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IP Indian Journal of Anatomy and Surgery of Head, Neck and Brain

Journal homepage: www.ipinnovative.com

Review Article

Demographics and age changes in geriatric population- part 1

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ARTICLE INFO

Article history:
Received 21-09-2020
Accepted 01-10-2020
Available online 13-10-2020

Keywords:
Geriatrics
Ageing
Quality of life

ABSTRACT

With the improved health care facilities and nutritional levels, the average life expectancy of Indian population has been on a steady rise over the years. Geriatrics, or geriatric medicine, is a specialty that focuses on health care of elderly people. It aims to promote the health by preventing and treating diseases and disabilities in older adults. There is no set age at which patients may be under the care of a geriatrician, or geriatric physician, a physician who specializes in the care of elderly people. Rather, this decision is determined by the individual patient's needs, and the availability of a specialist. It is important to note the difference between geriatrics, the care of aged people, and gerontology, which is the study of the ageing process itself. The term geriatrics comes from the Greek γέρων geron meaning "old man", and ιατρός iatros meaning "healer". However, geriatrics is sometimes called medical gerontology. It is also defined as the branch of medical science dealing with old age & its disease. The increased life expectancy demands an improved quality of life for the elderly thereby making geriatric medicine and dentistry an important aspect of the healthcare system.
This paper covers the overall demographics of the elderly population along with the various physical, dental and psychological changes that occur in them.

1. Introduction

The average life expectancy of an Indian has increased from 39.93 years in 1960 to 69.27 years in 2020.[1] Indian population is declared to have crossed 138 crores out of which 32% of people are 65 years of age or older [W.H.O-India 2020]. (Figure 1). Better health care facilities and improvement in standard of living have been the key factors responsible for the increase in life expectancy. The increased life expectancy demands an improved quality of life for the elderly thereby making geriatric medicine and dentistry an important aspect of the healthcare system. The prognosis of Prosthodontic treatment for older patients gets complicated due to concomitant or coexisting medical and dental factors and makes it more challenging. Forty-five percent of the older Indians have chronic diseases and disabilities.[2] Studies have revealed that the most common health-related problem among elderly Indians are hypertension, arthritis, diabetes, and constipation.[3,4] Several of these diseases and the medications used for them can cause reduction in the salivary flow[5] (Table 1). It may also be due to radiotherapy to the head and neck damaging the salivary glands.[6] Reduced salivary flow or xerostomia is associated with oral dryness, taste loss, dysphagia, increased dental caries, and periodontal disease, ultimately deteriorating the quality of life.

There may be number of issues like TMJ disorders along with existing arthrosis.[7] There may be reduced alveolar support for the prostheses due to physiologic or pathologic resorption. Therefore an accurate diagnosis based on a meticulous medical, dental, family and personal history is important to formulate an optimum and customised treatment plan. The treatment planning should give emphasis on oral hygiene, mouth preparation and tissue management etc during the prosthetic rehabilitation of geriatric patients.[8] Geriatric oral health care has not

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https://doi.org/10.18231/j.ijashnb.2020.022

received the same amount of importance as in the western countries.[9]

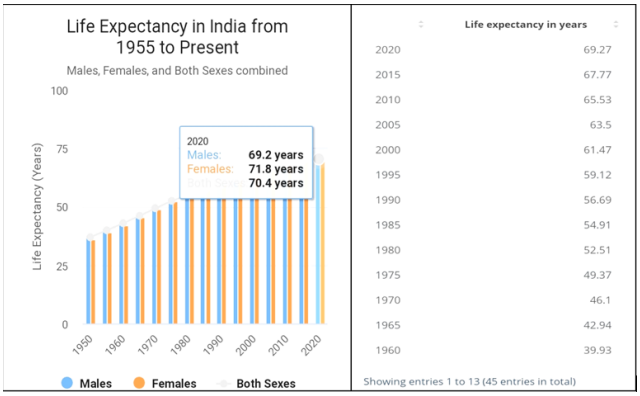

Fig. 1: Life expectancy in India from 1955 to 2020

Table 1: List of xerostomia inducing medications

S. No	Category	Mame of drug
1.	Antihistaminics	Diphenhydramine, chlorpheniramine
2.	Decongestants	Pseudoephedrine
3.	Antidepressants	Amitryptiline
4.	Antipsychotics	Haloperidol, Phenothiazine derivatives
5.	Antihypertnsives	Reserpine, Methyldopa, Chlorthiazide, Furosemide, Metoprolol, Calcium channel blockers
6.	Anticholinergics	Atropine, Scopolamine

