Original Article

Sarcopenia and frailty among the elderly population in the community: An observational study

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Abstract

Context: There are few studies on the prevalence of sarcopenia and frailty in India. **Aims:** The aim of this study was to assess sarcopenia and frailty using simple clinical tools among the elderly population in the community. **Settings and Design:** This was an observational study. The elderly population with an age group of >60 years residing in villages within 10–15 km of Sumandeep Vidyapeeth, Vadodara, formed the sampling frame of the study. **Methods and Material:** A total of 785 participants were approached, of whom 556 were included in the study based on inclusion criteria. Participants were assessed for grip strength, muscle mass, gait speed, and frailty. **Statistical Analysis Used:** The data were analyzed using STATA-IC statistical software version 13. A nonparametric Chi-square ($\chi 2$) test was used for categorical variables, and an independent-samples *t*-test was used to analyze the difference between various variables. Statistical significance was considered at $P < 0.05$ with a 95% confidence interval (CI). **Results:** Based on the Indian criteria, 205 participants (36.1%) were diagnosed as having sarcopenia, and 351 participants (63%) were diagnosed as having "no sarcopenia." 5.6% of participants were found to be frail, 19.2% to be pre-frailty, and 75.2% to be no frailty. The χ^2 analysis showed a significant association of sarcopenia with gender and different age groups (*P* value < 0.001). **Conclusions:** In this study, 36.9% of the elderly participants were found to have "sarcopenia," and 5.6% of the participants had frailty. Simple clinical tools used were easy to administer and suitable for field screening.

Keywords: Elderly, frailty, grip strength, muscle mass, sarcopenia

Introduction

Sarcopenia is defined as a progressive and generalized condition that is characterized by a loss of muscle mass and function.[1] It is also defined as "a progressive and generalized skeletal muscle disorder that is associated with an increased likelihood of adverse outcomes including falls, fractures, physical disability, and mortality" by the European Working Group on Sarcopenia in Older People (EWGSOP).[2]

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The prevalence of sarcopenia is 17.5% in India, as reported in one of the multi-continent studies.[3] Recently, Shaikh *et al.*, in 2020,[4] found the prevalence of sarcopenia to be 14.2% among the elderly population (>60 years of age) in rural South India. Based on the EWGSOP criteria, the prevalence is between 1 and 29%, and based on the International Working Group of Sarcopenia (IWGS) criteria, it is between 14 and 33%.[5]

Based on the EWGSOP criteria, three parameters are taken into consideration: grip strength, muscle mass, and gait speed. The presence of low muscle strength indicates a probable diagnosis. The presence of low muscle mass along with low muscle strength confirms the diagnosis, and the presence of all three (low muscle

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strength, low muscle mass, and poor physical performance) indicates the severity of sarcopenia.[2]

Based on the diagnostic criteria used in Indian studies, elderly participants with normal grip strength were considered to have "no sarcopenia." Elderly participants with low grip strength were further analyzed for the Skeletal Muscle Index (SMI) and gait speed. Sarcopenia is indicated when there is low grip strength with a low SMI and a normal or slow gait speed.[4]

The handheld dynamometer was considered a valid and reliable tool for assessing handgrip strength.[6] Various tools have been mentioned in the literature to assess muscle mass, including anthropometric measures, dual X-ray absorptiometry (DXA), and a bioelectric impedance analyzer (BIA) for muscle mass in the elderly population.[7] The Omron body composition analyzer is used to assess skeletal muscle mass, as it is a simple clinical tool that is portable and feasible to use in a community setting. Gait speed is one of the six vital signs that is considered to be a reliable, valid, and sensitive measure to monitor the functional status of elderly people, which are indicators of sarcopenia and frailty.[8]

