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Low Back Pain Related Disabilities and Level of Physical Activity among Elders Live in the Community and Elder's Home: A Comparative Study in Colombo District, Sri Lanka

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Abstract: ***A descriptive cross sectional analytical study was conducted in each 146 elders' age between 65 – 70 years was conducted to assess low back pain (LBP) related disabilities and level of physical activity among elders live in the community and elder's home.The level of LBP related disability was assessed by the Quebec Back Pain Disability scale while level of physical activity was assessed using International Physical Activity Questionnaire. The mean ages of the elders who lived in elders' home and in the community were 68.1 (2.02) and 67.3 (1.98) (yrs.). The significantly higher physical activity (PA) level and significantly lower mean disability percentage (MDP) were observed in elders lived in the community compared to elders lived in elders' home respectively (p<0.05). Moreover, negatively associated significant correlation was observed between MDP and total PA among elders lived in elders` home (r= -0.214, p<0.001) while elders lived in community was not significant. Elders' who lived in elders' home stated that greater possibility for disabilities and medical comorbidities that need to be considered when planning strategies for elderly care in future.***

Keywords: Low back pain, Disability, Physical activity& Elders

1. Introduction

According to the World Health Organization (WHO), elders are the people age 65 and above, which is now mostly accepted cut-off age over the world [1]. Approximately 617 million people had become elders over the globe and this figure expected to be double by the year 2025 [2]. Aging is a normal bio-physiological and universal phenomenon that happens to all living beings regardless of species [3]. However, advancement of science and technology and modifications of health determinants have directly contributed to increase the elderly population in 21st century [4]. Therefore, increased elderly population may challenge any government due to rapid increase of disability, non-communicable diseases and mental health problems [5].

Currently, Sri Lanka is undergoing demographic transition, with a steadily aging population which will peak by 2041. As a result, one out of four people is expected to be an elderly person [6].In local communities in Sri Lanka ,the family has been the main care giver and support base to elderly people. However, this type of caring and support cannot be expected to continue in future as most of the females who were expected to be housewives and caregivers to the elderly in the past are currently employed due to rapid social transition. As a result, the number of elderly homes within the country has been increased during the last two-decades [7,8]. Though there studies on health problems of elderly people, there is no comparative findings in the Sri Lanka on LBP related disabilities and LPA among elders based on place of living. Therefore, this study was carried out to compare the LPA and LBP related disabilities among elders living in the elder's homes and the community in peri- urban areas of Colombo District, Sri Lanka. The finding of this study will be helpful to ensure quality of life of elders in both community and elders' homes.

2. Literature Review

LBP directly affected the activities of daily living and it limited the activities of daily living. Furthermore, it stated that the LBP was a frequent public health problem among the economically productive age groups while creating adverse effects on their activities of daily living[9]. Moreover, the disability in older adults with LBP was influenced by the interaction of age group and marital status but had no association with pain intensity in the Brazilians community [10].In recent LBP study in Spain reveled that back stiffness in older, community-dwelling adults with low back pain may help explain physical health and low back pain-related disability, above and beyond demographics and pain [11].Comparison of life satisfaction and mood in a sample of cognitively intact and ambulatory elders, who lived in nursing homes and who lived independently in the community. The consequences reveled that communitydwelling elders reported greater life satisfaction, and mood than those who lived in a nursing home[12].Female sex hormones play an important role with the musculoskeletal degenerative diseases, meanwhile significant associations have been observed between LBP and social class, low level of educational and low income level [13].

3. Methods

A Comparative cross sectional analytical study was conducted in two elders groups including 146 in each whose age between 65 -70 years, one group from the community and other group from elders homes, in three selected peri-urban MOH divisions in Colombo , the capital of Sri Lanka . The subjects were randomly selected using the electoral register of each GramaNiladari (GN) division by simple random sampling. A homogeneous sample was recruited for comparison after matching gender and age.

Interviewer-administered Sinhala version of Quebec Back Pain Disability Questionnaire was used to assess level of disability in elders which has been validated for Sri Lanka[14]. The pre-tested International Physical Activity Questionnaire (IPAQ) was used to assess levels of physical activity in elders which was in the public domain, open access questionnaire and feasible instrument for measuring physical activity in populations which was comprised of four domains namely; work , active transportation , domestic and garden (yard work), and leisure time domain [15].

