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Assessment of Nutritional Status and Prevalence of Non-Communicable Diseases among Geriatrics of Rural and Urban West Bengal (India)

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Suparba Roy, Sauryya Bhattacharyya*

Department of Food & Nutrition
Sarada Ma Girls' College
Talikhola, Barasat, Kolkata 700126

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ABSTRACT

The elderly are one of the most vulnerable and high-risk groups in terms of health status. The present study was designed to delineate the relationship of nutritional status and chronic morbidity status with the prevalence of non-communicable diseases of both male & female elderly persons in rural & urban areas in West Bengal, India. A community-based Cross-sectional study was conducted during the period of May 2016 to August 2016 with random sampling design. Data were statistically analyzed by Spearman's rank coefficient correlation, at 95% confidence interval. It was found that majority of the elderly people were suffered from more than one chronic diseases. Urban females have mostly affected by hypertension and Rheumatoid Arthritis compared torural females. Prevalence of Diabetes was similar in the two female groups. Urban males, on the other hand, were more prone to insomnia. The present study also highlighted that the two very noticeable diseases of the modern era, rheumatoid arthritis and diabetes mellitus are observed as the predominant cause of ailment in the populace of urban and rural geriatrics of West Bengal. Evaluation of nutritional status and chronic morbidity status could be helpful for any future health action plan both in a rural and urban area in West Bengal.

INTRODUCTION

Aging has been defined as a series of time-related processes that ultimately bring life to a close. Persons of 60years of age and older are defined as elderly by WHO[1]. Successful aging is defined not by longevity alone and by sufficient wellbeing in multiple domains, socially, physically and mentally. The three components for successful aging are avoiding disease, engagement with life and maintaining high physical and cognitive function. The process of aging brings about physiological, psychological and immunological changes with influences the nutritional status. The elderly are one of the most vulnerable and high-risk groups in terms of health status in any society[2]. In this aging process, free radicals are thought to cause degenerative changes, various types of non-communicable diseases including cardiovascular disease, renal disease, nervous and mental disease, non-specific respiratory diseases (like asthma), musculoskeletal conditions (like arthritis and allied disease), obesity, cancer, diabetes mellitus and various other metabolic diseases and chronic results may occur. Disorders of unknown cause and progressive course are often labeled "degenerative".

It has been observed that the proportion of the elderly population was being increased in the last 50-odd years, mainly due to low fertility and mortality rates[3]. However, nutrition plays an important role in successful aging, avoiding the prevalence of non-communicable diseases to ensure better life of the geriatric population[4]. In light of the above, the present study was designed to identify the nutritional status of the elderly in rural and urban areas of West Bengal. Nutritional status of the geriatrics in this part of the country was not researched thoroughly except for a study, which indicated that 90% elderly of rural areas of West Bengal is undernourished[5]. The present study also focuses on the difference in the quality of life between the rural and urban elderly population of this state. The problems of malnutrition & non-communicable diseases among the male & female geriatrics were also highlighted. The study also deciphered the problems of nutritional status and chronic morbidity status of the elderly. As a whole, the study would help to recognize the age-related changes in the physiological system among both urban and rural geriatrics.

MATERIAL & METHODS

Participants

A community-based cross-sectional study was conducted & participants were selected using multi-stage simple random sampling technique. Elderly population of age 60 years and above

of urban and rural areas of West Bengal were selected for the study with their written consents. Exclusion criteria included people unwilling to participate, refused to give written consent or unable to give an interview due to various morbidity conditions. A hundred individuals were selected from rural & urban areas in total. 41 males & 59 females were selected for the entire study, in which 22 males and 31 females were from urban and 19 males& 28 females were from rural areas. Samples were collected from the rural area of Hooghly, Nadia, West Midnapur, East Midnapur andBirbhum districts and urban area of Howrah, Kolkata andNorth 24-Parganas district of West Bengal during the period of May 2016 to August 2016.

Study design

Data was collected using a pretested interview questionnaire[6]. The participants were interviewed at their old-age homes after taking written consent in the local language. Information was collected on socio-demographic factors & four domain i.e. physical, psychological, social relationship & environmental. Clinical information was also obtained in writing.

