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Awareness of Exercise as Medicine Among Rural and Urban Geriatric Populations

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Abstract

Background: Regular physical activity is an important component of healthy aging and contributes to the prevention and management of several chronic health conditions. The concept of exercise as medicine emphasizes appropriately prescribed physical activity as part of health promotion and disease management. However, awareness of this concept may vary between rural and urban older adults.

Objective: To assess and compare awareness of exercise as medicine among rural and urban geriatric populations.

Methods: A cross-sectional comparative observational study was conducted among 96 older adults aged 60 years and older residing in selected rural and urban areas of Karad, Maharashtra. The study included 48 rural and 48 urban participants recruited using nonprobability convenience sampling. Awareness was assessed using a self-developed questionnaire consisting of 10 yes/no questions addressing the role and benefits of exercise in older adults. Descriptive statistics were used, and awareness scores were compared using Welch's independent-samples t-test.

Results: Four rural participants had incomplete questionnaire responses and were excluded from the total awareness score analysis. The mean awareness score was 6.93 ± 3.44 among rural participants (n = 44) and 8.60 ± 2.00 among urban participants (n = 48). Urban participants demonstrated significantly higher awareness scores (t = -2.819, df = 67.76, p = 0.0063).

Conclusion: Older adults in both rural and urban areas demonstrated awareness of the health-related benefits of exercise. However, urban participants had significantly higher awareness scores. Community-based health education and physiotherapist-led programs may help strengthen awareness of exercise as medicine among older adults.

Categories: Therapeutics, Physical Medicine & Rehabilitation, Geriatrics
Keywords: exercise as medicine, exercise awareness, geriatric population, healthy ageing, physical activity, rural population, urban population

Introduction

Aging is accompanied by progressive changes in physical function, psychological well-being, and social participation. With increasing age, the likelihood of developing chronic conditions such as hypertension, diabetes, cardiovascular disease, arthritis, osteoporosis, and obesity also increases. These conditions may interfere with mobility, daily activities, and the ability of older adults to live independently. At the same time, improvements in health care and increased life expectancy have contributed to a substantial growth in the older population worldwide. The World Health Organization (WHO) reports that the global population aged 60 years and above is expected to reach approximately 2.1 billion by 2050, making healthy aging an increasingly important public health concern [1]. Healthy aging involves more than simply increasing the number of years a person lives. Maintaining functional capacity, physical health, mental well-being, and independence is equally important. Regular physical activity contributes to these aspects of aging by supporting muscle strength, joint mobility, balance, flexibility, and cardiovascular fitness. International physical activity recommendations emphasize regular physical activity for older adults because of its role in maintaining health and functional capacity [2]. National physical activity recommendations similarly recognize regular physical activity as an important component of disease prevention and health promotion [3]. The American College of Sports Medicine also provides recommendations supporting exercise and physical activity for older adults [4]. The increasing recognition of physical activity as a component of health care has led to greater interest in the concept of exercise as medicine. Exercise as medicine promotes the assessment and promotion of physical activity as part of health care and encourages health care professionals to provide appropriate physical activity advice, exercise prescriptions, or referrals [5]. Exercise can therefore be considered a planned health intervention rather than merely a recreational activity. Appropriate exercise can be prescribed according to an individual's age, health status, functional capacity, and specific health requirements. Evidence from previous research indicates that regular physical activity provides benefits across several chronic health conditions. Physical inactivity contributes substantially to

the global burden of noncommunicable diseases, while increasing physical activity can reduce the risk of several major chronic conditions [6]. Regular physical activity has also been associated with improvements in cardiovascular and metabolic health and reductions in the risk of chronic disease and premature mortality [7]. Exercise has further been described as a therapeutic intervention for a wide range of chronic diseases, supporting the broader concept of exercise as medicine [8]. Physical activity is particularly important in older adults because maintaining activity may help preserve functional independence and reduce the consequences associated with physical inactivity. Guidance for older adults emphasizes regular physical activity and appropriate exercise as part of healthy aging [9]. Despite these established benefits, participation in regular physical activity remains inadequate among many older adults. Lack of knowledge about appropriate exercise, fear of pain or injury, concern about falling, insufficient motivation, and limited guidance may discourage older individuals from exercising [10,11]. Awareness may influence the extent to which an individual accepts and incorporates physical activity into everyday life. An older person who understands the preventive and therapeutic value of exercise may be more likely to consider physical activity as part of routine health management. Conversely, inadequate knowledge may contribute to inactivity or the belief that exercise is relevant only to general fitness rather than disease prevention and management [10,11]. The level of awareness may also vary according to the environment in which older adults live. Rural and urban communities can differ in terms of health care availability, educational opportunities, health literacy, access to physiotherapy services, and exposure to health-related information. Recommendations for physical activity in older adults emphasize the importance of appropriate exercise for maintaining physical function and health [12,13]. Physiotherapists are well positioned to contribute to this area because their professional role includes exercise prescription, patient education, functional rehabilitation, and promotion of physical activity. Community-based physiotherapy may therefore contribute to improving knowledge regarding safe and appropriate exercise among older adults [14,15]. Differences in access to health information and health care may therefore contribute to differences in understanding and participation in physical activity. Previous research has established the importance of physical activity for healthy aging, while studies have also examined the challenges and perspectives of older adults regarding physical activity [16]. Physical inactivity has important consequences for older adults, including an increased risk of functional limitations and poorer health outcomes [17]. Evidence from India also indicates a substantial burden of physical inactivity among middle-aged and older adults [18]. Recent research among older adults in India has further identified educational, health-related, motivational, and environmental factors associated with physical activity participation [19,20].

