Accessing The Anthropometric And Haemodynamic Parameters Among Elderly Population Of Jammu

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Abstract: Objective: The objective of the present study was to access the physical parameters among elderly population aged 60 years and above.
Methods: The subjects were undertaken from old people homes and different geriatric organisations located in the city and its outskirts. One hundred eighty five subjects who fulfilled the eligibility criteria were selected for the study. The physical examination and clinical examination were performed in the Department of Physiology, Government Medical College, Jammu and at Old people homes. The statistical difference in mean values was tested using student's test to evaluate statistical significance. A p-value of < 0.05 was considered statistically significant.
Results: The results of the present study showed anthropometric and haemodynamic parameters like height, respiratory rate, pulse, diastolic blood pressure were almost similar in all groups. There was progressive decline in the mean value of weight and body surface area with increase in age which was statistically highly significant ($p < 0.001$). Statistically highly significant ($p < 0.001$) progressive increase was also seen in the mean value of systolic blood pressure with increase in age.
Conclusion: It was revealed that anthropometric and haemodynamic parameters like height, respiratory rate, pulse, diastolic blood pressure were almost similar in all groups. There was progressive decline in the mean value of weight and body surface area with increase in age.

Keywords: Anthropometric; haemodynamic parameters; geriatric population

I.   INTRODUCTION

World's population has continued on its remarkable transition path. It was predicted that one out of every ten persons is now 60 years or above; by 2050, one out of five persons will be 60 years or older.[1]
Aging is the progressive, universal decline first in functional reserve and then in function that occurs in organisms over time. It is heterogenous and varies widely in different individuals and in different organs within a particular individual. Aging is not a disease; however the risk of developing disease is increased.[2]
The elderly have been defined by the WHO as those above the age of 60 years and old age has been categorized into young old 60 to 69 years, the old old 70 to 79 years and the oldest old > 80 years.[3]
The aging process is associated with progressive constriction of homeostatic reserve resulting in homeostenosis of every organ. This increases the vulnerability of myriad afflictions. Pulmonary diseases like COPD are second only to cardiac diseases in morbidity and mortality in elderly.[4] Several studies have demonstrated that age related functional changes in the respiratory system result from three physiological events; progressive decrease in compliance of the chest wall, decrease in strength of respiratory muscles and decrease in elastic recoil of the lung.[5]
Diaphragm strength is reduced in elderly individuals.[6] Likely explanation for reduced diaphragmatic strength with age is related to muscle atrophy and age-related decrease in fast twitch fibers, responsible for generating higher peak tensions. [7]
In young people, the airways are extremely sensitive to mechanical stimulation. Inhaled debris will usually invoke a vigorous coughing reflex to dislodge and expel it. However, the sensory receptors that monitor the airways appear to become less sensitive with age, so coughing reflex may not be initiated in response to inhaled material in older people. This increases the chances of pathogens and irritants reaching the deep lung tissues and causing respiratory tract infections.[8]
Studies of physical parameters have been conducted mostly in the western population and for individuals in the younger age group. Therefore the major aim of this study is to evaluate physical parameters for elderly population of Jammu. The data can be used subsequently in evaluating the changes due to primary aging, secondary aging due to disease and tertiary aging due to life style.

II. METHODOLOGY

The present study was undertaken on elderly population of Jammu city aged 60 years and above. Both males and females were involved in the study.

Selection procedure of subjects

The subjects were undertaken from old people homes and different geriatric organisations located in the city and its outskirts. A list of all the inhabitants living in these old people homes was prepared. After seeking permission from the administration running these old people homes and organisations and detailing them the purpose of study, the eligible inhabitants were requested for participating in the study with a written consent.

Eligibility criteria

The study group comprised of all healthy, non-smoking subjects aged 60 years and above. Subjects with clinical abnormalities of hypertension, diabetes mellitus, pulmonary tuberculosis, bronchial asthma, bronchiectesis and emphysema were excluded from the study.

One hundred eighty five subjects who fulfilled the eligibility criteria were selected for the study. They were divided in four Groups. Group I included subjects from age 60 to 64, Group II included subjects from 65 to 69 years, Group III included subjects from 70 to 74 years age and Group IV included those who were 75 yrs and above.

The physical examination and clinical examination were performed in the Department of Physiology, Government Medical College, Jammu and at Old people homes.

The physical parameters noted for each subject were:-age, weight, height, body surface area (BSA), calculated from Dubois Nomogram in square meters (m^2) respiratory rate, pulse rate: The pulse rate was counted from radial artery by palpatory method.[9] Blood Pressure (B.P) was taken by Auscultatory method.[10] General physical examination and clinical examination of chest were performed as per the proforma.

All the eligible subjects were interviewed by the investigator himself and details of information like age, history of previous occupational hazards, smoking habits and any significant recent or past illness was recorded.