Anthropometric Measurement

From this selected study sample, the data was calculated regarding age, sex, weight, height & BMI, WHR etc. was collected with the pretested personal interview questionnaire. Weight was measured using an electronic weighing machine with barefoot & light clothing to the nearest 0.1 kg. The height was measured using stadiometer with the elderly standing upright with heals close to each other, arm hanging by the side, eyes looking straight forward & Frankfurt's plane (line joining the floor of the external auditory meatus & floor of the orbit) in the horizontal plane. The height was measured to the nearest 0.5 cm. Body mass index (BMI) was calculated using the formula:

$$\frac{\text{Weight in kg}}{\text{Height in m}^2}$$

Waist-Hip Ratio (WHR) was calculated by using the following formula:

$$\frac{\text{Waist (cm)}}{\text{Hip (cm)}}$$

Statistical Analysis

Data were analyzed using descriptive and inferential non-parametric statistics. Spearman's rank correlation coefficients were calculated between male and female subjects of rural and urban groups. Data were analyzed using Spearman's rank significance graph at a confidence level of 95%. Calculations were done using Microsoft Excel package.

RESULTS

Out of 100 elderly, 53 were from rural areas & 47 were from urban areas. All the 100 persons were in the age group of 60-80 years. Among 100 geriatrics, 41 were males & 59 were females, in which 22 males were from rural & 19 were from urban areas. 31 females were from rural areas &28 females were from urban geriatrics populations. It was observed that overweighing is a problem in both male and female in an urban area (Table 1). Over 70% of the geriatrics of urban area was affected with obesity, which included *ca*. 32% male and *ca*. 39% female. On the other hand, obesity was not much prevalent in rural males. Rural females, however, showed a tendency towards obesity (*ca*. 17% in comparison to *ca*. 10% in males). Geriatrics of the rural area was more inclined to thinness (Table 1). About 52% of rural males fell in this category in comparison to *ca*. 22.5% of urban males. In the case of females, about 36% of the rural category was thin in comparison to *ca*. 19% of the urban category. Spearman's rank correlation study showed that there was a positive correlation between the males of urban and rural categories with respect to their nutritional status (R = 0.43). The correlation was even stronger in the case of females (R = 0.55). The above result was substantiated by the waist-to-hip ratio of the geriatrics, as furnished in Table 2. In both rural and urban areas, more than 45% of the subjects of either sex fell into the high-risk category.

Table 1: Distribution of Body Mass Index (BMI) of Elderly Male and Females in Urban & Rural West Bengal.

Body Mass Index (BMI)	Urban Area (n=53)		Rural Area (n=47)	
	Male (n=22)	Female (n=31)	Male (n=19)	Female (n=28)
	(%)	(%)	(%)	(%)
Severe Thinness (<16.0 kg/m^2)	4.55	3.23	15.79	10.71
Moderate Thinness (16.0-16.9 kg/m^2)	9.09	6.45	21.05	14.29
Mild Thinness (17.0-18.4 kg/m^2)	9.09	9.68	15.79	10.71
Normal Range (18.5-24.9 kg/m^2)	18.18	12.90	10.53	21.43
Overweight (25.0-29.9 kg/m^2)	31.82	38.71	26.32	25.00
Obese (Grade-I) (30.0-35.0 kg/m^2)	9.09	12.90	5.26	10.71
Obese (Grade-II) (35.0-39.9 kg/m^2)	13.64	6.45	5.26	3.57
Obese (Grade-III) (≥40 kg/m^2)	4.55	9.68	-	3.57

Table 2: Distribution of Elderly Male & Female Geriatrics in Urban & Rural Population of West Bengal According To Waist Hip Ratio (WHR).

Waist Hip Ratio (WHR)	Rural Area (n=47)		Urban Area (n=53)	
	Male (n=19)	Female (n=28)	Male (n=22)	Female (n=31)
	(%)	(%)	(%)	(%)
High Risk	44.35	48.8	49.79	52.55
Moderate Risk	21.31	21.32	36.38	30.64
Low Risk	34.28	28.64	14.26	16.38

Table 3 depicted the prevalence of non-communicable diseases in geriatric populations. The most severe was found to be Rheumatoid arthritis, as about 32% female and 15% male of the urban population suffered from it. Diabetes mellitus also was found to be highly prevalent among urban and rural geriatrics. About 30% female and 27% male were suffering from this life-threatening disease in both areas. Hypertension was also a big problem in urban subjects as *ca*. 15% female and 10.5% male suffered from this disease.

Table 3: Distribution of Morbidity Status Based On Gender in Urban & Rural Geriatric Population of West Bengal.