2. Discussion

According to the Conduent Healthy Communities Institute, the age groups are defined by the following ages/grades

1. Children: <18, <11 or K - 7th grade.
2. Infants: <1.
3. Teens: 12-17 or 7th-12th grade.
4. Adults: 18+
5. Elderly: 65+

2.1. Geriatrics

The branch of medical science that treats all problems, peculiar to the aging patient, including the clinical problem of senescence and severity Aging is a normal, genetically dictated physiological process. It is a state of interplay between the physiologically contractile and pathologically destructive metabolic process. It is a process of morphological and functional involution that affects most organs of the body. It leads to gradual impairment in performance of various systems, hence of the individual as a whole.

2.2. Definitions

2.2.1. Geriatrics

The branch of medical science that treats all problems, peculiar to the aging patient, including the clinical problem of senescence and severity (GPT—9).

Dental Geriatrics: (GPT—9) The branch of dental care involving problems peculiar to advanced age and aging or dentistry for aged patient.

Geriatric Dentistry"(D.C.N.A. 1989, Jan): The provision of dental care for adult persons with one or more chronic debilitating, physical or mental illness with associated mediation and psychosocial problems.

Ageing (According to Glickman): Aging is process of physiological and morphological disintegration as distinguished from infancy and adolescence, which are processes of integration and co-ordination.

2.3. Ageing imperative - changing demographics

It is estimated that nearly 14% of Indian population will be above the age of 60 yrs by 2025 which means nearly 177 million elderly people in the country. The continuous increase in the number and proportion of elderly persons in the society will have a socioeconomic impact. The reasons for this tremendous increase is attributed to protection of water supplies from acute parasitic diseases, immunization against infectious diseases such as small pox and diseases of childhood, control of acute infections with the development of antibiotics and newer drugs, improved hygiene, better dietary habits, reduction in birth rate through the philosophical acceptance of birth control and development of the pill" and a real increase in life expectancy.

2.4. Population ageing in India

The UN defines a country as "Ageing" or "Greying Nation" where the proportion of people over 60 reaches 7 percent to total population. By 2011 India has exceeded that proportion (8.0 percent) and is expected to reach 12.6 percent in 2025 (Table 2). People over 80 years of age are estimated to increase by 108% during the years 1980-2020 (UN, 1991).[10]

2.5. Dental and prosthetic status of older adults-epidemiology

In 1900 only 3.1 million or one of every 25 individuals, were 65 years of age or older. In 1984, 27.9 million, or one of nine, fell in to this category. If present population trends continue, those over 65 should account for 64.5% million for 21.2 percent, of the population by the year 2030. Epidemiologic studies have shown that older people today tend to have few remaining functional teeth and that their general dental health is usually poor.[11] The elderly have

Table 2: Demography of elderly population

All India and selected major state	Proportion of elderly in total population of state		
	Male	Female	Total
Andhra Pradesh	8.3	9.4	8.8
Bihar	7.2	6.7	7.0
Gujarat	7.6	9.0	8.3
Haryana	6.6	7.6	7.1
Himachal Pradesh	10.4	10.3	10.4
Karnataka	7.9	8.9	8.4
Kerala	11.8	13.3	12.6
Madhya Pradesh	6.8	7.4	7.1
Maharashtra	8.8	9.7	9.3
Orissa	9.1	9.5	9.3
Punjab	9.1	10.0	9.5
Rajasthan	6.6	7.9	7.2
Tamil Nadu	10.2	10.9	10.5
Uttar Pradesh	6.6	7.1	6.8
West Bengal	8.2	8.2	8.2
All India	7.7	8.4	8.0

Source SRS Bulletin (Sample Registration system) October 2012, Registrar General of India, New Delhi

usually been defined as the cohort of people aged 65 years and older, but this chronologic age criterion is less useful in dentistry because of the large variations in physical, mental, and medical condition within group.

