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Effect Of Multimedia-Based Health Education Program on Fall Prevention Awareness Behaviour Among Older Adults Attending Primary Care Clinics in Ekiti State, Nigeria.

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ABSTRACT:
Falls among the elderly are becoming a major public health issue, often with serious consequences. Due to its usefulness, a rising number of academics advise employing multimedia-based tools such as PowerPoint slide presentations, audio, and graphics to educate people of all ages' older adults.
The investigation was conducted using a quasi-experimental design. Using the Power formula, 60 participants were selected among older persons who attended two tertiary hospitals in Ekiti State. The Experimental Group (EG) and Control Group (CG) each contained 30 participants. Both groups received different forms intervention twice a week for six weeks. Data were collected using a standardized and validated questionnaire including the Fall Awareness Behavior (FaB) scale.
There was no significant difference ($p>0.05$) in mean fall awareness behavior scores between the two groups at pre-intervention stage: EG (70.5 ± 12.4) and CG (73.7 ± 8.6). The mean FaB scores for CG did not differ significantly ($p>0.05$) between pre-intervention (73.7±8.7) and 12th-week follow-up (74.3±10.0). However, there was a significant difference ($p<0.05$) in the mean FaB scores for EG between pre-intervention (70.5±12.4) and at the 12th-week follow-up (89.2±21.9). At the 12-week follow-up, the EG had a substantial Effect Size (-1.1, 95% confidence interval: -1.6 to -0.5).
In summary, the multimedia-based health education intervention program effectively increased the fall awareness behavior of older adults in Ekiti State, Nigeria. We suggested using multimedia tools, such as electronic and social media, to teach older persons about fall prevention strategies.

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1.0. Introduction:

Falls pose a severe public health risk around the world, with over 37 million requiring medical attention and close to 700,000 fatal falls occurring each year.[1] More than 80% of fall-related deaths happen in low- and middle-income countries and older persons over 60 are at a higher risk of falls, which can lead to injury and death.[1,2] Falls among older adults are often associated with acute and long-term repercussions, making it a great concern among this demographic group.[3] Research has indicated that despite the high occurrence of falls among older adults in Nigeria and other African nations, there is a dearth of information on fall prevention education and awareness initiatives among them.[4,5] For various reasons, including failure to report fall incidences, there is relatively little information on falls from low- and middle-income nations.[6] Even though falls are currently one of the main causes of morbidity and mortality among older adults around the world, many events related to falls can be prevented.[3,6]

A fall usually occurs when an individual unintentionally drops to the ground, floor, or a lower level[1,3]. Although falls result from a complex process, they often result from loss of balance.[7] The loss of balance could be due to biological, social/economic, environmental, or behavioral factors[8]. Several researches have shown that environmental factors such as home hazards brought on by clutter, loose rugs or other tripping hazards, a lack of stair rails, a lack of grab bars in the bathroom, and poor lighting all increase the probability of falls in older individuals.[9] Furthermore, inappropriate clothing, footwear, lack of exercise, fear of falling, a poor diet or lack of hydration, and the use of various medications, particularly psychoactive ones like tranquilizers or antidepressants, are some of the behavioral risk factors for falls in older people.[10] All these, therefore, necessitated a need for behavioral change to prevent falls and its dire consequences among older adults.

Previous studies have demonstrated that older people's awareness and behavior regarding fall prevention are inadequate, particularly in low-income nations.[2,5,6] It has also been shown that low motivation and a lack of information about fall hazards influence older individuals' usage of fall prevention strategies such as exercise and other specialized treatments.[3,11] As a result, many authors have proposed that carefully designed and implemented health education to improve fall risk awareness and behavioral change towards fall prevention, would significantly improve the capability and motivation of older people to engage in fall prevention strategies, ultimately reducing the incidences of falls and related injuries among them.[12,13]

Educational interventions are capable of changing people's health beliefs and behavior.[14] Furthermore, health education is generally considered a relatively inexpensive tactic, positively impacting an individual's health.[15] The use of theory-led multimedia-based health educational interventions, frequently employed in health promotion and education research, has been demonstrated to successfully influence positive and appropriate actions, such as improved fall risk awareness and adoption of correct fall prevention behavior.[11,16] The use of a theoretical framework in carrying out the current study made it easier to communicate its findings, evaluate the intervention, and reproduce it.[17]

2.0 Objective:

To evaluate the pre-intervention and post-intervention levels of fall awareness behavior, among older adults attending Primary Care Clinics (PCC) of selected hospitals in Ekiti, Nigeria.