Quebec Back Pain Disability Questionnaire.
The scale was included 20 questions with a scale of 0 to 5 to assess the level of functional disability. The minimum score was 20 and the maximum score was 100. Higher scores were considered to have greater disability [14].
Percentage (%) of maximal disability (MDP)

$$= \frac{[(\text{score}) - 20] \times 100\%}{80}$$

International Physical Activity Questionnaire
The duration (in minutes) and frequency (days) were gathered for all the types of activities in all four domains (MET). Further, domain specific scores require summation of the sub scores for walking, moderate-intensity and vigorous – intensity activities. Finally total physical activity was calculated as summation of the Walking MET-minutes/week + Moderate MET-minutes/week + Total Vigorous MET-minutes/week.

Moreover, total physical activity (PA) was categorized into three sub categories as low, moderate and high physical activity based on MET values per week. High (PA) - Elders who met 7 or more days of any combination of walking moderate-intensity or vigorous-intensity activities achieving a minimum total physical activity of at least 3000 MET-minutes/week. Moderate (PA) - elders who met 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum total physical activity of at least 600 MET-minutes/week. If total physical activity MET value wasnot enough to meet moderate level, considered as low category [16].

4. Results

Majority of the elders were female (58.9%) unmarried (50%) and educated only up to primary level (49.3%). Comparison of the baseline characteristics of the elders who lived in community and elder's home were depicted in table 01. Baseline characteristics revealed that significant difference in marital status of elders' lived in homeswhile offspring and community dwellers respectively (χ^2 = 69.144, df= 2, χ^2 = 104.301, df= 1; p<0.05). However, gender and education level weren't significant in either elders living in elders home or community (p>0.05) (Table 01). The significant difference was observed in mean ages of the elders who living in elders' home (68.17±2.0 years) and community (67.28±2 years) respectively (t[290]=3.794, p<0.05).

Comparison of Domain related Physical Activity and Maximal Disability Percentage among elders living in the elder's homes and the community.
There was significantly higher mean scores of all four domains, as work domain, active transport domain, domestic and garden (yard work) domain, leisure time domain and total physical activity domains (MET minutes/week) of the elders as communitywhen compared to the elders living in the elders' home (t[290]= -4.091, p<0.05; t[290]= -5.4, p<0.05; t[290]= -7.038, p<0.05; t[290]= -2.506, p<0.05 and t[290] = -9.222, p<0.05). Furthermore, significantly lower mean percentage of MDP was notified among the elders living in the community when compared to living in elders' homeas shown in table 02 (t[290]= 6.382, p<0.001).

Further, physical activity was categorized into three levels as low, moderate and high based on the total physical activity (MET-minutes/week) and significant difference was found between levels of physical activities and type of living as shown in table 03 (χ^2 = 106.19, df= 2, p<0.001).

Associations between TPA and MDP in elders

A negative significant correlation was observed in mean scores of MDP with TPA as a whole sample of elders (r= -0.232, p<0.001). There was negatively associated significant correlation observed between MDP and TPA in elders lived in elders` home (r= -0.214, p<0.001) while no significant correlation was observed in elders lived in the community (p> 0.05).

Comparison of domain related Physical activity and MDP with demographics characteristics in elders' home and community.

Elders' home (EH)
The significantly lower mean scores in active transport domain was observed in female when compared to male (t[144]= 3.264, p<0.001). Further, significant group effect has been observed between mean scores of leisure time domain and marital status (df=2, F=7.00, p<0.05). Independent sample t test revealed that significant lower mean score in married counterparts compared to unmarried and other counterparts respectively (t[112]= -2.191, p<0.05; t[71] = -2.888, p<0.05) (Table 04).

Similarly, significant group effect has been observed between mean percentage of MDP and marital status (df=2, F=3.747, p<0.05). Independent sample t test revealed that significant higher mean scoreof MDP was notified in married counterparts when compared unmarried and other counterparts respectively (t[112]= 0.64, p<0.05; t[71]= 2.80, p<0.05). However, no significant mean differences were observed in other domains of physical activity and MDP

with demographics characteristics among elders living in elders' home (Table 04).

