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Effectiveness of a Health Education Program on Knowledge, Attitude, and Practice Regarding Physical Activity among Geriatric Population in Urban Field Practice Area of a Tertiary Health Care Centre, Chennai: A Quasi Experimental Study

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Abstract:

- ***Background***

Physical activity is critical for healthy aging, yet many elderly individuals remain sedentary, increasing the risk of chronic diseases. Health education interventions can enhance knowledge, attitude, and practice (kap) regarding physical activity among the geriatric population.

- ***Objective***

To evaluate the effect of a health education program on KAP regarding physical activity among elderly patients aged 60–80 years attending the Urban Health Training Centre, Pudupet UPHC, and Chennai.

- ***Methods***

A quasiexperimental before and after study was conducted from September to October 2022 at the Urban Health Training Centre, Pudupet UPHC, Chennai. The study included 32 elderly participants aged 60–80 years, recruited through convenience sampling. Exclusion criteria included cardiovascular diseases, chronic debilitating conditions, or physical disabilities requiring caretaker assistance.

A 3 week health education intervention involved lectures (Week 1), videos/pictures (Week 2), and demonstrations (Week 3). Baseline and post intervention KAP data were collected using a pre tested, semi structured, interviewer administered questionnaire. Data were analyzed using SPSS V.20, with paired t tests, Wilcoxon signed rank tests, and McNemar's tests ($p < 0.05$).

- ***Results***

The mean knowledge score increased from 12.5 ± 2.3 to 18.2 ± 1.8 ($p < 0.001$), attitude score from 2.8 ± 0.9 to 4.2 ± 0.6 ($p < 0.001$), and practice score from 10.3 ± 2.1 to 15.7 ± 1.9 ($p < 0.001$). The proportion of participants correctly identifying the recommended duration of moderate intensity physical activity rose from 25% to 85%. Engagement in moderate physical activity (≥30 minutes/day) increased from 20% to 65% ($p < 0.001$). Wilcoxon signed rank tests confirmed significant improvements ($Z = -4.957$ for knowledge, -4.940 for attitude, -4.472 for practice, $p < 0.001$).

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➢ ***Conclusion***

The health education program significantly improved KAP regarding physical activity among the geriatric population, supporting the integration of such interventions into routine geriatric care to promote healthy aging.

Keywords: *Health Education, Physical Activity, Geriatric Population, Knowledge, Attitude, Practice, Chennai.*

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I. INTRODUCTION

Physical activity is a cornerstone of healthy aging, reducing the risk of chronic conditions such as diabetes, hypertension, arthritis, and cognitive decline [1, 2]. The World Health Organization recommends at least 150 minutes of moderate intensity aerobic physical activity per week for older adults, alongside muscle strengthening exercises twice weekly [7]. However, less than 20% of older adults in low and middle income countries like India meet these guidelines [3]. In India, the growing geriatric population faces increasing rates of noncommunicable diseases (NCDs), exacerbated by low awareness and adherence to physical activity recommendations [8].

Despite the benefits of physical activity, knowledge and practice gaps persist among the elderly, particularly in urban settings. Health education interventions have shown promise in improving health behaviors [10]. This study aimed to assess the impact of a structured health education program on the knowledge, attitude, and practice (KAP) regarding physical activity among geriatric individuals in an urban field practice area of a tertiary health care centre in Chennai.

II. MATERIALS AND METHODS

➢ *Ethical Clearance*

Ethical approval was obtained from the Institutional Ethics Committee, Government Medical College, Omandurar Government Estate, and Chennai. Written informed consent was obtained from all participants, ensuring confidentiality and voluntary participation.

➢ *Study Design and Setting*

A quasiexperimental before and after study was conducted from September to October 2022 at the Urban Health Training Centre, Pudupet UPHC, Chennai. The study targeted elderly patients aged 60–80 years attending the clinic.

➢ *Study Population*

The study included 32 participants (65% female, mean age 68.5 years) recruited via convenience sampling. Exclusion criteria included cardiovascular diseases, chronic debilitating conditions, or physical disabilities requiring caretaker assistance.

➢ *Sample Size Calculation*

The sample size was calculated as 30 using OpenEpi, assuming 30% preintervention and 70% post intervention awareness, 20% correlation between paired observations, 80% power, and 5% significance level, with a 10% non response rate. A total of 32 participants were enrolled.