2.1. Research Questions:

a. Is there a significant difference in the level of fall awareness behavior between the pre-intervention stage and at the 12th week (post-intervention) among the experimental group of older adults attending PCC of selected hospitals in Ekiti, Nigeria?
b. Is there a significant difference in the level of fall awareness behavior between the control and the experimental groups at the 12th week (follow-up period) among older adults attending PCC of selected hospitals in Ekiti, Nigeria?

3.0 Method of the study

3.1 Study Design

This study used a quasi-experimental design comprising one experimental group and one control group to determine the effect of a multimedia-based health education program on fall awareness behavior in fall prevention among older adults attending Primary Care Clinics (PCC) at selected hospitals in Ekiti State,

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3.2. Study Area

The study was conducted at the Primary Care Centers (PCCs) also known as Family Medicine departments of the Federal Teaching Hospital (FETH), Ido-Ekiti, and the Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti. The PCCs of these two major teaching (tertiary) hospitals are the most highly patronized health facilities by all age groups, including community-dwelling older adults from different parts of the state. As a result, using PCCs at these tertiary hospitals increases the likelihood of enrolling older adults who represent the state. The PCCs at both institutions operate on an outpatient basis every day. Furthermore, the PCC at these two tertiary healthcare centers is typically the initial point of contact for patients who visit these hospitals. Participants for the intervention were recruited at EKSUTH Ado-Ekiti because it is more cosmopolitan due to its location in the state capital, whereas participants for the control group were recruited at FETH Ido-Ekiti, a similar health institution visited by a large number of people, including older adults.

3.3. Study population

The participants in this study were over 60 years old. The age range chosen was consistent with the United Nations definition of older adults or elderly people. The participants were community-dwelling individuals who were neither hospitalized or residing in a nursing home. They were also taken from the PCCs of selected health institutions in Ekiti State, Nigeria. The state was chosen because a recent study on falls in older individuals by Atoyebi et al. (2021) identified falls as a public health issue that needed to be addressed through additional research.

3.4. The inclusion and exclusion criteria

Participants in the study were older adults aged 60 or older who had visited the PCC within the previous three months. They were also community members who had lived in Ekiti State, Nigeria for at least a year. Participants were also found to be psychologically/mentally stable, with moderate to good cognitive abilities. The exclusion criteria are elderly persons who are hospitalized or in a nursing home. The study also eliminated sick or debilitated individuals, as well as non-consenting older individuals.

3.5. Sample Size Determination

The sample size for this study was calculated using a priori computation using G* Power version 3.1.9.4.[18] with the assumption of a two-tailed test with an alpha value of 0.05, an effect size (f) of 0.5, and a power of 0.95. However, twenty percent of the sample size was added to take care of attrition and compensate for the potential dropouts. Hence, 22 + 4.4 = 26.4 which was rounded up to 30. Two (2) independent groups of 30 older adults for each of the control and intervention groups were considered. Therefore, the total number of older adults recruited from both health institutions was sixty (60).

3.6. Sampling Procedure

Selection of participants in the intervention group:

A multistage sampling technique was used following the steps below to recruit thirty (30) older adults from the primary care clinic at EKSUTH Ado-Ekiti for the intervention group.

Stage one: Two Primary Care Clinics (FETHI and EKSUTH) were purposively selected in Ekiti State, Nigeria.

Stage two: A list of all eligible older adults between the ages of 60 and 90 years that have attended the clinic in the past three (3) months was obtained from the clinic register which resided with the Nurses.

Stage three: Each eligible older adult on the register was assigned a number. The coding of the numbers assigned was from 001. This list formed the sampling frame from which the participants were drawn and the sample size n = 30 was selected.