Materials And Methods

Study design and setting

A cross-sectional comparative observational study was conducted to assess and compare awareness of exercise as medicine among rural and urban geriatric populations. The study was conducted in selected rural and urban areas of Karad, Maharashtra, over a period of six months.

Participants

A nonprobability convenience sampling method was used. Eligible individuals aged 60 years and above from rural and urban areas of Karad were approached for participation. Participants who met the inclusion criteria and were willing to participate were enrolled until the required sample size of 48 participants in each group was reached. No formal sampling frame or household list was used, and no random selection procedure was performed. The study planned to include 96 participants, with 48 participants each in the rural and urban groups, as specified in the study protocol. Equal numbers were planned for both groups to facilitate the rural-urban comparison. However, a formal a priori power calculation based on the expected between-group difference in awareness scores was not performed. Therefore, the sample size represents the planned recruitment target rather than a sample size established through a formal power analysis. A total of 96 participants aged 60 years and above were included in the study, comprising 48 participants from rural areas and 48 participants from urban areas. The recruitment target was 48 participants in each group. Only eligible responses received up to the completion of the target sample size in each group were considered for the study. Additional submissions received after the target sample size had been reached were not included in the final study sample.

The inclusion and exclusion criteria for participant selection are presented in Table *1*.

Inclusion criteria	Exclusion criteria
Participants aged 60 years and above.	Participants below 60 years of age.
Participants residing in rural or urban areas of Karad.	Participants unwilling to participate in the study.
Participants willing to give informed consent.	Participants with severe cognitive impairment or communication difficulties that prevented completion of the questionnaire.

TABLE 1: Inclusion and exclusion criteria

Study procedure

The purpose and procedure of the study were explained to eligible participants in a language they could understand. Written informed consent was obtained before participation. Personal information was kept confidential, and participation was voluntary. A self-developed structured questionnaire was used to assess awareness of exercise as medicine. The questionnaire consisted of two sections. Section A collected demographic information, including age, sex, place of residence, educational status, occupation, and known medical conditions. Section B consisted of 10 yes-or-no questions addressing awareness of physiotherapy, the importance of regular exercise, the concept of exercise as medicine, the role of exercise in chronic disease management, reduction of joint pain and stiffness, improvement of balance and fall prevention, cardiovascular health, mental health, maintenance of independence, and the safety of exercise among older adults. The questionnaire was administered through a face-to-face interview. Assistance was provided when participants had difficulty understanding the questions. Each interview required approximately 15-20 minutes. Completed questionnaires were checked, and the responses were entered into Microsoft Excel (Microsoft Corporation, Redmond, WA) for analysis.

Outcome measure

The primary outcome measure was the awareness score obtained from the 10 questionnaire items. Each “Yes” response was assigned one point, giving a possible score range of 0-10. Participants with incomplete questionnaire responses were excluded from the total awareness score analysis. Of the 48 rural participants, four had incomplete questionnaire responses and were therefore excluded from the total awareness score analysis. All 48 urban participants had complete questionnaire responses. However, the available responses from the four incomplete rural questionnaires were retained for item-wise analysis. Missing responses were treated as missing data and were not counted as “No” responses. The questionnaire used for data collection was self-developed for the present study. The 10-item structured questionnaire was developed by the principal investigator and reviewed in consultation with the research guide and other faculty members to assess the clarity and relevance of the questions. The complete questionnaire is provided in Appendix 1.

