wide government dental service, while the private sector also provide dental services. The government which provides a free service to the people, has made a large financial commitment for this purpose. Unfortunately the proportion of the Sri

Lankan population that utilizes this free service is very low. This may be due to their negligence and ignorance.

Many oral diseases are linked to lifestyle and the unfavourable behavioural patterns of the people.

Sri Lanka being a developing country saddled with economic burdens and a long drawn out civil conflict, has to resolve the high priority problems of poverty and malnutrition. In this scenario, Sri Lanka has to consider and concentrate on developing and adopting simple low-cost methods to contain oral diseases, that bestow economic benefits to the individuals as well as to the country as a whole.

It is clear that mass media has to play an important role in propagating the correct information about food habits and their link to oral diseases. Advertisements on food items and commodities such as toothpaste and tooth brushes often give the wrong signals to the general public. The type of social marketing that is common today tends to present a distorted picture of food ingredients and oral practices. Unfortunately the public health services are not geared to deal with such malpractices in the trading of consumer goods that are inimical to public health.

Sri Lanka is also constrained by a shortage of trained dental doctors to meet the demand for dental services.

The percentage of people subjected to dental disorders are quite high, while the number of persons taking treatment are relatively low. Hence the need for a concerted effort to popularize the importance of good oral hygiene, especially among the poorer segments of the population.

All expectant mothers must be made aware of the need to maintain good oral health to ensure that their new born babies will not be subjected to oral diseases. For this purpose the nursing staff attached to the District Medical Officer divisions as well as other outreach health care personnel such as midwifes, should be mobilized to achieve this major task of improving the oral health of people.

In Sri Lanka pre-school education begins with children of the 2 ½ to 3 year age group. Health statistics show that most of these affected children do not get proper treatment. It is here that proper awareness among mothers can make an impact of improving childrens dental problems. The deployment of mobile dental services in pre-schools can also be helpful in preventing dental diseases.

About 50 years ago, a school dental health service was initiated. Unfortunately this service had not been properly utilized, probably due to attitudinal changes resulting from the current system of competitive education. The adverse consequences of neglecting oral health during childhood are realized during adolescence when they begin to be conscious of their personality and appearance.

It is evident that at the outset children should be encouraged to make good use of the school dental clinics. This service could be used by school children from year one to year 11. Thereafter there should be follow-up programmes to keep young people continuously reminded of the need to ensure oral health.

Another important aspect of oral health is the type of food consumed by children. It should be the responsibility of the teaching staff of schools and parents to supervise the school canteen and regulate the type and quality of food items served by these food outlets to the students.

Foods with excessive sugar as well as soft drinks should be strictly controlled, while milk and milk based food items should be given preference. Creating good food habits for children during their school days, can have a lasting effect on the lives.

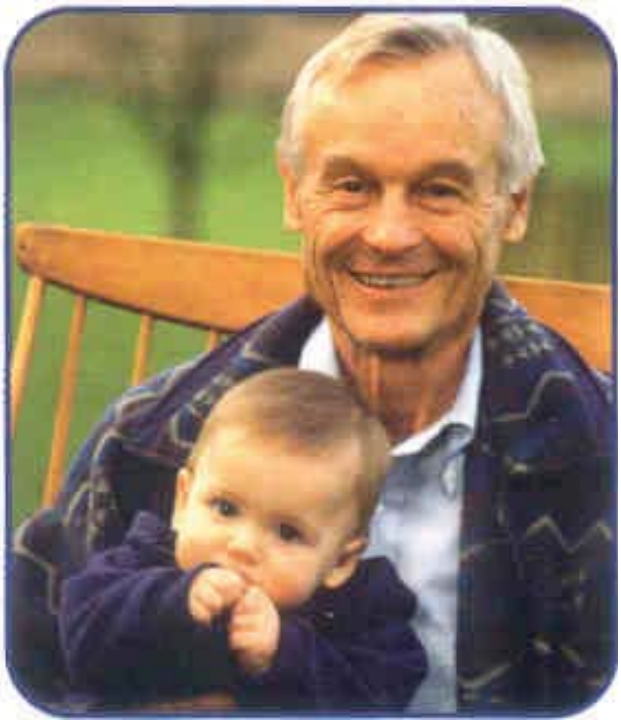
Thus a child trained on correct health practices from the stage of an infant to adolescence can face the society with confidence as an adult. The knowledge on good health practices should be continuously updated with well planned awareness programmes. If such programmes are conducted at national level, the general public will be able to share the benefits of a healthy nation.