Stage four: Using a simple random technique, a table of random numbers was generated using a computer. The table contained randomly computed numbers that were arranged in rows and columns. The table was constructed such that every digit occurred with approximately equal probability and this was used in the selection of potential participants.

Stage five: Those selected were contacted through their phone, inviting them to the clinic and to participate in research. Those who refused or had an objection to participating in the study were replaced by another eligible candidate on the list until the sample size n=30 was completed again.

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Stage six: Upon arrival in the clinic at a designated date, those who still do not meet all the inclusion criteria, including cognitive ability (tested using a mini cog test such as a Three-Word Recall- banana, sunrise, chair," or "daughter, heaven, mountain) and those that decline to give consent to participate in the proposed study were dropped and replaced with the next number on the sampling frame until the sample size n=30 was completed again.

Selection of participants in the control group:

The same steps stated above were replicated to recruit another thirty (30) older adults from primary care clinics at FETH Ido-Ekiti and they were categorized as the control group.

3.7. Instrument for Data Collection

The instrument for data collection in this study was a semi-structured, interviewer-administered questionnaire. Using the Fall Awareness Behaviour Questionnaire also known as Falls Behavioral (FaB) scale,[19] participants were questioned about their socio-demographic characteristics, fall awareness, and fall prevention behavior/practices. The same instrument was used both before intervention and at the 12-week follow-up phase.

Falls Behavioral Scale

Clemson et al. established the FaB scale, which determines the presence or absence of protective behaviors that older adults perform to prevent falls.[16,19] Strong internal consistency of Cronbach alpha 0.8 and a content validity index of 0.93 were discovered for the FaB scale.[19] The scale consisted of 30 items, ten subscales as shown (For each scale, the participants were required to give a score based on four categories, never, sometimes, often, and always. The data was analyzed based on its total score and scores ranged from 30 (risky fall behavior) to 120 (safest fall prevention behavior). The lower the score, the more likely a person would engage in risky behaviors. Higher scores indicated a person who was more likely to be aware of falls prevention.[16,19] This adapted instrument is freely available online for researchers to use without requiring any formal permission.

Validity of Instrument

A pilot study was conducted to evaluate the instrument's internal consistency through a test-retest procedure on older persons in a different but similar clinic setting at Oshogbo, Osun State which was outside the study locations in Ekiti State. Six volunteers (10% of the estimated sample size) who were above 60 years were administered the questionnaires. This gave us the privilege to identify and clarify all misunderstandings in the questionnaire.

3.8 Method of Data Collection

In this study, pre-intervention data (pre-intervention data) was collected from both the control and experimental groups. This was followed by the planned intervention in the experimental group for six (6) weeks while the control group was given necessary attention (in the form of health education on another topic of public health importance) but not the planned intervention. Then finally, at the twelfth (12^{th}) week from the date of the first data collection, an impact evaluation was carried out in the two groups (the control and experimental groups).

Two (2) research assistants were trained to gather data throughout the study. The research assistants received a two-day training on the study's objectives, and the methodology to be used for data collection, data management, and data entry.

A multistage selection technique described above was used to select the participants. The participants then received detailed information about the nature and objectives of the study. Additionally, the participants were given the assurance that the information they provided would only be utilized for research purposes and that not be divulged to anyone. Moreover, sensitive and confidential information, such as their names or other details, was not collected.

Pre-intervention Data Collection

Pre-intervention data were first collected it was used as a comparison against the outcome variables or data. Both groups were surveyed using the same data collection instrument.

Outcome evaluation

At the follow-up (12th week), data was again collected and the information gathered at this point was used to evaluate the intervention's success and assess its sustainability over time. The information at this point

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also revealed if the participants' awareness and attitude towards fall prevention have changed over time.

