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An exploratory study on the application of screening of activity limitation and safety awareness (SALSA) scale for evaluation of activity limitation among elderly

Roshni Mary Peter, Alex Joseph[1]

Abstract:

BACKGROUND: Aging poses a significant risk for activity and functional limitations. Problems among aged populations are interrelated, and these problems can lead to other disorders and finally leave a negative impact on the quality of life (QoL) This study used the screening of activity limitation and safety awareness (SALSA) scale to screen and measure activity limitations among the elderly.

MATERIALS AND METHODS: A community-based descriptive cross-sectional study was conducted among 928 elderly from the three districts of Tamil Nadu, India. The SALSA scale was administered via a door-to-door interview, and data analysis was carried out. Simple random sampling was used to obtain the study subjects in the selected study area. Chi-square tests and binary logistic regression were performed to find the association between selected risk factors.

RESULTS: Among the 928 elderly, 53.7% of them were males, 84.9% were between the age of 60 and 69 years, and 31% were 70 years and above. The study found that 66.5% of the elderly have mild activity limitations, 15.7% of them had moderate limitations, 4.8% of them had severe limitations, around 3% of them had extreme limitations, and 10.3% of them had no significant limitations. The binary logistic regression found people of age 65 and above (OR = 3.80), female gender (OR = 2.90), with hypertension (OR = 1.95), vision problem (OR = 1.92), decreased sensation of the foot (OR = 3.41), as the significant independent risk factors for activity limitation among the elderly.

CONCLUSION: The study found self-reported activity limitations among the elderly to be nearly 90%. The SALSA scale may be used as a handy tool to identify the activity limitation in community-based geriatric checkups.

Keywords:

Activity, chronic illness, elderly, epidemiology

Department of Community Medicine, SRM Medical College and Research Centre, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India, [1]Division of Epidemiology, School of Public Health, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India

Address for correspondence:
Dr. Alex Joseph, Division of Epidemiology, School of Public Health, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India.
E-mail: alexjosephdr@gmail.com

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Introduction

Aging is the normal, biological, and natural process of growing older.[1] Aging is a significant risk factor for activity and functional limitations, and a study conducted by McPhee *et al*.[2] states that regular physical activity helps to improve physical and mental functions and also reverse some effects of chronic disease to keep older people mobile and independent. The elderly population is the world's fastest-growing population.[3]

According to the World Health Organization report on report on aging and health, the elderly are facing multiple health problems; among all problems, functional ability has the greatest importance.[4] When compared to young people, the rate of hospitalization, length of stay, and medical costs are higher

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among the elderly population.[5] The mortality rate and long-term consequences are also higher. The increasing number of multiple chronic conditions among older adults in India is a major public health issue. A review conducted by Maresova *et al*.[6] reveals that aging has a huge negative impact on health. Chronic diseases can lead to dependency on activities of daily living (ADLs) among the elderly. Problems among aged populations are interrelated, and these problems can lead to other disorders and finally leave a negative impact on the QoL.

This is the first kind of study in nature that tends to explore the application of the screening of activity limitation and safety awareness (SALSA) scale for evaluating activity limitation among the elderly. The SALSA scale is designed to screen and measure the activity limitation, especially in low- and middle-income countries. Therefore, this study aimed to measure the activity limitation among the elderly through the SALSA scale in Tamil Nadu, India.

Objectives of the study

To study the prevalence of activity limitation among the elderly with the help of the SALSA scale in Tamil Nadu, India.

To study the associated risk factors of activity limitation among the elderly with the help of the SALSA scale in Tamil Nadu, India.

Materials and Methods

Study design and setting

A community-based descriptive cross-sectional study was conducted among the elderly in Tamil Nadu, India. Totally 928 elderly were selected from three districts, namely, Chennai, Kancheepuram, and Dharmapuri.

Study participant and sampling

A study conducted by Sharma *et al*.[7] 2014 states that the prevalence of ADL was 5.5%. Considering the ADL prevalence of 5.5%, 95% confidence interval (CI), margin of error of 0.05, and 866 were calculated as the ideal sample size.

$$n = \frac{z^2 pq}{e^2}$$

A house-to-household survey was carried out to identify the eligible study subjects after the elderly study purpose was explained. Simple random sampling was used to obtain the study subjects in the selected study area. Inclusion criteria: Permanent residents aged 60 and above of Tamil Nadu were included in the study. Exclusion criteria: The elderly who were not willing to participate, who did not give informed consent, and those with serious illnesses were excluded from the study.