There is a popular saying that "Healthy permanent teeth are for lifetime".

Adults must be aware of the dangers of periodontal diseases and mouth cancers, which become chronic with ageing. Since Sri Lanka's life expectancy has now reached very high levels,

and are on par with the highly developed countries, the importance of retaining a healthy mouth and a sound set of teeth is evident for a happy old-age existence. The simple steps to be adhered, to ensure healthy teeth, can be summarized as follows:

Brush the teeth in a proper manner twice a day using a good toothbrush and toothpaste. Control consumption of sugar-based foods (sweets). Check the mouth once a month, and consult a dental surgeon if you see any doubtful symptoms. Keep away from smoking, chewing betel and eating of hot meals, and finally ensure meeting a dental surgeon at least once in six (06) months.



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B.D.S.,MSc,M.D.(Community Dentistry)
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The body in decline

Brain	Gradually shrinks as brain cells become smaller. More than 30,000 neurons die each day. Their passing goes unnoticed because each person has perhaps billions of neurons, but accumulated loss might ultimately lead to memory problems and other dysfunctions.
Face	Buildup of fat cells creates bags under the eyes and a double chin: lips lose fullness.
Skin	Loses moisture and elasticity and becomes thinner, so wrinkles develop.
Bones	Become thinner and more porous – making them prone to fractures – as mineral content declines.
Muscles	Declining blood supply, dead nerve cells and warning testosterone result in decreased muscle mass and strength
Breasts	Tissue degenerates after menopause, causing breasts to sag and wrinkle
Arteries	building of calcium and fatty tissue raises blood pressure and decreases oxygen and nutrients reaching the body's cells
Heart	Grows less efficient as its valves become thicker and less elastic
Lungs	Extra secretions and declining elasticity can cause breathlessness and heightened risk of bronchitis and pneumonia
Stomach	Less digestive juices are produced and elasticity diminishes, making it harder to absorb nutrients
Hearing	Sounds might become duller or distorted; rapid speech and foreign accents become difficult to follow
Sight	Corneas thicken and lenses distort, causing nearsightedness; colours fade and peripheral vision shrinks
Touch	Sensitivity diminishes as skin thins and cells and nerve endings die

Source: *TIME Magazine July 21, 2003*

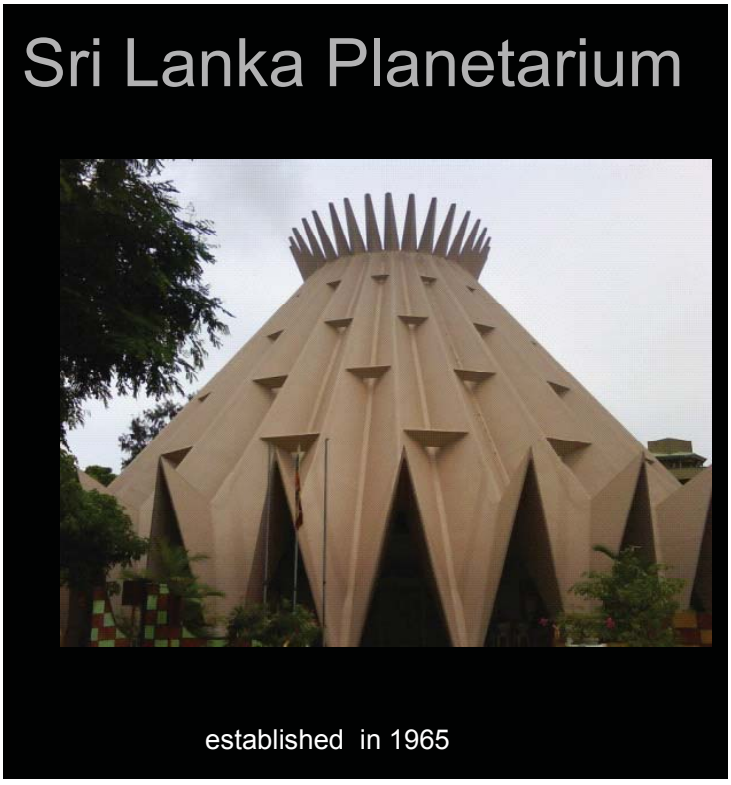
A place where you can see the night sky during day time : PLANETARIUM

Priyanka Kumudini Koralegama

A planetarium is a place built primarily for presenting educational and entertaining shows about astronomy and the night sky, or training for celestial navigation. Historically, Archimedes was the first person to construct a planetarium, which though primitive could predict movements of the sun, the moon, and the planets. The oldest but still functioning planetarium in the world could be seen in the Dutch town, Franeker. It was built by Eise Eisinga (1744-1828) in the living room of his house. It took seven (07) years to put up this planetarium, and was completed in the year 1781.