3.8.1 Intervention Group Training (Multimedia-based Health Education)

A comprehensive training program was designed to enhance health education among older adults, equipping both the researcher and research assistants with essential knowledge and skills aimed at fostering awareness of fall risks and promoting behavioral changes for fall prevention. The multimedia-based educational initiative was in the form of prepared PowerPoint slides and audio-visual clips adapted from evidence-based resources provided by the Centers for Disease Control and Prevention (CDC), specifically the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) tools, which are freely accessible on the CDC's website. The STEADI resources encompass a variety of multimedia formats, including printed materials and PowerPoint presentations, focusing on fall risk assessment and prevention strategies that have been effectively utilized in numerous fall prevention programs globally.[20,21]

Each training session given to participants, lasted between 20 to 30 minutes and was conducted bi-weekly over six weeks. Participants were encouraged to engage with their primary care physicians in considering behavioral changes to mitigate fall risks, and prompted to identify culturally relevant fall prevention strategies they were willing to adopt.

3.8.2 Control Group

The control group, on the other hand, did not receive the aforementioned intervention. Instead, the control group learned about proper health-seeking behavior and suitable diet for elderly persons. After the study, the control group received comparable health education materials in the form of brief video clips on fall prevention. The intervention group was equally taught some lessons on appropriate health-seeking behavior after the research.

3.8.3 Ethical consideration and consent:

The study was approved by the Ethics and Research Committees of Federal Teaching Hospital Ido-Ekiti and Ekiti State University Teaching Hospital with protocol numbers; ERC/2023/12/14/1055A and EKSUTH/A67/23/11/008 respectively. Informed consent was obtained from all the participants and were told they were free to refuse or disengage participation at any time without losing any benefit of care or favor to those who participated. Confidentiality and privacy were ensured and the study was not at any cost to the participants.

3.9 Method of Data Analysis

Statistical Package for the Social Sciences (SPSS) version 23 was used to compile and analyze the data. Data analysis employed both descriptive and inferential statistics. Frequency counts were utilized to display the results; percentages were also used for descriptive statistics, and a statistical threshold of significance of 0.05 was deployed for inferential statistics. For items within groupings, means and standard deviations were computed. The randomization of the socio-demographic factors between the two groups was equally examined.

Through the use of inferential statistics like the Pearson Product Moment Correlation, and the T-test for Independent Samples, hypotheses were tested. For comparison of the means of continuous variables, the Chi-Square test was employed. Similarly, Effect Size (ES) Cohen's d was used to determine the magnitude of the changes in both variables of interest for the experimental group and control group from pre-intervention to the 12^{th}-week follow-up.

4.0 RESULT

Data was collected from 60 older adults recruited from primary care clinics of two different hospitals in Ekiti State Nigeria, representing 100% response, The responses to the research questions were finally given as the basis for making conclusions regarding the study's findings.

4.1 Demographic Characteristics of Participants

Tables 1a and b display the socio-demographic characteristics of individuals in the experimental and control groups. At the pre-intervention stage, there was no significant difference in socio-demographic features among all participating older persons from the two chosen health institutions in Ekiti State ($p>0.05$).
Participants' age range was from 60 to 90, with a mean ± SD of 74.9±8.4 years for the experimental group (73.7±8.6 years) and 76.0±8.1 years for the control group. In general, the majority of the participants were

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female (58.3%), and Yoruba (85.0%). The percentage of those retired from active service was 48.3%, those earning more than 30,000 naira (55.0%), and the source of income for the majority (66.7%) was from their children. Majorities were Christians (76.7%), widowed (38.3%), from a monogamous family setting (61.7%), had more than 5 family members (60.0%), and had at least 3 dependents (51.7%). However, 20% of the participants were living alone.

Table 1a: *Demographic Characteristics of the participants in the study for each group at baseline*