In the clinical context, frailty can be used to evaluate potential advantages or risks associated with suggested medical, therapeutic, or surgical procedures because it can predict responsiveness to therapy and the likelihood of unfavorable clinical outcomes.[9] Frailty is a multisystem impairment associated with aging and an increased vulnerability to stressors.[10] To assess frailty, the Study of Osteoporotic Fractures (SOF) Index is easier and more practical to use in that pre-frail is defined as having one of the three criteria, such as being unable to stand up from a chair five times without assistance, losing weight, or having low energy, whereas frail is having two of the three criteria.[11]

Studies pertaining to the prevalence of sarcopenia and frailty in India are scarce, though there are many studies in other countries. Thus, the aim of this study was to assess and estimate sarcopenia and frailty using simple clinical tools in Indian communities, as they possess adverse effects on the mobility and independence of an elderly population. Identification of sarcopenia and frailty is required for establishing plans to prevent or deal with the problems. This identification would also help primary care physicians direct the elderly population for regular exercises to be performed to prevent sarcopenia and frailty. Understanding the prevalence of sarcopenia and frailty among the elderly population in the community would help primary care physicians have a more interdisciplinary approach for its assessment and management.[12]

Subjects and Methods

This was an observational study. The elderly population with an age group of >60 years residing in nearby villages within 10–15 km of Sumandeep Vidyapeeth, Vadodara, formed the sampling frame of the study. A door-to-door survey was conducted to determine the number of elderly people living in a particular family. The study has been approved by the Institutional Ethics Committee No. SVIEC/ON/Phys/RP/21005. A total of 785 elderly people were contacted and informed about the study. Those who consented to take part were requested to sign a consent form. From the 19 villages surveyed, 556 elderly individuals of 785 individuals were included in the study based on the inclusion criteria. The inclusion criteria were elderly individuals in the age group of >60 years, both genders with a Mini-Mental State Examination (MMSE) score of >23, and the individuals who agreed to participate in the study. The participants were excluded if they were completely bedridden, had major organ failures, malignant cancers, gastrointestinal disorders that compromised their nutrition, cardiopulmonary problems, or any musculoskeletal or neurological disorder that interfered with their understanding, muscle strength, or walking.[13]

The sample size was calculated using the formula $n = z^2P(1\text{-}P)/d2$, with a precision limit of 0.05; the expected prevalence of proportion was 29%, and the statistic for the level of confidence at the 99% confidence interval (CI) was Z = 2.58. According to calculations, the required sample size was 548. All the elderly individuals included in the study were assessed for grip strength, muscle mass, gait speed, and frailty.

(1) *Grip strength:* A Jamar Plus + electronic handheld dynamometer was used to measure grip strength. Before the beginning of the assessment, the procedure was explained to the participant. During measurement, hand dominance was noted by questioning which hand they use to write, and for the illiterate, we asked which hand they felt easiest performing the majority of daily tasks, such as washing clothes, eating, and combing. The individuals were asked to sit on a chair with back support, maintaining shoulders in a neutral position with elbow flexion at 90 degrees, as shown in Figure 1. The participant was encouraged to squeeze as long and tightly as possible for the best result, and a total of three measurements were taken for each hand. Average values out of the three measurements were noted in kilograms and used for the analysis. The cutoff values used for the interpretation of grip strength were <30 kg for men and <20 kg for women.[4]

(2) *Muscle mass:* The Omron body composition analyzer was used to assess the skeletal muscle mass. Initially, the participant's age, height, and gender were set in the analyzer, and then, the participant stepped on the unit. The elderly participant was instructed to extend their arms straight and place their hands over the grip electrodes, as shown in Figure 2a and b. They were checked for body shaking, a bent arm, a too-low arm, display unit lacing upward, a bent knee, or incorrect foot positioning during the measurement. Measurements such as height, weight, body mass index (BMI), percentage of whole-body skeletal muscle mass, arm muscle mass, trunk muscle mass, and leg muscle mass were noted. Omron's body composition analyzer considers <32.9 and <23.9 values to be low for the interpretation of skeletal muscle percentage for males and females, respectively. Appendicular skeletal muscle mass (ASM) was calculated using the Lee formula, that is, ASM= (0.244 × body weight-kg)