Community dwelling (CD)

The significantly lower mean scores in work domain and active transport domain were observed in female when compared to male (Work domain: t[144]= 4.684, p<0.05; Active transport domain: t[144]= 2.666, p<0.05). The significantly lower mean scores in TPA was observed in female when compared to male (t[144]= 4.053, p<0.001).

Further, significant group effect has been observed between mean scores of leisure time domain and education level (df=2, F=4.396, p<0.05). Independent sample t test revealed that significant lower mean score in secondary education level when compared primary and tertiary education levels respectively (t[119]= 2.609, p<0.05; t[83] = -3.161, p<0.05) (See table 04).

Table 1: Baseline characteristics of the elders who living in community and elder's home.

Demographic data	Elders' Home Dwellers, n=146		Community Dwellers, n=146	
	Frequency	(%)	Frequency	(%)
Gender				
Male	60	(41.1)	60	(41.1)
Female	86	(58.9)	86	(58.9)
Educational level				
Primary	72	(49.3)	61	(41.8)
Secondary	55	(37.7)	60	(41.1)
Tertiary	19	(13.0)	25	(17.1)
Marital status				
Married	41	(28.1)	101	(69.2)
Unmarried	73	(50.0)	12	(8.2)
Other	32	(21.9)	33	(22.6)
Offspring				
Yes	47	(32.2)	132	(90.4)
No	99	(67.8)	14	(9.6)

Table 2: LPA and MDP scores amongst elders living in community vs. elder's home dwellers

	Elder's in community dwellers n=146 (M) *(SD)*	Elder's in elder's home dwellers n=146 (M) *(SD)*
Domain related Physical Activity		
Work Domain	1764 (4984)	70 (405)
Active transport Domain	902 (1763)	104 (282)
Domestic and Garden (yard work)	2505 (3258)	514 (1032)
Leisure time Domain	382 (1105)	135 (436)
Total physical activity	5554 (6058)	825 (1298)
Disability Level MDP	10 (17)	25 (24)

Table 3: Association of LPA categories and Type of living in elders

LPA	Elders` Home	Community
Low	89 (61%)	16 (11%)
Moderate	47 (32.2%)	49 (33.6%)
High	10 (6.8%)	81 (55.5%)
	146 (100%)	146 (100%)

Table 4: Comparison of demographic factors, physical activity domains and maximum disability percentage among elders' home (EH) and community dwellers (CD)

Demographic factor	Work Domain MET-minutes/wk		Active transport Domain MET-minutes/wk		Domestic and Garden (yard work) Domain MET-minutes/wk		Leisure time Domain MET-minutes/wk		Total physical activity MET-minutes/wk		MDP	
	EH	CD	EH	CD	EH	CD	EH	CD	EH	CD	EH	CD
	M(SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Educational levels												
Primary	46 (395)	2670(6737)	61 (218)	870(1502)	541(984)	2395(3022)	171(566)	520(1280)	820(1229)	6458(7022)	25(24)	11(18)
Secondary	47 (349)	1064(3197)	125(293)	899(1719)	469(1174)	2702(3617)	64 (174)	81 (240)	706(1403)	4748(5398)	26(24)	10(16)
Tertiary	229(555)	1229(2810)	209(418)	1229(2810)	542(783)	1229(2810)	208(383)	1229(2810)	1189(1238)	5286(4805)	23(23)	5 (9)
Gender												
Male	97 (440)	3926(7096)	193(395)	1359(1971)	361(586)	2133(2940)	159(603)	449(1417)	811(1265)	7868(7603)	22(24)	7 (14)
Female	52 (380)	255 (1350)	42 (133)	584 (1535)	621(1245)	2765(3456)	119(226)	335(829)	835(1329)	3940(4010)	27(24)	12(18)
Marital status												
Married	62 (284)	1939(5576)	78 (227)	1024(2045)	598(1128)	2539(3389)	10 (46)	310(954)	749(1209)	5814(6728)	30(25)	9(17)
Unmarried	35 (303)	2884(4477)	73 (208)	1087(1012)	467(1123)	2549(3040)	103(268)	6 (19)	679(1338)	6526(4730)	27(25)	15(14)
Other	160(662)	820 (2650)	208(436)	462 (633)	515(628)	2386(3001)	371(799)	738(1580)	1256(1260)	4407(3906)	15(17)	11(14)
Offspring												
Yes	31 (213)	1711(5063)	101(259)	879 (1832)	596(1064)	2507(3322)	168(651)	423(1156)	897(1315)	5521(6207)	24(23)	10(16)
No	89 (469)	2259(4297)	106(293)	1126(890)	475(1019)	2488(2684)	120(285)	000 (0000)	791(1296)	5874(4598)	25(24)	13(15)