Variable	**Experimental Group** **N=30** **n (%)**	**Control group** **N=30** **n (%)**	**Total** **N=60** **n (%)**	**X^2**	**p-value**
Gender					
Male	15 (50.0)	10 (33.3)	25 (41.7)	1.714	0.190
Female	15 (50.0)	20 (66.7)	35 (58.3)		
Age group (in years)					
60 – 69	12 (40.0)	6 (20.0)	18 (30.0)	5.200	0.158
70 – 79	9 (30.0)	11 (36.7)	20 (33.3)		
80 – 89	6 (20.0)	12 (40.0)	18 (30.0)		
≥90	3 (10.0)	1 (3.3)	4 (6.7)		
Mean age ± SD	*73.7 ± 8.6*	*76.0 ± 8.1*	*74.9 ± 8.4*	*-1.095^t*	*0.278*
Ethnicity					
Yoruba	27 (90.1)	24 (80.0)	51 (85.0)	3.843	0.274
Igbo	1 (3.3)	5 (16.7)	6 (10.0)		
Hausa	1 (3.3)	1 (3.3)	2 (3.3)		
Others	1 (3.3)	0 (0.0)	1 (1.7)		
Educational Status					
Non formal	5 (16.7)	3 (10.0)	8 (13.3)	1.348	0.853
Primary school	12 (40.0)	10 (33.3)	22 (36.7)		
Secondary school	2 (6.7)	3 (10.0)	5 (8.3)		
Post-secondary	4 (13.3)	6 (20.0)	10 (16.7)		
University education	7 (23.3)	8 (26.7)	15 (25.0)		
Occupational status					
Currently employed	9 (30.0)	7 (23.3)	16 (26.7)	4.385	0.223
Part-time	3 (10.0)	8 (26.7)	11 (18.3)		
Currently unemployed	1 (3.3)	3 (10.0)	4 (6.7)		

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Retired active service	17 (56.7)	12 (40.0)	29 (48.3)		
Nature of occupation					
Civil servant	1 (3.3)	3 (10.0)	4 (6.7)	3.300	0.348
Self-employed	11 (36.7)	13 (43.3)	24 (40.0)		
Housewife	2 (6.7)	0 (0.0)	2 (3.3)		
Retired	16 (53.3)	14 (46.7)	30 (50.0)		
Income per month (in naira)					
<30,000	12 (40.0)	15 (50.0)	27 (45.0)	0.606	0.436
≥30,000	18 (60.0)	15 (50.0)	33 (55.0)		

t – independent t test **Multiple responses*

Table 1b: *Demographic Characteristics of the participants in the study for each group at baseline (continued)*

Variable	**Intervention Group N=30 n (%)**	**Control group N=30 n (%)**	**Total N=60 n (%)**	**X^2**	**p-value**
Source of income*					
Working	10 (33.3)	15 (50.0)	25 (50.0)	1.714	0.190
Children	22 (73.3)	18 (60.0)	40 (66.7)	1.200	0.273
Relation/ religious group	3 (10.0)	2 (6.7)	5 (8.3)	0.218	0.640
Religion					
Christianity	24 (80.0)	22 (73.3)	46 (76.7)	3.178	0.365
Islam	5 (16.7)	6 (20.0)	11 (18.3)		
Traditional	0 (0.0)	2 (6.7)	2 (3.3)		
Others	1 (3.3)	0 (0.0)	0 (1.7)		
Marital status					
Married	20 (66.7)	14 (46.7)	34 (56.7)	2.479	0.290
Divorced	1 (3.3)	2 (6.7)	3 (5.0)		
Widowed	9 (30.0)	14 (46.6)	23 (38.3)		
Type of family					
Monogamy	20 (66.7)	17 (56.7)	37 (61.7)	0.635	0.426
Polygamy	10 (33.3)	13 (43.3)	23 (38.3)		
Family size					
1 – 5	10 (33.3)	14 (46.7)	24 (40.0)	1.111	0.292
>5	20 (66.7)	16 (53.3)	36 (60.0)		
Number of dependents					
None	4 (13.3)	7 (23.3)	11 (18.3)	1.847	0.397
1 – 2	8 (26.7)	10 (33.3)	18 (30.0)		
≥ 3	18 (60.0)	13 (43.4)	31 (51.7)		
How many living in the house					
Alone	6 (20.0)	6 (20.0)	12 (20.0)	2.193	0.533
With wife/ wives	9 (30.0)	6 (20.0)	15 (25.0)		
With children/ grandchildren	11 (36.7)	16 (53.3)	27 (45.0)		

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With co-tenants	4 (13.3)	2 (6.7)	27 (45.0)

t – Student's independent t test **Multiple responses*

Medical Characteristics of Participants

The results in Table 2 illustrate the medical features of the participants from both institutions. There was no statistically significant difference between the medical features at the pre-intervention level ($p>0.05$).