The Planetarium of Sri Lanka has been functioning under the Ministry of Science and Technology since 1998. It was built in 1965 and was initially placed under the Ministry of Education.

Sri Lanka Planetarium is located in the old Race Course, Colombo 07. Anyone can reach the planetarium by traveling along the Stanley Wijesundara Mawatha, Colombo 07.

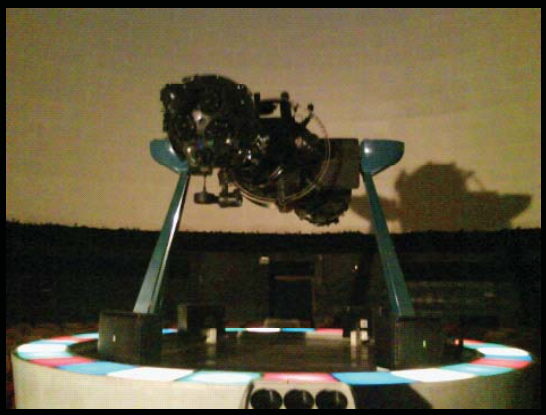


The Planetarium has been specially designed and constructed in the shape of a flower. The State Engineering Corporation was responsible for the construction of this massive building structure for the planetarium under the direction of late Dr A.N.S. Kulasinghe, who was then the Chairman of the State Engineering Corporation, and who was also responsible for its unique design. This building consists of interior bent pillars that rise to a height of nearly 100 feet from ground level.

The Sri Lankan Planetarium has seating capacity for 570 visitors. This shows that our planetarium is much larger than the planetariums in some other countries (which have seating capacities of 100-250). The giant universal projector is located in the centre of the planetarium. It projects images on to the hemispherical screen to demonstrate the natural events in the universe. This giant universal projector can project stars and planets that are visible to the naked eye. To demonstrate and explain events related to solar eclipses, lunar eclipses, thunder, lightning and comets etc, several additional projectors are used.

It is significant to note that natural astronomical events, which occurred several days, weeks, months, years or even about 25,000 years ago as well as those likely to happen in 25,000 years time can be shown in the planetarium. One can see the sky of Sri Lanka as seen from any place on the earth, may be even from the North Pole or from the South Pole. Models of the solar system and photos of the celestial objects such as planets, comets, and satellites can be observed as they are in their natural state.

Star Projector



Carl Zeiss Jena projcter
from West Germany in 1965

Lectures are arranged in relation to particular locations or events of the solar system, galaxies, seasonal changes, asters, nebulas, sun and zodiac, ecliptic etc. These themes are included in the curricula of school children, and therefore these lectures are beneficial for them.

School children can collect information in the fields of astronomy and space science from the internet unit of the planetarium. This information is useful for their school projects. Planetarium has organized computer training programmes for school children free of charge, which are selected on the basis of requests made at the end of year. Further, facilities are also available to clarify any confusing facts regarding astronomy.

Mobile planetarium facilities can be arranged, and students who are in remote areas can obtain this service from the planetarium. Night sky observation camps can also be arranged by the planetarium, and those who are interested in organizing this type of events should make a request in advance.

Natural phenomena such as solar eclipses, lunar eclipses, planetary transits, meteoric showers, comets, etc. are announced through mass media, in order that the general public would be made aware about such events. When there is such an event, usually the planetarium organizes special observation camps, which are open to the general public.

Mobile Planetarium

The planetarium is closed on Sundays, Mondays and on public holidays. There are two shows per day. The morning and afternoon shows are arranged at 10.00 am and 2.00 pm respectively. These shows should be booked in advance. The planetarium is open for the general public on Saturdays. School children can also attend the shows arranged on Saturdays.

Enjoy the Planetarium Shows!