III. STATISTICAL ANALYSIS

The data was analyzed using computer software Microsoft Excel, SPSS version 15.0. Mean and standard deviation (SD) was calculated and reported for quantitative variables. The statistical difference in mean values was tested using student't test to evaluate statistical significance. A p-value of < 0.05 was considered statistically significant.

IV. RESULTS

It was observed that 115 were male participants and 70 were female participants. In Table I mean weight of elderly male and female subjects divided in half decade of age groups. The table shows that there was progressive decline in the mean values of weight between different age groups and the difference was statistically highly significant (p value <0.0001).

It was mentioned in Table II that mean height of elderly male and female subjects divided in half decade of age groups. The table shows that mean values of height between different age groups were almost similar and the difference was statistically non significant (p value >0.05).

Table III depicts that the mean age of elderly subjects was 70.31 years and of females 67.6 years. The mean height of male subjects was 163.6 cms and mean height of female subjects was 154.6 cms. The mean weight of male subjects was 58.5 kgs and of females 56.12 kgs.

Table IV depicts mean Body Surface Area of elderly subjects divided in half decade of age groups. The table shows that there was progressive decline in the mean values of Body Surface Area between different age groups and the difference was statistically highly significant (p value <0.0001).

Table V depicts mean respiratory rate of elderly subjects divided in half decade age groups. The table shows that mean values of respiratory rate between different age groups were almost similar and the difference was statistically non significant (p value >0.05).

Table VI depicts mean pulse rate of elderly male subjects divided in half decade age groups. The table shows that mean values of pulse rate between different age groups were almost similar and the difference was statistically non significant (p value >0.05).

Table VII depicts mean values of systolic blood pressure of elderly subjects divided in half decade of age groups. The table shows that there was increase in the mean values of systolic blood pressure with age and the difference was statistically highly significant (p value <0.0001).

Table VIII depicts mean values of diastolic blood pressure of elderly subjects divided in half decade of age groups. The table shows that there was increase in the mean values of diastolic blood pressure with age but the difference was statistically non significant (p value >0.05).

V.   DISCUSSION

The present study discussed the anthropometric measurements among study subjects. It was found that 34% subjects were of age 60-64 years, 24% were from 65-69 years old, 22% were 70-74 years old and 20% of the subjects were of 75 years age and above.

The mean weight in male subjects of Group I was 65.77 kg, of Group II was 59.42 kg, of Group III was 56.89 kg and of Group IV was 49.62kg. The mean weight in female subjects of Group I was 64.40 kg, of Group II was 53.90 kg, of Group III was 49.53 kg and of Group IV was 46.80 kg. There was progressive decline in mean values of weight from Group I to Group IV in both males and females and the difference was statistically highly significant (p value<0.0001).The decline in the mean values of weight may be due to decrease in muscle mass and poor nutrition.

The mean height in male subjects of Group I was 166.44cm, of Group II was 166.95cm, of Group III was 164.14 cm and of Group IV was 163.92cm. The mean height in female subjects of Group I was 156.51cm, of Group II was 155.45cm, of Group III was 151.15cm and of Group IV was 153.60cm. The mean values of height were almost similar in different age groups and the difference was statistically non significant (p value >0.05).

The mean body surface area in male subjects of Group I was 1.72 sqm, of Group II was 1.67 sqm, of Group III was 1.62sqm and of Group IV was 1.52 sqm . The mean body surface area in female subjects of Group I was 1.64sqm, of Group II was 1.51sqm, of Group III was 1.43sqm and of Group IV was 1.42sqm. There was progressive decline in mean values of body surface area values from Group I to Group IV in both males and females and the difference was statistically highly significant (p value<0.0001).The decline in body surface area may be due to decline in weight of the subjects.

The hemodynamic parameters were also recorded in all subjects. The mean pulse rate in male subjects of Group I was 75.61/minute, of Group II was 76.62/minute, of Group III was 77.75/minute and of Group IV was 77.18/minute. The mean pulse rate in female subjects of Group I was 75.85/minute, of Group II was 78.30/minute, of Group III was 77.07/minute and of Group IV was 80.07/minute. The mean values of pulse rate were almost similar in different age groups and the difference was statistically non significant (p value >0.05).

The mean respiratory rate in male subjects of Group I was 16.38/minute, of Group II was 16.83/minute, of Group III was 17.21/minute and of Group IV was 17.59/minute. The mean respiratory rate in female subjects of Group I was 16.77/minute, of Group II was 17.50/minute, of Group III was 17.53/minute and of Group IV was 18.01/minute. The mean values of respiratory rate were almost similar in different age groups and the difference was statistically non significant (p value >0.05).

Our findings are in agreement with those reported by Britto et al.(2009)[11] who reported that aging process of the respiratory system does not have a significant impact on breathing pattern.