2.6. Classification of Geriatrics

2.6.1. According to the psychological reactions to ageing process

1. Realistic group
2. Resentment group
3. Resigned group

2.6.2. According to functional criteria (Ettinger and Beck 1984

1. Functionally independent elderly
2. Frail elderly
3. Functionally dependent elderly

2.6.3. According to Winkler

1. The hardy elderly
2. The senile aged syndromes
3. In between groups

2.7. Realistic group

They are philosophical and exacting types. They are Vigorous, alert active and usually economically secure, and their advice is respected at home and in the community. They accept changes as normal and their alertness to the changes and their realism in accepting them allow them to enjoy their old age. They follow instructions, take pride in their appearance practice good oral hygiene, seek dental care and accept a proper diet.

2.8. Resentment group

They are the indifferent and hysterical types. They are chronically ill emotionally and physically. They do not accept or adapt to tissue and organ changes, even though the changes are mild. They will not listen to advice, rarely follow instructions, become negligent in body care as well as in oral hygiene, and rarely seek dental care. They rarely seek dental treatment on their own initiative, concerned members of the family frequently seek treatment for them.

2.9. Functionally independent elderly

Makes up 70% of the population aged 65 or over. They are community unassisted. In these patients the same preventive measures, treatment principles and procedures can be applied as in younger cohorts.

2.10. Frail elderly

Make up 20% of the population aged 65 or over. They have lost some of their independence, but still live in community with the help of support services.

2.11. Functionally dependent elderly

Make up 10%, 5% are home bound and 5% are in long-term care facilities. They are unable to live independently in community. The limiting factors for dental health care include poor socioeconomic factor, lack of support services and poor general health status.

2.12. Aspects of aging

It can be classified as:

1. Physiologic
2. Psychologic
3. Pathologic

2.12.1. Physiologic changes

The physiologic changes of aging do not necessarily mean that a pathologic condition is not present. However, the condition is considered benign in comparison to the pathologic processes of the chronically ill group. The more prevalent physiologic changes are loss or greying of the hair and diminution of the senses of sight, hearing and taste.

2.12.1.1. The senses. The average person at age 60 needs twice the illumination for reading as one 25years of age. Person 80-85 years of age need over three times as much illumination as a person 25 to 30. The dread of glaucoma and for surgery for cataracts often makes geriatric patients secretive about sight loss, and the family may not be aware of the change.

About 55 out of every 1000 persons, 65 to 74 years of age are functionally deaf. This condition is said to be irreversible. Young adults have approximating 245 taste buds on each papilla of the tongue but by the age of 75 to 80 years the number has declined by 64% there by diminished taste perception.

2.12.1.2. Skin. Skin becomes thin wrinkled dry and freckled. The wrinkled skin of the face, particularly around the mouth may be cause for great mental anguish for some aging persons. It is better to discuss about this normal phenomenon of aging during the diagnostic interview. Accumulation of melanin and hair occurs, as skin becomes thinner, which is a normal phenomenon occurring particularly on the dorsa of the hands.

2.12.1.3. Neuromuscular changes. Advanced age brings a loss of muscle strength. There is a generalised slowing down of normal activity. A slowly progressive denervation of muscles is a feature of ageing process, consistent with long contraction times and more slowly contracting muscles. The density and muscle mass decreases with replacement of muscle fibres by fibrous tissues.

2.12.1.4. Sexual drive. The change depends on individuals and gender. Women may become rigid. The drive of males decreases but they do not want to admit this.

2.12.1.5. Memory. A decrease in remembrance of recent events, new names and new places occurs, but recall of past events and places seems to be less impaired. During conversation, they may distress or bore their listeners by repeating the same incidents many times.

2.12.1.6. Circulation alimentation and elimination. The flow of blood and lymph and acidity of gastric juices decreases with age. The digestion slow down and elimination of waste products may become irregular. These slowing process tend to make the elderly practice self-medication thereby causing dietary problems.

Eg: Harsh laxatives causes forceful expulsion of food through digestive tract thereby reducing the absorption of nutrients.

2.12.1.7. Generalized osteoporosis. The most common systemic bone condition occurring in both genders is osteoporosis. It appears more frequently in women than in men. Back pain, loss of body height and face height, stooping and some types of deformity are some of the symptoms. In advanced cases, spontaneous fractures occur. The atrophy is particularly noticeable in the residual alveolar ridge when the ridge is subjected to the continuous pressure of dentures.