	Morning	Afternoon	Charges Adults	Children
From Tuesday to Friday	10.00 am	2.00 pm	10/-	5/-
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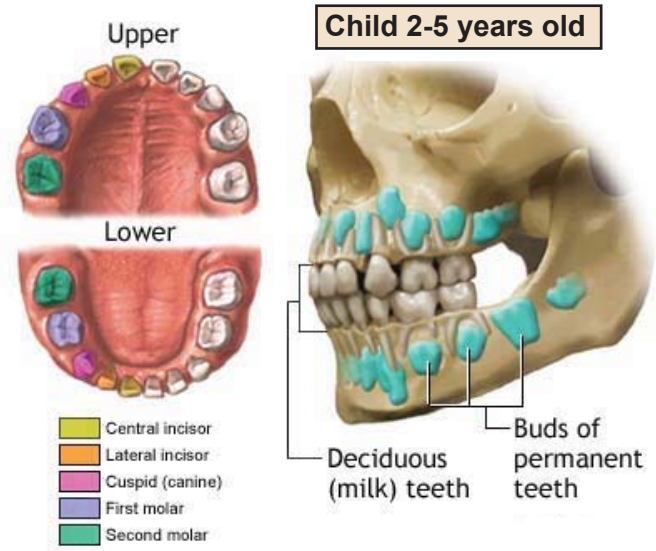
For more information call, 011 2586499 (Telephone/Fax)
Stanley Wijesundera Mawatha, Colombo 07.

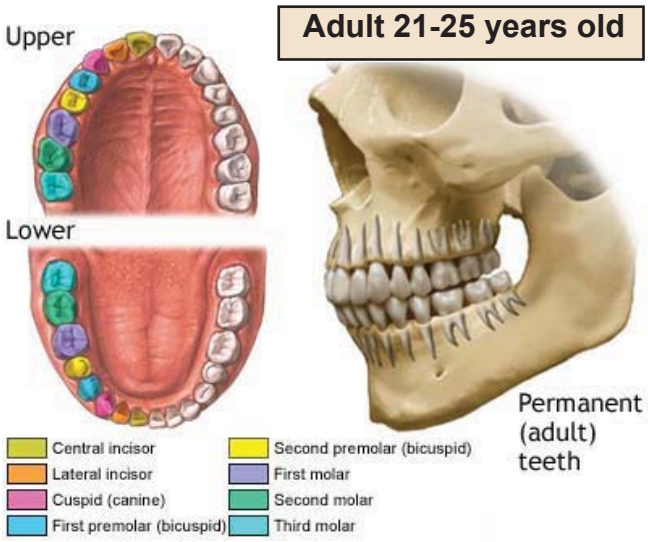
Priyanka Kumudini
Koralegama
Lecture-in-charge
Sri Lanka Planetarium

Science on Teeth

Teeth are small whitish structures made of tissues of varying density and hardness. They are not bones. Teeth are found in many vertebrates. They use teeth for chewing, tearing and scraping food and for milking.



Humans (*Homo sapiens sapiens*) are mammals. Teeth are among the most distinctive and long-lasting features of mammal species. The shapes of the teeth are related to its diet. Herbivores have many molars for chewing plant matters which are hard to digest. On the other hand canines are prominent in carnivores to kill and tear meat.



Some animals develop only one set of teeth for the life time (monophyodont). We (mammals) have two sets of teeth (diphyodont). There are animals that have many sets of teeth during their lifetime (polyphyodont).

Sharks grow a new set of teeth every two weeks to replace worn teeth. Rodents are nibblers, therefore their incisors wear away continually through nibbling. Their incisors grow and maintain relative constant length.

We have 20 milk teeth (primary, deciduous, or baby teeth) and 32 permanent teeth. Milk (primary) teeth begin to form between the sixth and eighth weeks *in utero*, and permanent teeth start to form in the twentieth week *in utero*. The first set of teeth (milk teeth) appears at about six months of age but in some babies one or more visible teeth can be seen at their birth. They are known as neonatal teeth. Eruption of the primary teeth is known as "teething" and this can be painful to the body.

All primary teeth are replaced by permanent teeth except for molars. There are 08 molars in the milk teeth and they are replaced by 08 permanent premolars.

A survey reveals that 90% of the school population is subjected to oral diseases. Therefore, oral hygiene is very important in many ways. Oral hygiene refers to the practice of keeping the mouth clean and it is a means of preventing dental caries ("tooth decay"/dental cavities), periodontal diseases, bad breath, and other dental disorders.