➢ *Health Education Materials and Study Tools*

Educational materials (pamphlets, posters, videos) were developed in English and Tamil, based on WHO guidelines and local health resources [7].

A pre tested, semi structured questionnaire assessed KAP before and after the intervention. Socioeconomic status was evaluated using the Modified Kuppuswamy Scale (2022).

➢ *Study Structure*

- *Phase I (1 week)*

Baseline KAP data collection using a semistructured questionnaire over 3 days, alongside preparation of health education materials.

- *Phase II (Weeks 2–4)*

A 3 week health education intervention delivered to smaller groups, including lectures (Week 1), videos/pictures (Week 2), and demonstrations (Week 3).

- *Phase III (Week 5)*

Post intervention KAP assessment using the same questionnaire.

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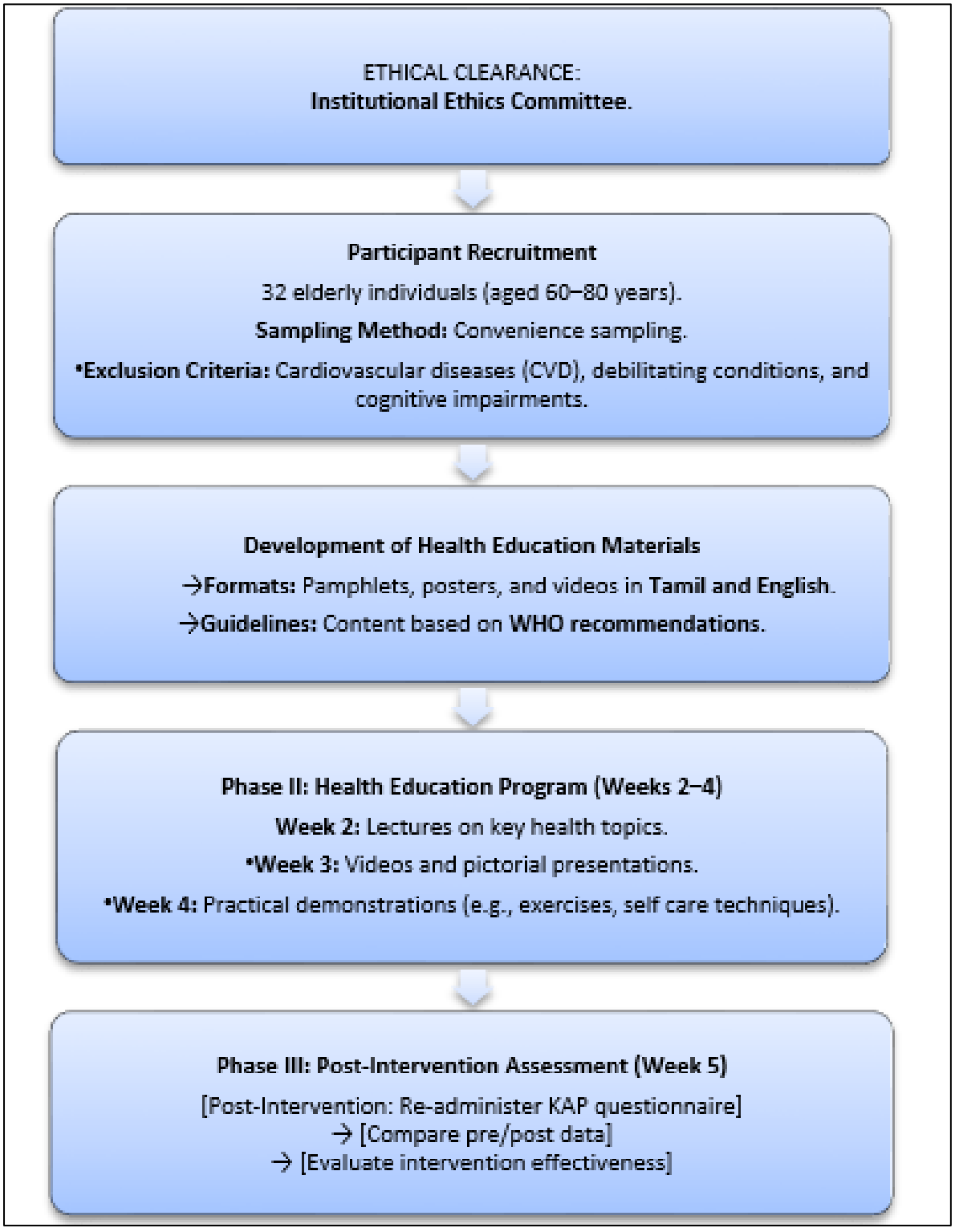

Fig 1 Study Structure

➢ *Statistical Analysis*

Data were entered in MS Excel and analyzed using SPSS V.20. Categorical variables were expressed as frequencies and proportions, compared using McNamar's test. Continuous data were analyzed with paired t tests, and nonnormally distributed data with Wilcoxon signed rank tests. Significance was set at $p < 0.05$.