2.12.1.8. Masticatory apparatus changes.

1. **Enamel:** Apart from occlusal, incisal and interproximal wear, there is also wear and loss of the structural details on the enamel surface, over time giving the surface a flat appearance and a different pattern of light reflection. Cracks and tissues in the enamel take up corrosive a product, which causes discoloration.
2. **Cementum:** The common feature is the increase in thickness of cementum. The gingival recession increases the cervical cementum exposure, making the patients esthetically insecure.
3. **Dentin:** Two age related changes occur
   a) Formation of secondary dentin, which results in gradual narrowing circumference of the pulp.
   b) The gradual obturation of dentinal tubules (dentinal sclerosis) by peritubular dentin, changes the refractive index of dentin making it more translucent. The obturation of the tubules also leads to reduction of sensitivity and permeability of tooth tissue.
4. **Pulp:** With increasing age, the pulp volume decreases as a result of continuous apposition of the dentin by odontoblasts. This is associated with apparent fibrosis of the pulp tissue and a reduction in vasculature. The denervation causes impairment in pain, which often gives the risk of irreversible thermal damage of pulp during tooth preparation.
5. **Tooth wear:** Tooth wear increase as the age increase and is primarily due to the fact that the teeth have functioned within the oral environment for a long period of time. The main causes are attrition, abrasion and erosion. Attrition of the anterior teeth tends to be advanced in patients with less molar and premolar support. Tooth wear particularly associated with bruxism, complicates and limits the possibility for restoration of teeth with crown, fixed partial dentures and removable partial dentures. Generally, restorative and prosthetic treatment of worn dentitions is difficult.

It is often difficult to create sufficient vertical space for the prosthesis.

6. **Periodontal tissue:** In Prosthodontics, the main function of periodontium is to absorb mechanical forces applied to the abutment by a fixed or removable partial denture. There is no evidence that age related changes of the periodontal tissues have any influence on the prognosis of the treatment with fixed or removable partial dentures, the major factor, for an acceptable prognosis being the patients ability to maintain plaque control.
7. **Loss of teeth:** The loss of teeth has been and still as a problem for the ageing. As many as 50% of the people over 65years of age are edentulous, the loss of teeth and loss of some taste senses lead to malnutrition.
8. **Oral mucosa:** The oral mucosa of the edentulous geriatric patient is characterized by a reduction of the total number of component cells with a resultant decrease in thickness of both the mucosa and submucosa. The oral mucosal lining becomes more susceptible to stress, pressure and disease. Although denture adaptation may be good the tissue resistance is poor, and inflammation and even ulcerations can occur.
9. **Tongue:** As age increases, the tongue size increases as a result of transference of some masticatory and phonetic function to the tongue, which has a negative effect on denture retention. Depapillation on apex and lateral borders along with fissuring of tongue may be seen; further more there is a decrease in taste buds resulting in decreased taste sensation [12].
10. **Residual ridge:** Residual ridge in elderly undergoes resorption after tooth extraction. The resorption is a sequel of alveolar remodeling due to altered functional stimulus of bone tissue. The crest of the residual ridge is usually found to be concave or flat and can terminate in a "knife edge". Extensive resorption may place the mental foramen on or near the crest. Some times mandibular canal may have resorbed completely, leaving a thin layer of oral epithelium as the only protection. The ratio between the resorption of the mandible versus that of the maxilla is approximately 4:1.
11. **Saliva:** Saliva is important in wearers of removable dentures to protect the oral mucosa from the mechanical irritation and infections and to achieve retention of complete dentures. As a result of regressive changes in the salivary glands, particularly atrophy of the cell lining of the intermediate ducts, there is a decease in salivary flow in the aged, moreover there is a change over serous saliva into more mucous which could be viscous and ropy. This could give a negative effect in denture retention and a positive effect on accumulation of plaque and cariogenic bacteria. This also leads in to mucosal discomfort, dysphagia and candidiasis. Atrophy of cells lining can also lead to xerostomia, which can again lead in to abnormal taste sensations and stomatodgnia.