Milk teeth and permanent teeth: Number and location

Teeth	Milk Teeth		Permanent teeth	
	(Upper) Maxila	(Lower) Mandible	(Upper) Maxila	(Lower) Mandible
Incisors	4	4	4	4
Caniners	2	3	2	2
Premolar	-	-	4	4
Molar	4	4	6	6
TOTAL	10	10	16	16
	20		32	

Source: ***Internet***

Janaka Karunasena

What have you learnt? Scan your own memory!

1. True or False

(a) A lot of what is called memory loss is really just a slowing down of the ability to retrieve knowledge.
(b) Throughout Asia, a large proportion of older people do not live with their children.
(c) The most common cause of psychological problems among older people is the disabilities caused by strokes.
(d) Fear of loss of independence due to decline in mental function is the root cause of all myths and misconceptions about aging.
(e) If you have a negative attitude, it can more than compensate for a number of other things that may be lacking.

2. True or False

(a) A planetarium is a place built primarily for presenting educational and entertaining shows about astronomy and the night sky.
(b) The Planetarium now functions under the Ministry of Education.
(c) School children can collect information about astronomy and space science from the internet unit of the Planetarium.
(d) Our Planetarium with a capacity for 570 visitors is smaller than the ones of many other countries.
(e) Themes such as the solar system, galaxies, seasonal changes, nebulae, sun, zodiac etc, are included in the school curricula.

3. True or False

(a) Decreasing fertility and mortality has led to increasing the population of elderly persons.
(b) The elderly population is expected to decrease significantly with the increase of the under 15 years of age population by 2021.
(c) Widowhood is more prevalent among men than among women.
(d) The reduction of living space due to urbanization is a critical factor to accommodate the requirements of elders.
(e) The main objectives of the National Council for Elders are to promote and protect the rights of elders, and assist elders to live with self-respect and dignity.

4. True or False

(a) Ants are the most conspicuous group of terrestrial insects in any landscape.
(b) Most of the ant species have more than one queen per colony.
(c) Ants have proven to be the richest source of alarm pheromones among social insects.
(d) The Red Imported Fire Ant and the Black Crazy Ant are considered tramp species..
(e) There are no endemic genera of ants in Sri Lanka

5. True or False

(a) Dental caries, periodontal diseases, oral cancers, dental fluorosis and dental distortions are common problems in dental hygiene
(b) The proportion of Sri Lankan population that utilizes the free dental services of the government clinics is very high.
(c) Many oral diseases are linked to lifestyles and unfavourable behavioural patterns.
(d) Sri Lanka is not constrained by a shortage of trained dental doctors to meet the demand for dental services.
(e) The adverse consequences of neglecting oral health during childhood are realized during adolescence, when they begin to be conscious of their personality and appearance.

Answers

1. (a) True (b) False (c) True (d) True (e) False
2. (a) True (b) False (c) True (d) False (e) True
3. (a) True (b) False (c) False (d) True (e) True
4. (a) True (b) False (c) True (d) True (e) False
5. (a) True (b) False (c) True (d) False (e) True