The mean Diastolic Blood Pressure (DBP) in male subjects of Group I was 80.44 mmHg; of Group II was 82.08 mmHg, of Group III was 83.28 mmHg and of Group IV was 84.29 mmHg. The mean Diastolic Blood Pressure in female subjects of Group I was 81.43 mmHg, of Group II was 82.60 mmHg, of Group III was 83.84 mmHg and of Group IV was 85.00mmHg. There was progressive increase in the mean value of Diastolic Blood Pressure from Group I to Group IV but the difference was statistically non significant (p value >0.05).

The mean systolic blood pressure (SBP) in male subjects was 123.94 mmHg, 124.83 mmHg, 127.71 mmHg and 130.00 mmHg in Group I, Group II, Group III and Group IV respectively. The mean Systolic Blood Pressure in female subjects of Group I was 123.33 mmHg, of Group II was 126.10 mmHg, of Group III was 126.76 mmHg and of Group IV was 133.80 mmHg. There was progressive increase in the mean value of Systolic Blood Pressure from Group I to Group IV and the difference was statistically highly significant (p value <0.0005).

The increase in systolic blood pressure may be because aging per se is associated with the deterioration in arterial compliance through both structural and functional changes in large arteries. These changes result in a decrease of the lumen-to-wall ratio, the overall lumen cross-sectional area and an increase in arterial stiffness. In addition to the structural changes in vessel walls, aging is also associated with certain functional changes such as an increase in sympathetic system activity probably due to the age-related decreased sensitivity of beta-receptors. While the function of arterial wall alpha-receptors remains intact, in elderly subjects a shift towards arterial vasoconstriction is observed. The general physical examination of the study subjects like height, respiratory rate, pulse, diastolic blood pressure were normal in all elderly healthy males and females.

VI.   CONCLUSION

The present study was conducted on healthy elderly population to record their physical parameters and general physical examination. It was revealed that anthropometric and haemodynamic parameters like height, respiratory rate, pulse, diastolic blood pressure were almost similar in all groups. There was progressive decline in the mean value of weight and body surface area with increase in age. Statistically highly significant progressive increase was also seen in the mean value of systolic blood pressure with increase in age.

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Table I: Relationship of mean values of weight (Kg) among elderly subjects

Weight (KG)	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p value
Male	65.77±9.50	59.42±-10.08	56.89±8.97	49.62±7.06	<0.0001
Female	64.40±11.80	53.90±9.92	49.53±8.10	46.80±7.34	<0.0001

Table II: Relationship of mean values of height (cm) among elderly subjects

Height (cm)	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p value
Male	166.44±5.27	166.95±-5.33	164.14±4.44	163.92±6.02	>0.05
Female	156.51±6.89	155.45±5.66	151.15±4.14	153.60±5.50	>0.05

Table III: Anthropometric data

	Males	Females
No of Subjects	115	70
Age (yr)	70.31± 8.09	67.6±6.46
Range(yr)	60-100	60-86
Height (cm)	163.6±5.82	154.614±6.26
Range (cm)	148-174	140-168
Weight (Kg)	58.5±10.71	56.12±11.75
Range(Kg)	35-78	30-82

Table IV: Relationship of mean values of body surface area (m^2) among elderly subjects.

Body surface area	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p- value
Male	1.72±0.13	1.67±-0.13	1.62±0.13	1.52±0.11	<0.0001
Female	1.64±0.16	1.51±0.13	1.43±0.10	1.42±0.13	<0.0001

Table V: Relationship of mean values of respiratory rate (/min) among elderly subjects

Respiratory rate	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p value
Male	16.38±1.76	16.83±-1.92	17.21±1.64	17.59±2.04	>0.05
Female	16.77±1.76	17.50±1.76	17.53±0.96	18.10±1.57	>0.05

Table VI: Relationship of mean values of Pulse Rate (/min) among elderly subjects

Pulse Rate	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p value
Male	75.61±4.11	76.62±4.82	77.75±4.32	77.18±4.18	>0.05
Female	75.85±4.25	78.30±4.61	77.07±4.36	80.07±7.77	>0.05

Table VII: Relationship of mean values of systolic blood pressure (mmHg) among elderly subjects.

Systolic blood pressure	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p value
Male	123.94±6.71	123.83±4.37	127.71±6.27	130.00±6.22	<0.005
Female	123.33±5.65	126.10±5.36	126.76±7.98	133.80±5.02	<0.0005

Table VIII: Relationship of mean values of diastolic blood pressure (mmHg) among elderly subjects

Diastolic blood pressure	Group1 (60-64 yrs)	Group2 (65-69 yrs)	Group3 (70-74 yrs)	Group4 (≥75yrs)	p value
Male	80.44±3.64	82.08±-3.61	83.28±2.89	84.29±4.79	<0.05
Female	81.43±4.38	82.60±2.98	83.84±4.11	85.00±2.74	>0.05