EH - Elder's Home
CD - Community Dwellers

5. Discussion

Aging is a natural process in degenerating muscles and that might associated with the pain and related disabilities which may lead to less energetic in elderly population. However, present study revealed that LBP related disabilities and LPA were significantly difference in elders living in the elders'homes and community in periurban areas of Colombo District, Sri Lanka. Further, consequences shown

that significantly higher mean scores of all four domains of LPA and mean score of TPA (MET minutes/week) in elders living in the community when compared to elders in elders' home. Moreover, significantly higher mean percentage of MDP in elders living in the elders' homes was notified when compared elders living in community. Similarly, the recent studies reveled that LPA was directly proportionate between LBP related disability and elders [11, 17].

A prospective cohort study conducted in Thailand showed that LBP directly affects the activities of daily living and it was frequent public health problem among the economically productive age groups due to the influence of adverse effects on their daily activities [9].Another longitudinal study notified that back pain had led to activity restriction and back pain had been independently associated with decline in lower extremity physical function among community dwellers age 70 and above [18].

Our study revealed that comparatively high physical activity and low disability level in elders lived in the community when compared to elders lived in elders' home. Further, female physical activities were significantly lower than male physical activities. Some studies have been conducted to assess incidence of falling/injuries among age 65 years and over community dwellers[19,20]. Results revealed that approximately 30% of the elders had experienced with falling with injury during the study period [19]. Mobility was significantly impaired in those whowere reporting falls and falling incidence of female had increased 2-3 folds than males [20]. Further, LBP related disability was significantly higher in postmenopausal women than age-matched men. Another study has shown that LBPhad associated with the physiological changes caused by the relatively lower level of sex hormones after menopause in women[13].

Cross-sectional analytical study was carried out by Sions and colleague [11] in order to explain level of physical health among older community dwelling adults with LBP. The significant model (R^2= 0.265, p<0.001) was found to express association between LBP and physical activity. However, the model was included in age sex, weight, education level and other comorbidities. These results were in line with our findings and LPA was associated with gender and education level among community dwelling elders.

Cross-sectionalstudy was conducted in Brazil among elders who had acute LBP. The results stated that LBP related disability was associated with age groups and marital status [10]. Our study showed that MDP was associated with marital state among elders 'lived in home while no significant difference was notified in elders' in the community.

Gueldner and colleagues[12] revealed that communitydwelling elders had greater life satisfaction, optimal mood status, less depression and anxiety levels than elders those who lived in a nursing homes. However present study did not cover psychological aspect of the study population. Therefore, the results of the present study can cautiously be interpreted to contribute a certain extent to the elders who are living in community and elders' home.

6. Future Scope

One limitation of this study was that not covering a representative sample from all ethnic groups to be applicable to findings for all ethnic groups and the gender distribution in the sample wastoo small. Therefore our findings limits toprovide primary data regarding the association of LPB related disability on LPA among elders, Colombo district, Sri Lanka.

As we could not achieve comparative research studies under this topic in our literature review, it is better if further researches are conducted. As global and Sri Lankan elderly population is increasing and comorbidities are rising among them it is important to investigate long term resolution for this fact.

7. Conclusion

Results of the current study has further confirmed the association between LBP related disability and LPA amongst elder living in community and elders' homes. Elders' lived in community had maximum physical activity and minimum disability percentage when compared to elders' in elders' homes. Therefore, this results may be useful for elders' homes in order to improve elders' quality of life and minimizing comorbidities. Future research should seek to further clarify the causality and the cause and effect relationship between confounding factors and LBP related disabilities and LPA amongst elders.

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