Statistical analysis

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the collected data. The proportions of “Yes,” “No,” and missing responses were calculated for each questionnaire item. The mean awareness scores of the rural and urban groups were compared using Welch's independent-samples t-test because the variability of awareness scores differed between the two groups. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 96 older adults were included in the study, comprising 48 rural participants and 48 urban participants. Four rural participants had incomplete responses to one or more questionnaire items and were therefore excluded from the total awareness score analysis. All 48 urban participants had complete responses.

The distribution of responses to the individual awareness questionnaire items is presented in Table *2*. Among rural participants, the proportion of “Yes” responses ranged from 62.5% to 75.0%. Among urban participants, the proportion of “Yes” responses ranged from 70.8% to 97.9%. Urban participants demonstrated a higher proportion of “Yes” responses for most questionnaire items.

Awareness questionnaire item	Rural Yes, n (%)	Rural No, n (%)	Rural Missing, n (%)	Urban Yes, n (%)	Urban No, n (%)
Awareness of physiotherapy	30 (62.5)	17 (35.4)	1 (2.1)	45 (93.8)	3 (6.2)
Importance of regular exercise	36 (75.0)	10 (20.8)	2 (4.2)	47 (97.9)	1 (2.1)
Exercise can work like medicine for some diseases	33 (68.8)	14 (29.2)	1 (2.1)	45 (93.8)	3 (6.2)
Exercise can help control blood pressure and manage diabetes	33 (68.8)	13 (27.1)	2 (4.2)	43 (89.6)	5 (10.4)
Exercise can reduce joint pain and stiffness	35 (72.9)	12 (25.0)	1 (2.1)	46 (95.8)	2 (4.2)
Exercise can improve balance and prevent falls	30 (62.5)	17 (35.4)	1 (2.1)	39 (81.2)	9 (18.8)
Exercise can improve heart health	34 (70.8)	13 (27.1)	1 (2.1)	40 (83.3)	8 (16.7)
Exercise can improve mental health and reduce stress	30 (62.5)	16 (33.3)	2 (4.2)	35 (72.9)	13 (27.1)
Exercise helps maintain independence in old age	34 (70.8)	13 (27.1)	1 (2.1)	34 (70.8)	14 (29.2)
Exercise is safe for older adults when done properly	35 (72.9)	12 (25.0)	1 (2.1)	39 (81.2)	9 (18.8)

TABLE 2: Responses to individual awareness questionnaire items

Note: Percentages are based on 48 participants in each group. “Missing” indicates an unanswered questionnaire item.

The comparison of total awareness scores is illustrated in Figure *1*. The mean awareness score was higher among urban participants than among rural participants.

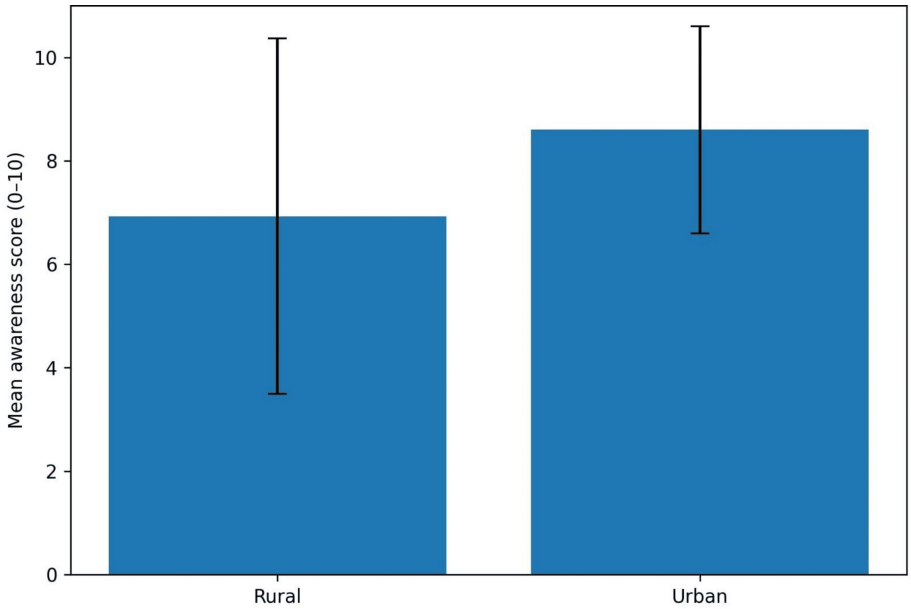


FIGURE 1: Mean awareness scores in rural and urban geriatric populations

Bars represent mean awareness scores, with error bars representing standard deviations. The awareness score ranged from 0 to 10.