+ (6.6 × gender)-(0.098 × age) + (race-3.3).[2] The values assigned were 0 for women, 1 for men, and -1.2 for Asians. The cutoff points given by the EWGSOP guidelines were <20 kg for men and <15 kg for women. Microsoft Excel was used to compute the SMI using the ASM/Height (m^2) formula. The cutoff values used for the SMI were <7.0 kg/m^2 (men) and <5.7 kg/m^2 (women).[14]

In addition, calf circumference (CC) (cutoff value 33 cm) was also measured because it was thought to be a practical and generalizable anthropometric predictor of sarcopenia. It is a noninvasive, easy, and inexpensive approach to determine the extent of muscle mass.[15] Using a flexible measuring tape, the CC was measured in standing posture. To get the largest circumference, the tape was wrapped around the broadest girth at the calf, which is located halfway between the ankle and the knee, as shown in Figure 3. For each leg, values were recorded as the average of the measurements from two trials.

(3) *Gait speed (4-meter walk test):* A total of six-meter lanes were used, and the middle four meters were taken into consideration for measurement. Four cones were used, of which, two were placed at the starting and end of four meters (measurement phase: cones 2 and 3). The other two cones were placed one meter outside of these two cones on both sides (acceleration phase: cone 1 and deceleration phase: cone 4). Figure 4 shows the placement of the 4-meter walk test.

During measurement, participants were instructed to wear comfortable shoes and chappals and stand behind the first cone. They were asked to start after the command, "Ready, 3, 2, 1, Go," and walk until they reached the last cone. They were instructed to walk at their normal speed, like when they walked down the street, at home, or while going to the store and farm. Measurement time began when the first foot passed the starting cone (cone 2) of the 4-meter line and ended when the foot passed the second cone (cone 3) of the 4-meter line.

(4) *Frailty assessment*: Frailty was assessed using the SOF frailty index. Pre-frail was considered for those who had one of the three criteria, that is, the inability to rise from a chair five times consecutively without arm support, weight loss, or poor energy. Frailty was considered if they met two of the three criteria.

Data analysis

The collected data were entered into a Microsoft Excel sheet and analyzed using descriptive statistics. The data were analyzed using STATA-IC statistical software version 13 along with Microsoft Excel. A non-parametric Chi-square (χ^2) test was used to analyze the categorical variables. An independent-samples *t*-test was used to compare the means of various variables in the two groups (sarcopenia and no sarcopenia). Statistical significance was considered at $P < 0.05$ with a 95% CI.

Results

The data were collected from 556 individuals. There were 337 (61%) females and 218 (39%) males in the study.

Figure 1: Hand grip strength assessment with electronic handheld dynamometer

Figure 2: (a) Anterior view position of muscle mass analysis with Omron's Body Composition (b) Lateral view position of muscle mass analysis with Omron's Body Composition

Figure 3: Calf circumference measurement with measure tape

Table 1 shows the demographic information of the elderly participants.

(1) Sarcopenia:

a. **Grip Strength:** The cutoff point for grip strength was 30 Kg for men and 20 Kg for women based on studies performed in India.[4] Considering the cutoff values, 71 (13%) participants had higher (normal) grip strength, and 485 (87%) participants had less grip strength, as shown in Table 2.

b. **Muscle Mass:** The cutoff values considered for muscle mass were <32.9 (men) and <23.9 (women), respectively. Five hundred and forty-six (n = 546, 98.2%) participants were identified to have less skeletal muscle mass. ASM was determined using the Lee formula, and it showed that 339 (61%) participants had fewer values considering cutoff values of 20 kg (men) and 15 kg (women). SMI was calculated from ASM, cutoff values considered for SMI were 7.0 kg/m2 (men) and 5.7 kg/m2 (women). Two hundred and seventeen (n = 217, 39%) of participants had fewer values than cutoff points. The results pertaining to skeletal muscle mass are shown in Table 2.

c. **Gait speed:** The cutoff values considered for gait speed were <0.8 m/s.[4] Three hundred and fifty-six (n = 356, 64%) participants had normal gait speed and 200 (36%) had less gait speed, as shown in Table 2.