Tool development

A semi-structured questionnaire was developed on socio-demographic, personal characteristics, comorbidity, chronic disorders, and activity limitation based on a literature review, and the SALSA scale was used to study the activity limitation among the elderly.

SALSA scale

SALSA stands for screening of activity limitation and safety awareness. The SALSA scale was simultaneously developed in five countries which include Brazil, China, India, Israel, and Nigeria; most of the countries are middle-to low-resourced countries. The SALSA scale is designed to screen and measure activity limitations. SALSA is a cross-cultural tool; it has 20 items of daily activities related to the three domains of mobility, self-care, and work. The tool is administered via an interview. It is a subjective tool.[8]

Objectives of the SALSA scale

"The SALSA scale is used to identify persons with activity limitations; it helps to assess the extent of activity limitations and the risk of increasing impairment; major target people in the SALSA scale have leprosy, diabetes, or other peripheral neuropathies; the SALSA scale is used in combination with "impairment" and "participation restriction" tools to measure disablement from a holistic point of view, and it provides a means to measure the results of interventions whose goal is to improve function and/or self-care." (8, SALSA Collaborative Study Group, 2009).

Development of the SALSA scale

The SALSA scale was developed from the year 2000 to 2006. It is a standard tool that helps to measure activity limitations and safety awareness for people affected by leprosy, diabetes, and other peripheral neuropathies in low-income and developed counties.[4] The SALSA scale was developed in three phases.

Phase I: Lists of ADLs relevant to the target populations were generated through individual interviews and focus-group discussions. A questionnaire of 374 items (questions) was compiled and administered to 436 persons.

Phase II: The 374 items were reduced to 20 items; at this stage, construct validity was tested.

Phase III: Reliability testing: Using the Nigerian data, the 20-item SALSA scale is reliable.[8,9]

Properties of the SALSA scale

The SALSA scale has high-quality psychometric properties.[10] The psychometric properties of this tool include face validity, construct validity, convergent validity, internal consistency, and external validity.[11,12] Items for the SALSA scale were selected because they were practiced by at least 70% of respondents in each of the five participating centers on many continents and because they were easy to perform for some but difficult for others. Reliability refers to the internal consistency and test–retest reliability of the SALSA scale.[10-13]

Computing the score

A SALSA score as less as 10–24 indicates no significant limitation, a score between 25 and 39 indicates mild limitation, a score between 40 and 49 indicates moderate limitation, a score between 50 and 59 indicates severe limitation, and a score between 60 and 80 indicates extreme limitation (SALSA Collaborative Study Group, 2007).

Ethical consideration

The protocol was approved by the institutional ethical review committee of SRM School of Public Health, SRM IST, Tamil Nadu, via letter no.: SRMSPH/IEC003/2017/24/11/2017. This is the authors' original work, which has not previously been published elsewhere. The paper is not being considered for publication elsewhere at present. All investigation has been conducted according to the Declaration of Helsinki. Formal oral and written informed consent was obtained, and data regarding activity limitation, chronic disorders, socio-demographic, and personal characteristics were gathered.

Data collection

The data collection was carried out for 3 months, with a total of 928 subjects; 10–15 subjects were interviewed per day. Both descriptive and inferential analysis was done by using the trial version of SPSS Software 22. Chi-square and binary logistic regression were performed to find the association for selected risk factors.

Results

Among the 928 elderly, most of the subjects were males 53.7%, most of the respondents 84.9% were between the age of 60 and 69 years, and 31% were 70 years and older. The study found that 66.5% of the elderly had mild activity limitations, followed by 15.7% having moderate limitations and 10.3% with no significant limitations. The majority of the subjects belonged to the middle class 65.3%, followed by the lower class 30.7%, and 4% of them belonged to the upper class.

Figure 1 shows the obtained scores which indicated that 90% of the elderly have significant activity limitations.

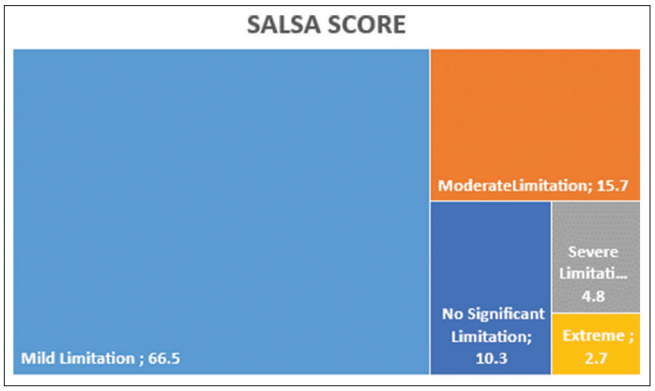

Figure 1: Prevalence of activity limitation among selected subjects (*n* = 928)

Among the elders, 66.5% were found to have mild limitations, followed by 15.7% having moderate limitations, 4.8% having severe limitations, 2.7% having extreme limitations, and only 10.3% without any significant limitations.