The comparison of mean awareness scores between the rural and urban groups is presented in Table *3*. The rural group had a mean awareness score of 6.93 ± 3.44, whereas the urban group had a mean awareness score of 8.60 ± 2.00. Welch's independent-samples t-test demonstrated a statistically significant difference between the groups ($t = -2.819$, $df = 67.76$, $p = 0.0063$), with higher awareness in the urban group. As a

sensitivity analysis, an available-case approach was used to account for missing responses in the rural group. For each questionnaire item, the proportion of "Yes" responses was calculated using the number of participants who provided a valid response to that item. The average of these item-specific proportions corresponded to an awareness score of 7.07 out of 10 for the rural group and 8.60 out of 10 for the urban group. The direction of the findings remained consistent with the primary analysis, with higher awareness observed among urban participants.

Study group	n	Mean awareness score	Standard deviation	t-value	df	p-value
Rural	44	6.93	3.44	-2.819	67.76	0.0063
Urban	48	8.6	2	-	-	-

TABLE 3: Comparison of mean awareness scores between rural and urban geriatric populations

Awareness score represents the number of "Yes" responses across the 10 questionnaire items. Participants with incomplete questionnaire responses were excluded from the awareness score analysis. Welch's independent-samples t-test was used for comparison. A p-value <0.05 was considered statistically significant.

Discussion

The present study assessed and compared awareness of exercise as medicine among older adults living in rural and urban areas. The findings demonstrated a mean awareness score of 6.93 ± 3.44 among rural participants and 8.60 ± 2.00 among urban participants. The urban group demonstrated a significantly higher awareness score than the rural group (p = 0.0063). The findings indicate that participants in both groups were aware of several health-related benefits of exercise. This is consistent with international recommendations emphasizing regular physical activity for older adults and its importance in maintaining health, physical function, and independence [1,2]. National recommendations and professional guidance also support regular physical activity and appropriately prescribed exercise among older adults [3,4]. The higher awareness observed among urban participants may reflect differences in exposure to health information, educational opportunities, access to health care services, and contact with health professionals. However, these factors were not directly measured in the present study and should therefore be considered possible explanations rather than established causes of the observed difference. The concept of exercise as medicine emphasizes physical activity as an important component of health care and chronic disease prevention and management [5]. Evidence has demonstrated that physical inactivity contributes to a substantial burden of noncommunicable disease, while regular physical activity provides multiple health benefits [6,7]. Exercise has also been described as a therapeutic intervention across a wide range of chronic diseases, supporting its role as an important component of preventive and therapeutic health care [8]. The importance of exercise is particularly relevant to older adults because physical activity can contribute to maintaining physical function, independence, and quality of life. Guidance for older adults recommends regular physical activity adapted to individual abilities and health conditions [9]. Nevertheless, older adults may encounter barriers such as pain, fear of falling or injury, lack of motivation, limited knowledge, and inadequate guidance [10,11]. The present study found that urban participants had higher awareness than rural participants. Item-wise analysis revealed specific areas of comparatively lower awareness among rural participants. Awareness of physiotherapy, the role of exercise in improving balance and preventing falls, and the benefits of exercise for mental health and stress reduction each received 62.5% positive responses in the rural group. In comparison, the corresponding urban response rates were 93.8%, 81.2%, and 72.9%, respectively. Awareness of the role of exercise in improving heart health was also lower among rural participants (70.8%) than among urban participants (83.3%). Furthermore, awareness of exercise safety among older adults was 72.9% in the rural group and 81.2% in the urban group. These findings suggest that rural health education programs should particularly emphasize physiotherapy awareness, fall prevention, the mental health benefits of exercise, cardiovascular health, and safe exercise practices. Differences in awareness may be important because knowledge of appropriate and safe physical activity can support informed participation in exercise. Professional recommendations emphasize the importance of appropriately designed exercise for older adults, including consideration of individual functional abilities and health conditions [12,13]. Previous qualitative research has shown that older adults' participation in physical activity may be influenced by their personal experiences, beliefs, social environment, and access to appropriate opportunities [16]. These findings support the need to consider both knowledge and environmental factors when developing strategies to promote physical activity among older adults. Physiotherapists may have an important role in addressing these needs. Their professional expertise includes exercise prescription, functional assessment, education, and rehabilitation. Community-based physiotherapy programs can provide older adults with information about the benefits of physical activity, appropriate exercise selection, safety considerations, and strategies for maintaining physical function [15]. These findings highlight the importance of comprehensive physiotherapy assessment in older adults, considering their overall functional status rather than focusing solely on the presenting complaint. The consequences of physical inactivity in older adults are substantial and include increased risks of functional