Table 3 shows the diagnostic criteria used, which are based on Indian studies.[4] A total of 205 (37%) participants were diagnosed as having sarcopenia, and 352 (63%) participants were diagnosed as having "no sarcopenia," as shown in Figure 5.

(2) Frailty

In this study based on the SOF frailty index, 19.2% (n = 107) of elderly individuals were found to be pre-frail, 5.6% of elderly individuals (n = 31) were found to be frail, and 75.2% of elderly individuals (n = 418) were having no frailty. The results pertaining to frailty are shown in Table 4.

The $\chi 2$ analysis of sarcopenia in elderly participants with the age of >60 years showed a significant association with gender and different age groups (P value < 0.001). As shown in Table 5, the incidence of sarcopenia was found to be higher in females (53.6%) than in males (11%). Sarcopenia was found to be 32.2%, 56.5%, and 71.4% in the 60–70 years, 71–80 years, and >80 years age groups, respectively. Table 5 shows the age- and gender-wise comparison of sarcopenia.

Based on the analysis, the age group has been found to have a statistically significant association with SOF frailty prevalence ($P < 0.05$), whereas no association was found with sarcopenia status ($P = 0.064$) and gender ($P = 0.067$).

Table 1: Demographic details of the participants (*n*=556)

Descriptive statistics of demographic details					
Characteristics	***n***	**Minimum**	**Maximum**	**Mean**	**Std. deviation**
Age (yrs.)	556	60	99	66.28	6.07
Height (m)	556	1.31	3.37	1.54	0.12
Weight (kg)	556	26.5	105.0	51.17	13.33
BMI (Kg/m)^2	556	10.90	96.60	21.75	5.79
MMSE score	556	23	30	27.23	1.56

MMSE: Mini-Mental Status Examination, BMI: body mass index, Kg: kilograms, m: meter, yrs: years

Table 2: Grip strength, muscle mass, gait speed, ASM, and SMI of the participants (*n*=556)

Frequency analysis of all the variables			
Variable	**Levels**	**Frequency (*n*)**	**Percentage**
Grip strength	Less	485	87.2
	More	71	12.8
Muscle mass	Less	546	98.2
	More	10	1.8
Gait speed	Less	200	36.0
	More	356	64.0
ASM	Less	339	61.0
	More	217	39.0
SMI	Less	217	39.0
	More	339	61.0

ASM: appendicular skeletal muscle mass, SMI: Skeletal Muscle Index. Note: Levels "less and more" are in context to the cutoff values considered for the study

Table 3: Diagnostic criteria of sarcopenia based on Indian Study

Diagnostic Criteria of Sarcopenia	
Low grip strength + low SMI + normal gait speed	Sarcopenia
Low SMI + slow gait speed	Sarcopenia
Slow gait speed + normal SMI	No sarcopenia
Normal grip strength	No sarcopenia
Low grip strength + normal SMI + normal gait speed	No sarcopenia

Table 4: Results of frailty among elderly participants diagnosed with sarcopenia

Frailty among elderly participants diagnosed with sarcopenia			
	Levels	**Frequency (*n*)**	**Percentage**
SOF Frailty Index	Frail	31	5.6
	Pre-frail	107	19.2
	No frail	418	75.2