In general, the majority paid for medical treatment out of pocket (66.7%), and were primarily treated for hypertension (58.3%), diabetes (25.0%), and arthritis (30.0%). Approximately 20.0% of these patients take at least five different drugs daily. Furthermore, 50% of each of the experimental and control groups had visual problems while 40% were using glasses of which 38.3% were recommended glasses. Close to half (41.7%) of the participants had a fall within the previous year. Almost a quarter (23.3%) fell once while 11.3% had a fall two or more times within the previous year. Nearly forty percent (38.3 %) sustained injuries from the fall and only 23.3% reported the fall mostly to their children and family members.

Table 2 *Medical Characteristics of the participants in the study for each group at pre-intervention*

Variable	**Experimental Group N=30 n (%)**	**Control group N=30 n (%)**	**Total N=60 n (%)**
Sources of medical treatment*			
Out-of-pocket	22 (73.3)	18 (60.0)	40 (66.7)
Children	12 (40.0)	16 (53.3)	28 (46.7)
Relation/religion group	2 (6.7)	1 (3.3)	3 (5.0)
What you are being treated for*			
Hypertension	17 (56.7)	18 (60.0)	35 (58.3)
Diabetes	9 (30.0)	6 (20.0)	15 (25.0)
Arthritis	8 (26.7)	10 (33.3)	18 (30.0)
Do not know	2 (6.7)	2 (6.7)	4 (6.7)
Others	8 (26.7)	5 (16.7)	13 (21.7)
Average number of drugs			
1 – 4	21 (70.0)	27 (90.0)	48 (80.0)
5 – 10	9 (30.0)	3 (10.0)	12 (20.0)
Have a visual problem			
Yes	15 (50.0)	15 (50.0)	30 (50.0)
No	12 (40.0)	14 (46.7)	26 (43.3)
Not sure	3 (10.0)	1 (3.3)	4 (6.7)
You use glasses			
Yes	13 (43.3)	11 (36.7)	24 (40.0)
No	17 (56.7)	19 (63.3)	36 (60.0)
Is it recommended			
Yes	12 (40.0)	11 (36.7)	23 (38.30
No	1 (3.3)	0 (0.0)	1 (1.7)
Not applicable	17 (56.7)	19 (63.3)	36 (60.0)
Ever experienced a fall in the last 1 year			
Yes	11 (36.7)	14 (46.7)	25 (41.7)
No	19 (63.3)	16 (53.3)	35 (58.3)
How many times			

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1	9 (30.0)	5 (16.7)	14 (23.3)
≥2	2 (6.7)	9 (30.0)	11 (18.3)
Not applicable	19 (63.3)	16 (53.3)	35 (58.3)
Did you sustain any injury?			
Yes	9 (30.0)	14 (46.7)	23 (38.3)
No	2 (6.7)	0 (0.0)	2 (3.3)
Not applicable	19 (63.3)	16 (53.3)	35 (58.3)
Did you report the fall?			
Yes	7 (23.3)	7 (23.3)	14 (23.3)
No	4 (13.3)	7 (23.3)	11 (18.3)
Not applicable	19 (63.3)	16 (53.3)	35 (58.3)
Who you reported to*			
Family/ Children	7 (23.3)	7 (23.3)	14 (23.3)
Clinic/ hospital	1 (3.3)	2 (6.7)	3 (5.0)
Chemist shop	1 (3.3)	2 (6.7)	3 (5.0)
Did nothing	0 (0.0)	1 (3.3)	1 (1.7)

**Multiple responses*

The findings in Table 3 below show that there was no statistically significant difference in the levels of fall risk awareness behavior between the control and experimental groups at pre-intervention with a significant level set at p<0.05.