Non-Communicable Diseases	Rural Area (n=47)		Urban Area (n=53)	
	Male (n=19)	Female (n=28)	Male (n=22)	Female (n=31)
	(%)	(%)	(%)	(%)
Osteoporosis	5.66	7.55	4.25	10.63
Heart Disease	5.66	3.77	10.63	4.25
Rheumatoid Arthritis	13.21	22.64	14.89	31.91
Parkinson's Disease	11.32	5.66	8.51	2.13
Diabetes Mellitus	15.09	16.98	12.76	14.89
Anaemia	9.43	16.98	2.13	4.25
Insomnia	7.55	5.66	21.27	10.63
Asthma	3.77	3.77	4.25	2.13
Cancer	1.89	1.89	2.13	4.25
Hypertension	7.55	7.55	10.63	14.89
Mental Depression	5.66	9.43	2.13	4.25

DISCUSSION

The findings of the present study have been discussed in accordance with the objectives of the study. Being a comparative study, the nutritional status & its relation to the prevalence of non-communicable diseases were identified & compared both in urban & rural geriatrics in West Bengal. During analysis, it was found that the majority of geriatrics were suffering from Rheumatoid arthritis in both areas. Regarding scoring, rural geriatrics had more affected in Parkinson's disease (*ca*.17% in rural areas compared to*ca*.10.6 % in urban areas), diabetes mellitus (*ca*. 32 % in rural areas & 27% in urban areas), Anaemia (*ca*.26 % in rural population & 6 % in urban geriatrics). Prevalence of anemia among persons aged 60 years and above was reported to be around 15.2% in a previous study[6], which was lower compared to the present study. This indicated that with time, the occurrence of these diseases increased among geriatrics.

In the case of asthma, a non-communicable widespread breathing difficulty condition, males and females of rural & urban geriatrics were suffered equally as shown in the present study. However, urban elderly persons were suffered more than rural elderly persons in coronary

artery diseases, probably due to the difference of socio-economic status and lifestyle between urban & rural geriatrics.

In the urban elderly population, at about *ca*. 10.5% males were in hypertensive condition &15% females were suffered from high blood pressure, whereas *ca*. 7.55 % of males & females in rural geriatrics suffered from high blood pressure. When compared between urban and rural populations, urban geriatrics suffered from the disease, probably due to the difference in the lifestyles. Hypertension is connected to obesity. Since the difference between grades of obesity between males and females of rural and urban areas were non-significant ($p>0.05$) according to Spearman's rank coefficient correlation test, it can be concluded that obesity was not the solitary cause for hypertension among the geriatrics.

In the present study, osteoporosis was seen vividly in female than male both the rural & urban geriatric population. Rheumatoid Arthritis was also highly prevalent in females than in males. Mainly coronary artery disease, Parkinson's disease, insomnia etc were observed more in male geriatrics population than female both the rural & urban areas in West Bengal whereas diabetes mellitus, joint pain, anemia, obesity, overweight, high blood pressure etc were detected more in female geriatrics than male for both rural & urban areas in West Bengal. As a whole, the prevalence of non-communicable diseases were non-significant ($p>0.05$) among the males of urban and rural West Bengal, but it was significant ($p<0.05$) among the female geriatrics, which indicated that elderly women of this state are susceptible to such diseases in a similar pattern. The elderly are vulnerable to the risk factors that contribute to non-communicable diseases, either from unhealthy diets, physical inactivity or exposure to tobacco smoke. Since elderly males are somehow engaged in physical activities more than women, the pattern of occurrence of diseases might not be similar. On the other hand, women in West Bengal are mostly housewives with minimum possibilities of physical activities. This has been reflected in the occurrence of non-communicable diseases in them.

CONCLUSION

The study signified that the epidemiology of health status of rural and urban elderly of West Bengal could serve as an important tool to plan future health actions for geriatrics. Although we had evidence that many advances have been made in the care of elderly people, still some gap in the current knowledge is to be plugged. The present study highlighted that the two very noticeable diseases of the modern era, rheumatoid arthritis and diabetes mellitus are

observed as the predominant cause of ailment in the populace of urban and rural geriatrics of West Bengal. Prevalence of rheumatoid arthritis in the urban population (*ca*. 47%) is more than the rural population (*ca*. 35%). It can also be observed that the females of both the area were affected more than the male. It was also observed that the geriatrics of the rural area suffered more with diabetes mellitus (*ca*. 32%) than the subjects of the urban area (*ca*. 28%). In this case, also, the females suffered more in both the areas, although the difference is very marginal. These results were substantiated by the fact that obesity and BMI were higher in the female population of both areas. Telling effects of these two factors were observed in the proportion of subjects with high blood pressure in an urban area (*ca*. 26%), where males suffered significantly more (*ca*. 11%) than the females (*ca*. 15%). In a rural area, hypertension was observed in 15% subjects only. All these data indicated the fact that if nutritional status of the geriatrics could be improved by some well-measured action plans, there might be a chance of improvement of the morbidity pattern of the subjects as the pattern is well-related with BMI.

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