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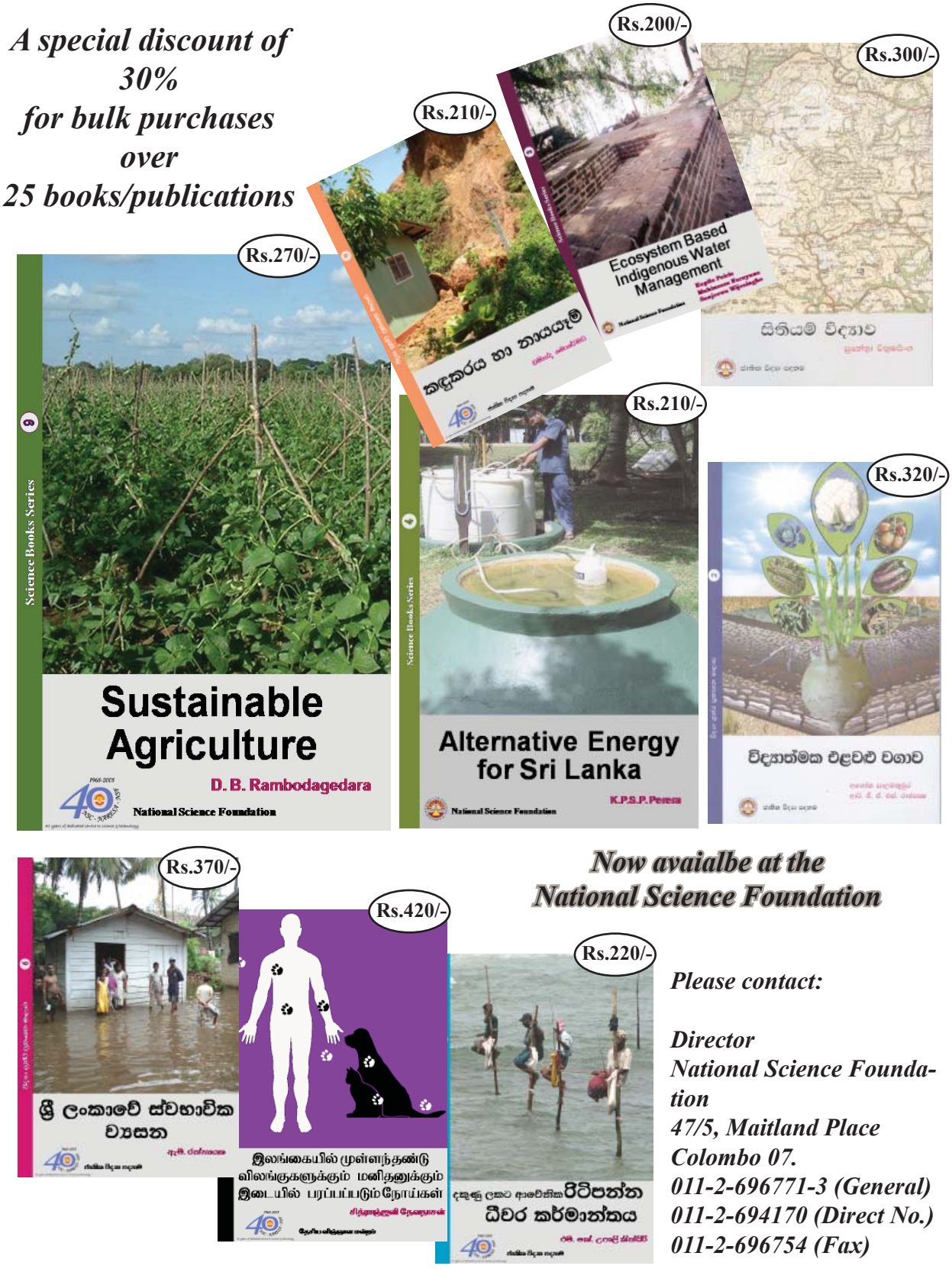

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VIDURAVA

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2. Guide to preparation of manuscripts

Manuscript

Manuscripts of articles should be typewritten in double space on one side white A4 sheets. Adequate margins (4 cm) should be left with sufficient spacing at the top and bottom of each page. The typescript should be free of corrections and should be complete and in final form. It is preferable if the article could be sent together with the diskette on MS Word 98.

It is better if the illustrations/photographs/ graphics too are included with the manuscript.

Length and style

Articles should be written to a given theme/topic related to science and science activities. They should be well focused, preferably organized, structured, and avoid the 'text book' style. Articles should be written clearly and concisely in simple language avoiding complex words as much as possible. The theme article (cover story) should not exceed 3000 words. Other articles should not exceed 2000 words.

Manuscript layout

- Title of the articles should be brief, and the author's name and affiliation should also be mentioned preferably along with a recent passport size photograph.
- Tables and figures should be on separate sheets and should be fully labeled and captioned.
- Graphs and other line drawings should be clearly drawn.
- Photographs must have good contrast and should be in black and white.
- Use names of chemical compounds and not their formulae be given in the text. Scientific (Botanical and Zoological) names should be correctly spelled and typed in italics or underlined. In case of Sinhala or Tamil articles, scientific/technical terms should be given in English within brackets. Mathematical applications, such as statistical analysis should be avoided as far as possible.
- Reference and footnotes should be numbered consecutively and given at the bottom of each page. Provide complete name of the text book.

i.e. Barras, R. (2003). (First Indian reprint). *Scientists Must Write*. Gopsons Papers Ltd., India.

Submission of Manuscripts

The original and two copies of the manuscript should be sent to the following address.

Vidurava
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National Science Foundation (NSF)
47/5, Maitland Place
Colombo 07.

T/P: 011-2696771-3 Fax: 011-2694754
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Note: Articles found unsuitable in terms of the overall requirements of the bulletin will be returned to the authors. Returned articles cannot be resubmitted. The decision of the Editorial Board is final.