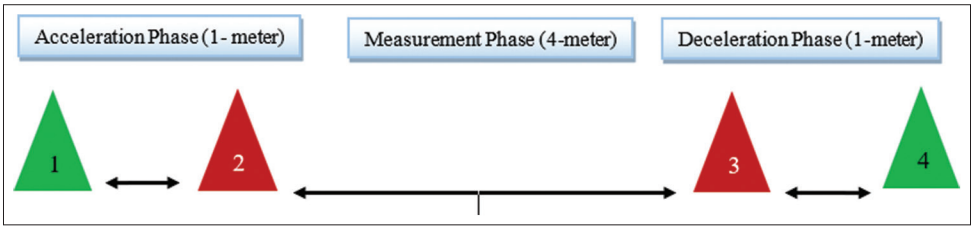

Figure 4: Measurement of gait speed

The differences between the participants with and without sarcopenia were based on age, gender, height, weight, BMI, MMSE, arm muscle mass (%), trunk muscle mass (%), leg muscle mass (%), whole-body skeletal muscle mass (%), grip strength, CC, and gait speed with 95% CI ($P < 0.05$), as shown in Table 6. An independent-samples *t*-test reveals a significant difference between the two groups. There was no statistically significant difference found in ASM ($P = 0.474$) and SMI ($P = 0.896$). CC has also shown a significant association in right CC (t = -20.530, $P < 0.001$, 95% CI) and left CC (t = -10.088, $P < 0.001$, 95% CI) in both groups (sarcopenia and no sarcopenia), as shown in Table 6. The cutoff values considered for CC were <33 cm.[15]

Table 5: Age- and gender-wise comparison of sarcopenia in the participants (n=556)

Age- and gender-wise comparison of incidence of sarcopenia				
Variable	**Level**	**Sarcopenia**	**No sarcopenia**	**Chi-square (*P*)**
Gender	Male	24 (11%)	194 (89%)	103.04 (<0.001)
	Female	181 (53.6%)	157 (46.4%)	
Age group	60–70 yrs	147 (32.2%)	310 (67.8%)	25.557 (<0.001)
	71–80 yrs	48 (56.5%)	37 (43.5%)	
	>80 yrs	10 (71.4%)	4 (28.6%)	

Discussion

A total of 556 community elders who were over 60 years old participated in this study. Based on the Indian criteria, 36.9% of the participants were diagnosed as having sarcopenia. The prevalence of sarcopenia was reported to be 1–29% among individuals and 14–33% in those in the long-term care population, according to a prior review study that included people aged >50 years and above based on the EWGSOP definition. Globally, for those under 60, the prevalence varied from 8% to 36%, while for those over 60, it was between 10% and 27%.[16] The results of the other study revealed that sarcopenia was

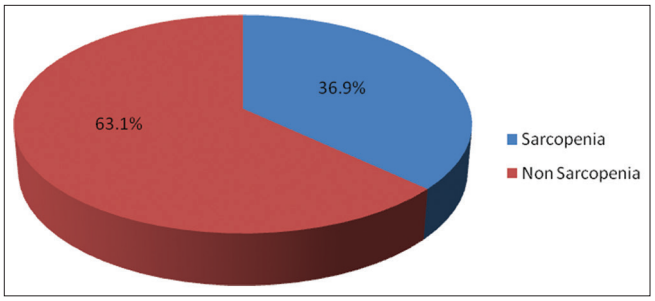

Figure 5: Percentage of elderly with and without sarcopenia

Table 6: Independent-samples *t*-test of variables of sarcopenia and no sarcopenia