Table 3*: Pre-intervention comparison of the level of fall awareness behavior between control and experimental groups*

Variables	**Pre-intervention**				
	Control Group		**Experimental Group**		**p-value**
	N=30 n (%)		**N=30 n (%)**		
Fall awareness behavior					
Poor (30 – 74)	19 (63.3)		22 (73.3)		0.703[C]
Fair (75 – 92)	8 (26.7)		6 (20.0)		
Good (93 – 120)	3 (10.0)		2 (6.7)		
	X̄(SE)	**±SD**	**X̄(SE)**	**±SD**	
	73.7(1.6)	8.7	70.5(2.3)	12.4	0.250[t]
Range of scale of measure (min. – max.)	*30 – 120*				

C – Chi-square test t – Student's independent t-test *Significant at p<0.05

Table 4. Shows that at the 12th week follow-up period, the level of fall risk awareness behavior among the participants in the control group was not significantly different from what it was at the pre-intervention (*p=0.530*[c]). The majority of the participants (63.3%) had poor fall awareness and behavior and this number reduced only slightly to 50% at the 12th week follow-up period. In addition, there was no significant difference between the mean scores in the two stages, 73.7±8.7 at pre-intervention and 74.3±10.0 at the 12th week follow-up period (Paired sample *t-test = 0.540, p=0.530*

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Table 4 *Comparisons between Pre-intervention and 12th-week follow-up assessment of fall awareness/ behavior among the control group*

Variables	Control group					
	Pre-intervention		12th-week follow-up			p-value
	N=30 n (%)		N=30 n (%)			
Falls awareness behavior						
Poor (30 – 74)	19 (63.3)		15 (50.0)			0.530[c]
Fair (75 – 92)	8 (26.7)		12 (40.0)			
Good (93 – 120)	3 (10.0)		3 (10.0)			
	X̄(SE)	±SD	X̄(SE)	±SD	ES (95% CI)	
Falls awareness behavior	*73.7*(1.6)	8.7	74.3(1.8)	10.0	-0.1 (-0.6 – 0.4)	0.768[t]
Range of scale of measure	30 – 120					

C – Chi-square test t – Paired t-test *Significant at p<0.05

Table 5 shows that in the experimental group at the 12th week post-intervention, 53.3% of the participants had a good fall awareness behavior (practices) compared to 6.7% at pre-intervention (*p<0.001*). Also, comparing their mean scores of the fall awareness behavior at the pre-intervention level and at the 12th week follow-up period, it was observed to have increased significantly from 70.5±12.4 to 89.2±21.9 (Paired sample t-test = -14.432, *p<0.001*). In addition, the difference between these two means is large as shown in the ES-1.1 (95%CI: -1.6 – 0.5)

Table 5 *Comparison between Pre-intervention and 12th week follow-up of fall awareness and behavior among the experimental group.*

Variables	Experimental group Pre-intervention	12th week follow-up	p-value
	N=30 n (%)	N=30 n (%)	
Falls awareness behavior			
Poor (30 – 74)	22 (73.3)	7 (23.3)	<0.001*[c]
Fair (75 – 92)	6 (20.0)	7 (23.3)	

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Good (93 – 120)	2 (6.7)		16 (53.3)			
	X̄(SE)		**±SD**		**X̄(SE)**	**±SD**
Falls awareness behavior	70.5(2.3)	12.4	89.2(4.0)	21.9	**ES (95% CI)**	
Range of scale of measure	30 – 120				-1.1 (-1.6 – 0.5)	<0.001*[t]

C – Chi square test t – Paired t test *Significant at p<0.05

Table 6 below shows a comparison of the control and experimental groups at the 12th-week follow-up period. There was a significant difference between the level of fall awareness behavior/ practices between both groups at the 12th-week follow-up period. While 53.3% of participants from the experimental group had a good fall awareness behavior/ practice at the 12th-week follow-up only10.0% of their counterparts in the control group had an equally good fall risk awareness behavior and this was statistically significant (X^2=13.120, p=0.001). Likewise, the mean level of fall risk awareness/practice was significantly higher in the experimental group (89.2±21.9) compared to that of the control group (74.3±10.0) (t=3.402, p=0.001). The magnitude of the differences between the two groups was also moderate or medium as shown by effect size ES=0.88 (95% CI: 0.33 – 1.39).