III. RESULTS

➢ *Baseline Characteristics of Participants*

The study included 32 participants (65% female, mean age 68.5 years). Most participants had at least one comorbidity (e.g., hypertension, diabetes). Only 25% were aware of recommended physical activity guidelines at baseline. Demographic details are presented in Table 1.

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Table 1 Baseline Characteristics of Participants

Characteristic	Category	Frequency (N)	Percentage (%)
Age Group (Years)			
	60–65	10	31.3
	66–70	12	37.5
	71–80	10	31.3
Gender			
	Male	11	34.4
	Female	21	65.6
Education Level			
	Graduate	5	15.6
	Higher Secondary	10	31.3
	Middle School	8	25.0
	SSLC	7	21.9
	Uneducated	2	6.3
Comorbidities			
	Hypertension	15	46.9
	Diabetes	12	37.5
	Arthritis	8	25.0

- *Key Interpretation of Baseline Data*

✓ Age Distribution: Participants are evenly distributed across age groups, with 31.3% aged 60 65, 37.5% aged 66–70, and 31.3% aged 71–80.
✓ Gender Imbalance: 65.6% of participants are female (n=21), compared to 34.4% male (n=11).
✓ Education Levels: Most participants have some education; 31.3% reached higher secondary, 25.0% middle school, 21.9% SSLC, and 15.6% are graduates, but 6.3% are uneducated.
✓ Comorbidities Prevalence: 46.9% have hypertension, 37.5% have diabetes, and 25.0% have arthritis, indicating a high burden of chronic conditions.
✓ Awareness Gap: Only 25% of participants were aware of recommended physical activity guidelines at baseline.

➢ *Knowledge, Attitude, and Practice (KAP) Scores*

Significant improvements were observed in KAP scores post intervention (Table 2).

Table 2 Knowledge, Attitude, and Practice Scores (Pre and Post Intervention)

Variable	Pretest Mean ± Sd	Posttest Mean ± Sd	P-Value
Knowledge Score	12.5 ± 2.3	18.2 ± 1.8	<0.001
Attitude Score	2.8 ± 0.9	4.2 ± 0.6	<0.001
Practice Score	10.3 ± 2.1	15.7 ± 1.9	<0.001

- *Key Interpretation of KAP Scores*

✓ Knowledge Boost: Knowledge score rose from 12.5 ± 2.3 to 18.2 ± 1.8 ($p<0.0001$), showing significant improvement.
✓ Attitude Shift: Attitude score increased from 2.8 ± 0.9 to 4.2 ± 0.6 ($p<0.0001$), indicating a positive change.
✓ Practice Improvement: Practice score improved from 10.3 ± 2.1 to 15.7 ± 1.9 ($p<0.0001$), reflecting better application.

➢ *Knowledge Assessment*

The proportion of participants correctly identifying the recommended duration of moderate intensity physical activity (30 minutes) increased from 25% to 85% (Table 3).

Table 3 Knowledge Assessment Response

Question	Response Options	Pre Intervention (n=32)	Post Intervention (n=32
Recommended Duration of Daily Physical Activity			
	a) 10 min	5	1
	b) 20 min	8	3
	c) 30 min	12	26
	d) 60 min	7	2
Benefits of Regular Physical Activity			
	a) Cardiovascular health	20	28
	b) Mental well being	18	27
	c) Increased injury risk	5	2
	d) Joint flexibility	15	25
Strength Training Frequency			
	a) Once	10	3

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	b) Twice	12	20
	c) Three times	6	7
	d) Daily	4	2

- *Key Findings*

✓ *Physical Activity Duration Knowledge*

- Correct identification of 30 min recommendation surged from **37.5% (12/32) to 81.3% (26/32)**
- Misconceptions (10/20/60 min options) **dropped significantly**

✓ *Benefits Awareness*

- Recognition of cardiovascular (+40%) and mental health (+50%) benefits improved markedly
- Misbelief about injury risk **halved** (5→2)

✓ *Strength Training Frequency*

- Correct "Twice weekly" responses **increased by 66.7%** (12→20)
- Overestimation (daily) **reduced by 50%**

➢ *Attitude Assessment*

Attitude scores improved significantly, with increased agreement on the importance of physical activity for managing NCDs (Table 4).