Table 1 shows that there is a statistically significant association between age, gender, diet pattern, alcohol consumption, and activity limitation except for family type. People aged 65 and above were found to have a 4.5 times higher risk, compared to those who belong to less than 65 years of age. Females were at a 2.9 times higher risk than males; vegetarians were at 2.8 times higher risk compared to non-vegetarians, and the elders with a habit of alcohol consumption were found to have a 0.2 times higher risk of activity limitation compared to the elders who do not consume alcohol.

Table 2 shows that there is a significant association between hypertension, diabetes mellitus (DM), impaired vision, difficulty in walking, decreased sensation of the foot, dizziness, and activity limitation. The elderly with a history of hypertension have a 2.2 times higher risk of activity limitation compared to those who do not have hypertension. The elderly with diabetes had a 3.9 times higher risk of activity limitation compared to those who did not have diabetes. Subjects with impaired vision and those who had difficulty in walking were found to have increased the risk of activity limitation by 1.6 times, compared to those who do not. Individuals who had decreased sensation of foot were found to have a 2.9 times higher risk of activity limitation compared to those who did not have decreased sensation of foot. Individuals who had dizziness were found to have a 2.4 times increased risk of activity limitation compared to those who did not have dizziness.

In Table 3 Binary logistic regression was done to ascertain the individual effects of age, gender, hypertension, DM, vision problem, and decreased sensation of the foot on the likelihood that participants have an activity

Table 1: Association of selected socio-demographic and personal profile vs activity limitation (*n*=928) (Source: Original Research Data)

Variables	Activity Limitation		Chi-square Value	Crude OR	*P*	95% CI	
	Yes	No				Lower Limit	Upper Limit
Age							
65 and above	545 (65.4%)	28 (29.5%)	46.6	4.5	<0.001*	2.848	7.199
<65	288 (34.6%)	67 (70.5%)					
Gender							
Female	407 (94.7%)	23 (5.3%)	20.8	2.991	<0.001*	1.835	4.876
Male	426 (85.5%)	72 (14.5%)					
Family type							
Nuclear	536 (89.8%)	61 (10.2%)	0.001	1.006	1	0.646	1.566
Joint family	297 (89.7%)	34 (10.3%)					
Diet Pattern							
Vegetarian	318 (94.9%)	17 (5.1%)	15.2	2.833	<0.001*	1.646	4.876
Non-Vegetarian	515 (86.8%)	78 (13.2%)					
Alcohol Consumption							
Yes	235 (81%)	55 (19%)	34.9	0.286	<0.001*	0.185	0.441
No	598 (93.7%)	40 (6.3)					

Table 2: Association of comorbidity vs activity limitation (*n*=928) (Source: Original Research Data)

Variable	Activity Limitation		Chi-square Value	Crude OR	*P*	95% CI
	Yes	No				
Hypertension						
Yes	373 (93.7%)	25 (6.3%)	11.8	2.2	0.001*	(1.410-3.657)
No	460 (86.8%)	70 (13.2%)				
DM						
Yes	286 (96.2%)	11 (3.8%)	19.5	3.9	<0.001*	(2.051-7.446)
No	551 (86.8%)	84 (13.2%)				
Impaired vision						
Yes	544 (91.4%)	51 (8.6%)	5	1.6	0.025*	(1.059-2.491)
No	289 (86.8%)	44 (13.2%)				
Difficulty in walking difficulty						
Yes	553 (91.4%)	52 (8.6%)	5.1	1.6	0.024*	(1.064-2.508)
No	280 (86.7%)	43 (13.3%)				
Decreased sensation of foot						
Yes	480 (94.1%)	30 (5.9%)	23.3	2.9	<0.001*	(1.871-4.639)
No	353 (84.4%)	65 (15.6%)				
Dizziness						
Yes	203 (94.9%)	22 (5.1%)	7.8	2.4	0.005*	(1.287-4.704)
No	630 (88.2%)	84 (11.8%)				