2.12.2. Psychologic changes

The psychological changes influencing the aging can be divided into:

2.12.2.1. Reaction to physiologic changes. The first and foremost complaint of the patient's reaction to physiologic changes is nothing but their appearance. This seems to affect women more than men. Women frequently voice their concern over the loss of hair and face height, wrinkling of the skin, changes in the tooth appearance and the loss of natural teeth. Women particularly who have been admired for their beauty, may be quite demanding about the cosmetic arrangement of their artificial teeth. A man may not vocally register his concern however his reaction may be more dramatic, but concealed. The reaction to other physiologic changes such as senses, hearing, taste, neuromuscular function etc. can also cause personality changes, which can be unpredictable.

2.12.2.2. Reactions to social changes:. As people age, changes over which they have no control take place in their social lives. In many instances, these changes occur in a relative short period. When people change residence, it is not always easy to make new friends. Isolation can lead to resentfulness and unreasonable demands on the time of others. Retirement from jobs can lead to anxiety over loss of income and fear that they will have to depend upon someone else for support. The feeling of worthlessness of loss of identity and of being rejected or forsaken can lead to a lack of desire to live.

2.12.3. Pathologic changes

The pathologic disorders or changes most frequently encountered are metabolic, skeletal, muscular, circulatory, neoplastic and Psychologic.

2.12.3.1. Facial expression. An absence of facial expression may be due to or indicate a loss of muscle tonus, Tic douloureaux, Plastic surgeries, - Disorders of CNS (Paralysis agitans), - Endocrine gland disease (Hypothyroidism)

2.12.3.2. Complexion. Pallor may be indicative of Anemia, Hypoparathyroidism, - Nephrosis, - Lack of nourishment, Tuberculosis. Ruddy complexion may be due to polycythemia ,chronic alcoholism Bronzed skin due to Addisons disease, Radiation of head and neck . Diffuse bluish purple color due to Vitamin B2 deficiency.

2.12.3.3. Posture and walking pattern. Stooped shoulders may indicate disease of spine. Protruded mandible may indicate TMDs .Tremor of head due to Parkinson's disease.

Dragging of one leg while walking can be due to cerebrovascular diseases. (festinating). Involuntary hurried walking can be seen in parkinson's disease. Slapping the sole of foot Tabes dorsalis , Spinal cord injury. Dropping the toe while walking may be due to poliomyelitis. Staggering can be due to excessive alcohol intake or excessive medication (muscle relaxant).

2.12.3.4. The voice. Hyper nasality may be due to paralysis of musculature of soft palate or perforation of palate. Hoaresness due to paralysis of one or both vocal cords, laryngitis, polyps or ulcerations, Excessive smoking , menopausal syndrome

2.12.3.5. Breathing pattern. Wheezing may be due to bronchial asthma,emphysema, bronchial infection or heart failure. Shortness of breath (dyspnea) due to lung disease, Heart failure. Shallow breathing at rapid rate can be due to pulmonary fibrosis. Erratic breathing, continuous hyperventilation periodic breathing can be due to serious pulmonary, renal or cardiac problems.

2.12.3.6. Local factors.

1. Halitosis due to poor oral hygiene , unhealed surgical site, heavy smoking, highly flavored foods, Gastro intestinal problems, Diabetes (Acetone breath) or Uremia (Ammoniac odor).
2. Crinkly, sparse coarse hair and slow speech and perception may indicate a low basal metabolic rate.
3. Enlargement of finger joints may be visible evidence of osteoarthritis. Spindle fingers denote rheumatoid arthritis. Swollen hand and swollen feet may indicate heart failure or kidney disease.
4. Dry skin and dry lips may indicate xerostomia
5. Mouth breathing may be due to drying of nasal mucosa, nasal congestion, deviated septum, and nasal polyp

2.12.3.7. Intraoral changes.

1. Ill-fitting dentures lead in to inflammatory hyperplasia or papillary Hyperplasia [13]
2. Unilateral swelling in the hard palate, in the second bicuspid, and for molar area may be an indicative of neoplasm of maxillary antrum.
3. Purple discoloration and atrophy of the superficial papilla of tongue can be indicative of Riboflavin deficiency.
4. Generalized cyanosis of the oral mucosa of elderly suggests either heart or lung disease or Polycythemia.
5. Macroglossia occurs in disturbances of the endocrine glands as in hyperpituitarism or it can be due to relaxation of tongue musculature due to extraction of mandibular posterior teeth
6. Serous glands decrease in activity and saliva becomes more mucous and ropy. When the salivary glands atrophy, the reduction of salivary flow results in a dry mouth (xerostomia)
7. Candidiasis can be seen in Denture irritation, Xerostomia, Antibiotics chemotherapy, Radiation Therapy, Aids, Physical debilitation.