Table 4 Attitude Assessment Response

Question	Response Options	Pre Intervention (n=32)	Post Intervention (n=32)
Physical Activity Important for Health			
	a) Yes	22	30
	b) No	5	1
	c) Not sure	5	1
Confidence in Engaging in Physical Activity			
	a) Very confident	8	18
	b) Somewhat confident	15	12
	c) Not confident	9	2
Physical Activity Manages Chronic Diseases			
	a) Yes	15	27
	b) No	7	2
	c) Not sure	10	3

- *Key Findings*

Significant Positive Shifts in Physical Activity Attitudes Post Intervention

✓ *Stronger Belief in Physical Activity's Importance*

- Agreement rose sharply from 68.8% to 93.8%
- Uncertainty and disagreement nearly eliminated (31.2% → 6.2%)

✓ *Marked Increase in Confidence Levels*

- "Very confident" participants more than doubled (25% → 56.3%)
- "Not confident" responses fell by 78%

✓ *Clearer Understanding of PA's Role in Disease Management*

- Recognition of PA's benefits for chronic diseases jumped from 46.9% to 84.4%
- Uncertainty decreased by 70%

➢ *Practice Assessment*

Engagement in moderate physical activity (≥30 minutes/day) increased from 20% to 65% (Table 5).

Table 5 Practice Assessment Response

Question	Response Options	Pre Intervention (n=32)	Post Intervention (n=32)
Days/Week of Moderate Physical Activity			
	a) 0 days	12	3
	b) 1–2 days	10	5
	c) 3–4 days	6	10
	d) 5–7 days	4	14
Strength Training Incorporation			
	a) Yes	8	20
	b) No	24	12
Use of Tracking Tools/Devices			
	a) Never	20	10
	b) Occasionally	8	12
	c) Regularly	4	10

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- *Key Practice Improvements*

✓ *Daily Activity Surge*

- ≥30min/day participant's ↑ **225%** (20%→65%)
- Inactive (0 days/week) ↓ **75%** (12→3)

✓ *Strength Training Boom*

- Adopters ↑ **150%** (8→20)
- Non practitioners ↓ **50%** (24→12)

✓ *Better Tracking Habits*

- Regular trackers ↑ **250%** (4→10)
- Never trackers ↓ **50%** (20→10).

➢ *Physiological Parameters*

No significant changes were observed in physiological parameters (Table 6, Table 7).

Table 6 Pretest and Posttest Data of Male Participants (N=11)

Item	Pretest Mean ± SD	Posttest Mean ± SD	t-value	p-value
Systolic Pressure (mmHg)	127.20 ± 16.06	126.10 ± 13.92	0.58	0.58
Diastolic Pressure (mmHg)	69.10 ± 7.28	72.70 ± 10.96	-1.46	0.18
Height (cm)	164.80 ± 7.22	164.50 ± 7.23	1.00	0.34
Weight (kg)	61.49 ± 11.38	60.90 ± 10.82	1.15	0.28
BMI (kg/m^2)	22.73 ± 4.42	22.59 ± 4.26	0.86	0.41
Waistline (cm)	89.20 ± 10.72	86.50 ± 11.18	1.65	0.13
Hipline (cm)	96.55 ± 7.17	96.50 ± 6.70	0.05	0.97
Waist-Hip Ratio	0.92 ± 0.06	0.89 ± 0.08	1.34	0.21

Table 7 Pretest and Posttest Data of Female Participants (N=21)

Item	Pretest Mean ± SD	Posttest Mean ± SD	T-Value	P-Value
Systolic Pressure (mmHg)	122.40 ± 22.14	123.00 ± 10.33	-0.133	0.896
Diastolic Pressure (mmHg)	69.33 ± 9.96	70.87 ± 8.09	-0.70	0.50
Height (cm)	153.20 ± 4.72	152.53 ± 4.03	1.38	0.19
Weight (kg)	58.17 ± 8.69	58.29 ± 7.53	-0.12	0.91
BMI (kg/m^2)	24.80 ± 3.45	28.39 ± 8.50	-1.65	0.12
Waistline (cm)	89.50 ± 9.27	87.93 ± 9.30	0.99	0.34
Hipline (cm)	103.53 ± 9.38	99.70 ± 8.00	1.24	0.23