Table 3: Binary Logistic Regression (*n*=928)

Parameter	*P*	AOR	95% of CI	
			Lower	Upper
Age (≥65)	0.000	3.801	2.340	6.172
Gender (Female)	0.000	2.902	1.736	4.850
Hypertension	0.020	1.952	1.112	3.425
DM	0.097	1.813	0.898	3.659
Vision problem	0.019	1.920	1.115	3.305
Decreased sensation of feet	0.000	3.411	1.961	5.932
Constant	0.000	0.004		

limitation. The binary logistic regression found people of age 65 and above (OR = 3.80), gender female (OR = 2.90), hypertension (OR = 1.95), vision problem (OR = 1.92), and decreased sensation of the foot (OR = 3.41) as the significant independent risk factors for activity limitation among the elderly. The regression model was found to be statistically significant with $X^2(6) = 107.8$, with a *P* value less than 0.05. The model explained a 22.0% Nagelkerke R2 value of the variance of an activity limitation, and the prediction success was overall 90.1% of the cases.

Discussion

The SALSA score tends to increase with age and gender. Higher scores indicate increasing levels of activity limitation, whereas a low score indicates little difficulty with ADLs (SALSA Collaborative Study Group, 2007).

Our study found a similar pattern concerning age and gender with activity limitations. The present study found that the elderly who were aged 65 and above had a 4.5 times higher risk of activity limitation than those who were less than 65 years of age, and females were at a 2.9 times higher risk of activity limitations than males.

The present research was carried out to measure the activity limitation with the help of the SALSA scale; nearly 90% of elderly people had limitations, whereas the remaining 10.3% had no significant limitation. The percentage of reported limitations more than mild based on the SALSA scale in the current study was about 23.2%, which was comparable to a study Asian region of 21.7%, in the GALI study.[14]

A systematic review of 37 studies found that elderly people have significant activity limitations. Chronic health conditions, older age, and female gender were the most prevalent factors significantly associated with activity limitations in elderly people, which is in agreement with the current study as well.[15] A French cohort study conducted among 9294 community-dwelling participants aged 65 years and older found activity limitation and vision impairment to have a significant association, and after adjusting for confounders, the risk was found to be 1.6 (95% CI = 1.2, 2.0),[16] which is very close to the present study findings 1.75 (95% CI = 1.0, 2.9). Individuals with foot problems are more likely to use a cane or walker-like assistive devices. Studies have shown similar results that foot problems are associated with decreased motor performance and physical activity, and a similar result has been shown in the present study.[17]

Limitation and recommendation

Strength of the study: Being a community-based study done in three districts of Tamil Nadu, the study can be generalized to the larger elderly population of the state of Tamil Nadu.

A similar study can be done with a larger population nationwide so that we can generalize the results.

The SALSA scale can be used to measure the activity limitation.

Conclusion

In old age, disability and functional decline are not static phenomena. Current research gives new insights into the prevalence of ADL. The study found self-reported activity limitations among the elderly to be nearly 90%. Activity limitation is one of the important health indexes for the elderly.[18] First, our study findings show the prevalence of activity limitation among the elderly by using the SALSA scale. Second, our analysis reveals that activity limitations were found to be higher among the elderly with major chronic diseases than for persons without such conditions. A widely held assumption is that persons with major non-communicable diseases generally face a higher risk of mortality. Specifically, the current study witnessed that the majority of the activity limitations were found among chronically ill elderly.

The present study concludes that the SALSA scale may be used as a handy tool to identify the activity limitations in community-based geriatric checkups. Further research is necessary to estimate the public health impact of interventions directed toward the management of the risk factors which can reduce the activity limitation in the elderly.

Challenges in the study

Interviewers were aware of the outcome status, so there may be a chance of an interviewer bias in the study. Potential recall and reporting bias could have occurred. Being a cross-sectional survey, a causal relationship between risk factors and activity limitations could not be established, although strong evidence exists.

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Ethics approval and consent to participate

The protocol was approved by the institutional ethical review committee via letter no: SRMSPH/IEC003/2017/24/11/2017 of SRM School of Public Health, SRM IST, Tamil Nadu. This is the authors' original work, which has not previously been published elsewhere. The paper is not being considered for publication elsewhere at present. All investigation has been conducted according to the Declaration of Helsinki. Formal oral and written informed consent was obtained, and data regarding activity limitation, chronic disorders, socio-demographic, and personal characteristics were gathered.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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