2.13. Ageing and nutrition

Nutrition is one of the factors under human control that could influence the health of aging. A good general diet is essential to the health of the elderly and to the supporting tissues of the teeth. A lack of essential nutrients can cause tissue friability and depress potential for repair. Many of the aged live under circumstances predisposing them to malnutrition such as low income, isolation, inadequate facilities for food preparation, marketing problems and the high prevalence of disease. As age proceeds it is time for more proteins and fewer carbohydrates but many revert in to childhood habits, frequently consuming excess carbohydrates. Decline in sensibility to taste can result in appetite loss, which can result in malnutrition. Unhealthy oral tissues will not provide a satisfactory foundation for successful denture service. [14,15]

3. Conclusion

The elderly population (60+) increased sharply during 1991-2020. In India, as a result of the change in the age composition of the population over time, there has been a progressive increase in both the number and proportion of aged people. The proportion of elderly female to elderly males has been found higher than in the general population for all the years since independence. The improvement in life expectancy and decline in age-specific death rate among the elderly are particularly due to the improvements in public health and medical advances in the prevention of many fatal infectious diseases and both are the major cause for the increase in elderly population. Since age is associated with increase in physical illness and disability, ageing becomes an essential part of the health care delivery system. Therefore in-depth studies through multidisciplinary assessment on issues like socio-economic problems, health, and psychological stress and social security needs of the elderly should be done nationwide.

4. Source of Funding

None.

5. Conflict of Interest

None.

References

1. Life expectancy in India 1800-2020 . Aaron O'Neill; 2020.

2. Macentee MI. Clinical epidemiology and the geriatric prosthodontic patient. *J Prosthet Dent*. 1994;72:487–91.
3. Berkey DB. Assessment of the older adult. Geriatric dentistry . Mosby-year book Inc; 1991.
4. Swami HM, Bhatia V. Primary health care geriatric in India. *Indian J Prev Soc Med*. 2003;34:148–52.
5. Kreher JM, Graser GN, Handelman SL. The relationship of drug use to denture function and saliva flow rate in a geriatric population. *J Prosthetic Dent*. 1987;57(5):631–8.
6. Dirix P, Nuyts S, Poorten VV, Delaere P, den Bogaert WV. Efficacy of the BioXtra dry mouth care system in the treatment of radiotherapy-induced xerostomia. *Supportive Care Cancer*. 2007;15(12):1429–36.
7. Hiltunen R, Kalahti MV. Occlusal imbalance and temperomandibular disorders in the elederly. *Actaodentol Scand*. 1997;55:137–41.
8. Lehl G, Lehl SS. Oral health care in the elderly. *J Ind Acad Geriatr*. 2005;1:25–30.
9. Elango S. A study of health and health related social problems in the geriatric population in a rural area of Tamil Nadu. *Indian J Public Health*. 1998;42:7–8.
10. Demography of elderly population . Census of India for the period; 1961.
11. Greksa LP, Parraga IM, Clark CA. The dietary adequacy of edentulous older adults. *J Prosthetic Dent*. 1995;73(2):142–52.
12. Koshino H, Hirai T, Ishijima T, Ikeda Y. Tongue motor skills and masticatory performance in adult dentates, elderly dentates, and complete denture wearers. *J Prosthetic Dent*. 1997;77(2):147–52.
13. Grotz KA, Genitsariotis S, Vehling D, Al-Nawas B. Long-term oral Candida colonization, mucositis and salivary function after head and neck radiotherapy. *Supportive Care Cancer*. 2003;11(11):717–21.
14. Ramsey WO. The role of nutrition in conditioning edentulous patients. *J Prosthet Dent*. 1970;23:130–5.
15. Brodeur JM, Laaurin D. Nutrition intake and gastrointestinal disorders related to masticatory performance in the edentulous elderly. *J Prosthet Dent*. 1993;70:468–73.

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Cite this article: Prakash P, Bhandari SK. **Demographics and age changes in geriatric population- part 1**. *IP Indian J Anat Surg Head, Neck Brain* 2020;6(3):75-81.