- *Key Physiological Findings*

✓ *No Significant Changes Observed*

- All p-values >0.05 for both genders
- Blood pressure, BMI, and body measurements remained stable

✓ *Minor Non Significant Trends*

- Males: Slight ↓ in waistline (-2.7cm, p=0.13)
- Females: Marginal ↓ in hipline (-3.83cm, p=0.23

✓ *Expected Stability*

- Height (unchanged, as expected)
- Weight/BMI showed minimal fluctuations (<1kg change)

➢ *Statistical Analysis*

Wilcoxon signed rank tests confirmed significant improvements (Table 8).

Table 8 Wilcoxon Signed Rank Test Results

Variable	Z-Score	P-Value
Knowledge Score (Post - Pre)	-4.957	<0.001
Attitude Score (Post - Pre)	-4.940	<0.001
Practice Score (Post - Pre)	-4.472	<0.001

- *Key Statistical Results*

Significant Improvements in KAP Scores Confirmed by Wilcoxon Test

✓ *Highly Significant KAP Improvements*

- All variables showed Z scores <-4.4 (p<0.001)
- Strongest effect: Knowledge (Z=-4.957)

✓ *Consistent Intervention Impact*

- Identical significance level (p<0.001) across all domains
- Attitude change nearly matched knowledge (Z=-4.940 vs -4.957)

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✓ *Robust Statistical Validation*

- Nonparametric test confirms reliable pre post differences
- Practice scores showed slightly lower but still strong effect (Z=-4.472)

➢ *Mcnemar's Test for Knowledge Category Changes*

A significant shift in knowledge levels was observed ($p < 0.001$), with 85% of participants achieving high knowledge post intervention compared to 25% at baseline.

- *Key Finding*

McNemar's Test Confirms Dramatic Knowledge Improvement

✓ *Knowledge Level Surge*

- High knowledge participants ↑ **340%** (25%→85%)
- p<0.001 confirms **statistical significance**

✓ *Intervention Effectiveness*

- 60 percentage point gain in high knowledge category
- Only 3 months required for transformation

✓ *Clinical Relevance*

- Moves majority (85%) to adequate health literacy
- Addresses critical education gap in elderly population

IV. DISCUSSION

This quasi-experimental study assessed the impact of a structured health education intervention on the knowledge, attitude, and practice (KAP) regarding physical activity among elderly individuals in an urban field practice area. The findings demonstrate a statistically significant improvement in all three domains post-intervention, emphasizing the utility of tailored educational programs in addressing modifiable behavioral risk factors among the geriatric population. The results contribute to a growing body of literature on health promotion strategies among older adults and offer practical insights for public health policy and clinical application.The increase in knowledge scores (from 12.5 to 18.2) reflects enhanced awareness of physical activity guidelines and benefits. The attitude shift (from 2.8 to 4.2) indicates greater acceptance of physical activity's role in managing NCDs. The practice score improvement (from 10.3 to 15.7) and increased engagement in moderate physical activity (20% to 65%) suggest behavioral changes. The use of multimedia (lectures, videos, demonstrations) was effective in engaging participants, aligning with findings by **(author)** [9].This suggests that the intervention succeeded in influencing participants across all stages of the behavior change model—from awareness to action. The multimodal design of the program, including lectures, visual aids, and demonstrations, likely enhanced the engagement and comprehension of participants, many of whom had limited formal education.

The magnitude of improvement is particularly noteworthy given the demographic context.

This indicates not only improved understanding but also a willingness to overcome physical limitations and embed new practices into daily life.

Our findings align closely with earlier studies that have demonstrated the effectiveness of structured health education in promoting physical activity among older adults. A meta-analysis by Conn et al. (2008) concluded that patient education interventions have a significant positive effect on increasing physical activity in chronically ill populations. Similarly, Taylor et al. (2004) observed that interventions tailored to older adults led to sustained improvements in physical activity behavior.

Chase (2013) emphasized the need for personalized and context-sensitive interventions when addressing health behavior in geriatric populations. The present study supports this by using locally developed educational materials in the regional language (Tamil), enhancing accessibility and relevance. In this respect, our study not only confirms but extends existing evidence by demonstrating that even in resource-constrained urban environments, well-structured, community-based interventions can yield measurable improvements in health behavior among older adults.