limitations and several adverse health outcomes [17]. Evidence from India has also demonstrated a considerable prevalence of physical inactivity among middle-aged and older adults [18]. Recent Indian research has identified multiple factors influencing physical activity among older adults, including educational status, previous occupation, health conditions, motivation, and other barriers [19,20]. The statistically significant difference observed in the present study suggests that residence may be associated with differences in awareness within this study population. However, because the study was cross-sectional, causality cannot be established. The difference should therefore not be interpreted as evidence that urban residence itself causes greater awareness. The findings support the importance of community-based educational strategies, particularly in settings where older adults may have fewer opportunities to receive structured health information. Physiotherapist-led education could include information about the health benefits of exercise, exercise safety, appropriate exercise selection, management of common chronic conditions, fall prevention, and maintenance of independence. Professional assessment before initiating an exercise program is important in older adults to identify underlying health conditions, recognize potential risks, and ensure that exercise recommendations are appropriate and safe for their individual health status.

Limitations

The study had a relatively small sample size and was conducted in selected rural and urban areas of one geographical region, which may limit the generalizability of the findings. The study used a self-developed questionnaire that was reviewed by the principal investigator's research guide and other faculty members for clarity and relevance. However, formal validity and reliability testing, including pilot testing, was not performed. This may limit the measurement consistency of the questionnaire, and future studies should establish its psychometric properties before wider application. Four rural participants had incomplete questionnaire responses and were excluded from the total awareness score analysis. However, their available item-level responses were retained for the analysis presented in Table *2*. The study assessed awareness but did not evaluate actual physical activity levels or whether awareness translated into regular exercise participation. Although educational and occupational information was collected, these variables were not included in the comparative analysis. Therefore, their potential influence on awareness levels between rural and urban participants could not be assessed. Furthermore, because the study used a cross-sectional design, causal relationships between place of residence and awareness could not be established. Although educational and occupational information was intended to be collected, educational status data were not available for a reliable comparison between the rural and urban groups. Therefore, the potential influence of educational status on awareness could not be assessed. Future studies should systematically record and analyze educational status and occupation to better understand their association with awareness of exercise as medicine.

Conclusions

Participants in both rural and urban groups showed varying levels of awareness of exercise as medicine, as assessed by the structured 10-item questionnaire. However, urban participants had significantly higher mean awareness scores than rural participants. These findings highlight the need to strengthen awareness of the benefits, appropriate use, and safety of exercise among older adults, particularly through community-based health education and physiotherapist-led programs. Further studies involving larger and more geographically diverse populations and validated assessment tools are needed to identify factors associated with awareness and determine whether increased awareness translates into greater participation in physical activity.

Appendices

Appendix 1

Awareness of Exercise as Medicine Questionnaire

Section A: Demographic Information

Name: _____

Age: _____

Gender: _____

Place of Residence: Rural / Urban

Educational Status: _____

Occupation: _____

Any Known Medical Condition: _____

Section B: Awareness of Exercise as Medicine

Instructions: Please answer each question by selecting Yes or No.

1) Do you know what physiotherapy is?
☒ Yes ☒ No

2) Do you know that regular exercise is important for good health?
☒ Yes ☒ No

3) Have you heard that exercise can work like medicine for some diseases?
☒ Yes ☒ No

4) Do you know that exercise can help control blood pressure and manage diabetes?
☒ Yes ☒ No

5) Do you believe exercise can reduce joint pain and stiffness?
☒ Yes ☒ No

6) Do you know that exercise can improve balance and prevent falls?
☒ Yes ☒ No

7) Do you think exercise can improve heart health?
☒ Yes ☒ No

8) Do you believe exercise can improve mental health and reduce stress?
☒ Yes ☒ No

9) Do you know that exercise helps maintain independence in old age?
☒ Yes ☒ No

10) Do you think exercise is safe for older adults when done properly?
☒ Yes ☒ No

Scoring: Each “Yes” response is scored as 1 and each “No” response as 0. The total awareness score ranges from 0 to 10. Incomplete questionnaires were excluded from the total awareness score analysis.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Rutuja R. Patil, Tejashree Kumbhar

Acquisition, analysis, or interpretation of data: Rutuja R. Patil, Tejashree Kumbhar

Drafting of the manuscript: Rutuja R. Patil, Tejashree Kumbhar

Critical review of the manuscript for important intellectual content: Rutuja R. Patil, Tejashree Kumbhar

Supervision: Rutuja R. Patil, Tejashree Kumbhar

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Institutional Ethics Committee, Krishna Vishwa Vidyapeeth (Deemed to be University), Karad, Maharashtra issued approval 539/2025-2026. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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