Independent-samples *t*-test of variables of sarcopenia and no sarcopenia								
Variable	**Group**	***n***	**Mean**	**SD**	***t***	***P***	**95% CI of difference**	
							Lower	**Upper**
Age (yrs)	Sarcopenia	205	68.49	7.47	6.807	<0.001	2.48	4.50
	No sarcopenia	351	64.99	4.63				
Height (m)	Sarcopenia	205	1.49	0.15	-7.971	<0.001	-0.10	-0.06
	No sarcopenia	351	1.57	0.09				
Weight (kg)	Sarcopenia	205	39.25	5.81	-22.072	<0.001	-20.56	-17.19
	No sarcopenia	351	58.13	11.41				
BMI	Sarcopenia	205	18.51	6.18	-11.121	<0.001	-6.04	-4.22
	No sarcopenia	351	23.64	4.61				
MMSE score	Sarcopenia	205	26.69	1.397	-6.491	<0.001	-1.12	-0.59
	No sarcopenia	350	27.55	1.561				
Arm muscle mass (%)	Sarcopenia	205	25.31	4.42	-5.546	<0.001	-4.02	-1.92
	No sarcopenia	351	28.28	6.87				
Trunk muscle mass (%)	Sarcopenia	201	14.80	3.20	-5.292	<0.001	-3.19	-1.46
	No sarcopenia	350	17.13	5.73				
Leg muscle mass (%)	Sarcopenia	205	29.64	5.72	-16.203	<0.001	-9.92	-7.77
	No sarcopenia	351	38.48	6.47				
Right grip average	Sarcopenia	205	14.08	3.84	-3.003	0.003	-12.70	-2.66
	No sarcopenia	351	21.76	36.48				
Left grip average	Sarcopenia	205	13.41	3.83	-10.954	<0.001	-6.97	-4.85
	No sarcopenia	351	19.33	7.15				
Whole-body skeletal muscle mass (%)	Sarcopenia	205	19.80	3.26	-11.685	<0.001	-4.36	-3.10
	No sarcopenia	351	23.53	3.83				
Right calf average	Sarcopenia	205	26.80	2.1	-20.530	<0.001	-5.41	-4.46
	No sarcopenia	351	31.74	3.05				
Left calf average	Sarcopenia	205	27.30	7.23	-10.088	<0.001	-5.32	-3.58
	No sarcopenia	351	31.75	3.07				
Maximum gait speed (m/sec)	Sarcopenia	205	0.87	0.24	-4.610	<0.001	-0.13	-0.05
	No sarcopenia	351	0.96	0.22				

present in 17.5% of participants who were >65 years old and found to have sarcopenia and were defined as sarcopenia with the presence of individuals with low SMI and reduced grip strength or gait speed.[3]

The prevalence of sarcopenia has been reported to be 11%, 16.1% in females, 14.4% in males, and ranging between 4.1% to 11.5%, in the various studies, based on the different definitions and diagnostic criteria.[16-19] Different definitions and methods were adopted for the assessment of sarcopenia and frailty by different researchers, which may have an impact on the prevalence rate.

Frailty is a state that leads to impairment. Sedentary behavioral patterns, immobility, and lack of physical activity are major causes of frailty. This study showed that 5.6% of the elderly population in the nearby villages in Vadodara were frail, 19.2% were pre-frail, and 75.2% had no frailty. In comparison with the findings of this study, other Indian studies conducted in Thanjavur (28% frailty), the Pune study by Kashikar *et al.* (26% frailty and 63.6% pre-frailty), rural West Bengal (38.8%), and Bengaluru (24.70% frailty and 62.75% pre-frailty) had higher prevalence rates.[20-23]

A statistically significant association was found between age and sarcopenia ($t = 6.807$, $P < 0.001$). Sarcopenia is an age-related syndrome; as individuals grow older, an inflammatory process occurs in their muscles, which is associated with sarcopenia. Some biological and age-related inflammatory markers were found in the muscle mass of individuals with sarcopenia.[24]

In the current study, females had a higher prevalence of sarcopenia (53.6%) than males (11%) and there was no statistically significant association found with gender in groups with sarcopenia. However, another study found that males (41.2%) had a higher prevalence than females (37.2%) and reported that male height, weight, BMI, waist circumference, fasting glucose, SMI, and triglyceride levels were indicators of clinical risk factors that were specific to men. As there were more female participants than males, a higher prevalence of sarcopenia was found in females as compared to males. This is one of the limitations of the current study.