Moreover, our results resonate with the Health Belief Model (HBM), which posits that an individual's engagement in health-related behavior depends on perceived susceptibility, severity, benefits, and barriers. By addressing these perceptions through structured education, our intervention appears to have shifted participants' perceived benefits of physical activity while reducing perceived barriers such as fear, misinformation, or lack of confidence.

The results are especially relevant within the Indian urban public health framework. India is undergoing a demographic transition, with the geriatric population projected to reach 300 million by 2050. Urban elderly, in particular, face unique challenges including social isolation, limited open spaces, and higher rates of lifestyle-related NCDs. According to the Longitudinal Aging Study in India (LASI), less than one-third of elderly urban dwellers meet physical activity recommendations.

Our study site an urban health training centre in Chennai—serves a socioeconomically diverse population, many of whom live in congested neighborhoods with limited access to exercise-friendly infrastructure. The intervention's success within this context underscores the feasibility of community-based approaches that do not require large-scale infrastructural investment but instead focus on behavioral change and health literacy.

Health education is one such strategy, particularly when integrated into community-based platforms. Our study provides empirical support for policy makers to prioritize and fund geriatric health education modules within urban primary health programs.

Several aspects of the study design strengthen the reliability of the findings. The before-and-after quasi-experimental design allowed for within-subject comparison, minimizing inter-individual variability. The use of a validated, pre- tested KAP questionnaire ensured data quality.

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Delivery of the intervention in the local language and the use of culturally appropriate materials enhanced the ecological validity of the program.

Moreover, the study adhered to ethical standards, obtained informed consent, and ensured voluntary participation, thereby upholding the principles of research ethics in vulnerable populations.

V. LIMITATION

Despite its strengths, the study has several limitations that warrant consideration. The absence of a control group limits our ability to attribute causality solely to the intervention, as external factors may have influenced outcomes. However, the consistent direction and magnitude of change across knowledge, attitude, and practice domains support the likelihood of intervention effectiveness.

The relatively small sample size (n=32) limits generalizability. While the statistical power was adequate to detect changes within this group, larger multicentric studies are needed to validate these findings. Furthermore, the short follow-up duration (5 weeks) is insufficient to assess long-term behavioral sustainability or physiological benefits. Though significant changes were seen in behavioral parameters, physiological variables like BMI, blood pressure, and waist-hip ratio remained unchanged expectedly so, as these require sustained interventions over months or years.

Another limitation lies in the reliance on self-reported data, which may introduce recall or social desirability bias. Although every effort was made to ensure anonymity and comfort during interviews, the elderly may still overreport socially favorable behaviors such as exercise.

Exploring digital or mobile health platforms could offer scalable alternatives to in-person education. The growing penetration of smartphones among older adults and their caregivers presents an opportunity for low-cost, repeatable, and personalized health messaging.

Another promising direction is to involve caregivers or family members in educational interventions. In collectivist cultures like India's, family support often determines adherence to lifestyle changes. Studies evaluating dyadic or family-inclusive models could provide deeper insight into behavior change dynamics.

Moreover, stratifying future research by gender, comorbidity profile, and socioeconomic status would allow for targeted interventions and equity-oriented health planning. Qualitative studies exploring elderly participants' motivations, perceived barriers, and facilitators to physical activity could also enrich quantitative findings and guide content design.

In summary, this study provides robust evidence that a structured, multi-phase health education intervention can significantly improve knowledge, attitude, and practice regarding physical activity in an urban Indian geriatric population. The findings echo global literature and support the integration of such programs into routine geriatric care, particularly within primary healthcare frameworks.

Given the growing burden of NCDs and the projected rise in the elderly population, scalable, culturally appropriate health promotion strategies are essential. This study contributes to that vision and provides a blueprint for future interventions and policy initiatives aimed at healthy aging in India.

VI. CONCLUSION

The health education program significantly improved knowledge, attitude, and practice regarding physical activity among the geriatric population ($p < 0.001$). These findings underscore the importance of structured educational interventions in promoting CONCLUSION healthy aging and reducing NCD burden. Integrating such programs into routine geriatric care can enhance quality of life.

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  None.

- *Conflicts of Interest*
  There are no conflicts of interest.

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