The prevalence of sarcopenia varies by individual variables, such as body type, level of physical activity, and occupation, and by regional and global population characteristics.[25] In the present study, the majority of them fell into the underweight category of BMI. Sarcopenia was found to be statistically significantly associated with BMI ($t = -11.121$, $P < 0.001$). Individuals in the underweight category of BMI have a significant association with sarcopenia, as weight loss increases the risk of sarcopenia in the elderly. Individuals who have sarcopenia and who are underweight are more at risk of mortality, and it was found that having body fatty tissue (obesity) who have no sarcopenia was recognized as an independent protective factor against mortality.[26,27]

This study showed a significant association ($t = -6.491$, $P < 0.001$) of sarcopenia with cognitive function, which was examined using the Mini-Mental State Examination (MMSE). This finding was supported by the studies performed in this area, where a decline in parameters of sarcopenia (grip strength and gait speed) was substantially associated with cognitive function. Aging plays a significant part in the onset of sarcopenia and a decrease in cognitive function.[28,29] Reduced physical activity at a later age is another cause of sarcopenia, which leads to cognitive impairment due to cerebral hypoperfusion.[30]

For the diagnosis of sarcopenia, circumference can be used as an alternative marker for the measurement of muscle mass, and elderly individuals who have CCs ≤33 cm tend to have higher chances of frailty and a decrease in physical function.[15] With age, gait speed decreases, which increases the risk of falls and disability.[31] Similarly, in our study, we found a statistically significant association between CC and gait speed with sarcopenia.

To summarize, there were 36.9% of the elderly population who found to have sarcopenia, where females were affected more as compared to males. There is a need to create awareness or knowledge regarding regular exercises (strength training, flexibility, or balance exercises), apart from daily routine activities, to deal with age-related sarcopenia and frailty. There is a need to have good interdisciplinary teamwork among primary care physicians and physiotherapists, to deal with this problem, to improve the quality of life of the elderly population in the community. It needs to be emphasized in the community that daily routine activities at home or household chores cannot be equated with exercises. They need to take time for regular exercises to prevent sarcopenia or frailty and improve their quality of life and functional independence.[32]

Conclusion

This is one of the community-based studies conducted to assess frailty and sarcopenia among the elderly population residing in nearby villages in Vadodara, Gujarat, India. In conclusion, 36.9% of the elderly participants (>60 years old) were found to have "sarcopenia." Frailty was seen in 5.6% of the participants, and pre-frailty was seen in 19.2% of the participants. Simple clinical tools used to assess sarcopenia and frailty were easy to administer and suitable for field screening.

Ethical policy and institutional review board statement

The Ethics Committee of the Institute (SVIEC/ON/PHYS/RP/21005) approved the study. Permission to collect data was obtained in writing from the sarpanch.

Patient declaration of consent statement

Participants were informed about the study using a participant information sheet, and we had them sign an informed consent

form to participate on a voluntary basis. Verbal approval was also taken for taking pictures of participants during the measurement.

List of abbreviations

Abbreviation	Definition
SOF	Study Of Osteoporotic Fractures Index for Frailty
EWGSOP	European Working Group On Sarcopenia in Older People
ASM	Appendicular Skeletal Muscle Mass
SMI	Skeletal Muscle Index
BMI	Body Mass Index
MMSE	Mini-Mental State Examination
IWGS	International Working Group of Sarcopenia
DXA	Dual X-ray absorptiometry
BIA	Bioelectric impedance analyzer
CC	Calf circumference
FNIH	Foundation for the National Institute of Health

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Name	Role
Vikas Doshi (statistician) Mahek Parmar (statistician)	Statistical analysis
Anilkumar Harijan (data entry operator) Prashant Patel, Devang Mehta, Yash Kogje, Tanvi Radadiya, Divya Bhanushali, Rithambara Pathak, and Vedanti Shastri (MPT students)	Tremendous assistance during data collection

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Conflicts of interest

There are no conflicts of interest.

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