Table 6 *Twelfth (12th) week follow-up evaluation of fall awareness behavior among older adults in Ekiti State comparing the experimental and control groups.*

Variables	**12th-week follow-up**					**p-value**
	Control group N=30 n (%)		**Experimental group N=30 n (%)**			
Falls awareness behavior						
Poor (30 – 74)	15 (50.0)		7 (23.3)			0.001*[c]
Fair (75 – 92)	12 (40.0)		7 (23.3)			
Good (93 – 120)	3 (10.0)		16 (53.3)			
	X̄(SE)	**±SD**	**X̄(SE)**	**±SD**	**ES (95% CI)**	
Fall awareness behavior	74.3(1.8)	10.0	89.2(4.0)	21.9	0.88 (0.33 – 1.39)	0.001*[t]
Range of scale of measure	30 – 120					

C – Chi-square test t – Student's independent t-test *Significant at p<0.0

DISCUSSION.

Socio-demographic characteristics of participants.

The findings from our study revealed that in total, more females (58%) participated in the research, This is not

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surprising given that some studies have found that women have better health-seeking behavior and are more likely to participate in research than men.[22,23] Furthermore, in a recent study conducted by Olajide et al in FETHI, among 148 respondents, 56 (37.8%) were males and 92 (62.2%) were females, with a male-to-female ratio of 1:1.6.[24]

The majority of the participants in this study were of Yoruba origin (85%) and 76.7% of them were Christians. This finding is similar to that found in two separate surveys conducted in Ido and Ado-Ekiti respectively.[25,26] In addition, inhabitants of Ekiti state located in the southwestern part of Nigeria are mainly of Yoruba race and Christian religion. The present study also revealed that 20% of the participants were living alone and 45% of them lived on less than #30,000 per month. This is in line with a recent systematic and meta-analysis report where it was observed that one in four community-dwelling older adults complained of social isolation.[27] Adisa in his study, also observed that a significant proportion of older people in developing countries were assessed to be economically disadvantaged yet often excluded from social protection programs.[28]

Medical characteristics of participants

The majority of the participants (66.7%) paid for their health care needs out of pocket and this is a testament to the observation made by Archibong et al, that out-of-pocket spending by Nigerians is more than 60% of total health expenditure instead of WHO recommended 30-40% because the national coverage of the National Health Insurance is still below 5%.[29] Close to half (41.7%) of all the participants experienced a fall in the previous year and 38.3% of them sustained injuries from the falls. According to a recent publication by Oduoye et al, the prevalence of falls among the senior population is 53.4% (65-74 age range), 34.3% (75-84 ages), and 12.3% (85 years or above).[5] Approximately one-third of older adults who experience falls annually sustain injuries, which might impair their mobility and independence.[30] This was also in line with our finding in which 38.3% of those who fell sustained one form of injury or the other. Half (50%) of the participants from both groups admitted to visual problems for which 40% were on a pair of glasses. In a study conducted in Lagos among 500 participants with a mean age of 54 a large (47.2%) proportion of them had moderate visual impairment.[31] The major causes of visual problems were cataracts, glaucoma, and refractive error. Mehta et al (2022) found that older adults have an increased risk of experiencing a fall if they have reduced visual function.[32]

More than 70% of participants in both population groups frequently or always need help to read prescriptions given by health personnel, this could be due to their visual impairment or their level of health literacy. In a recent nationwide survey conducted by Suppiah et al (2023), the prevalence of adequate health literacy among older adults in Singapore was 37.7% while the remaining had either limited or marginal health literacy.[33] Sub-optimal (inadequate) health literacy has been associated with profound consequences for individuals and health systems.[33]

Fall awareness behavior and multimedia health education

In this study, most individuals in both the control and experimental groups had low fall awareness behavior before the intervention. At pre-intervention, only 10.0% of the control group and 6.7% of the experimental group had good fall risk awareness behavior. However, there was a substantial improvement in fall risk awareness behavior/practice among the experimental group, whereas no significant improvements were observed among the control group. As a result of obtaining multimedia health education, participants in the experimental group indicated a higher grasp or awareness of the risk factors for falls and were implementing preventative measures. This study's findings were consistent with Ong et al's conclusion that fall prevention education enhances awareness and some behavioral changes among older adults in community settings.[11] Our findings were also consistent with the findings of a quasi-experimental study conducted at Masih Daneshvari Hospital in Iran, where the researchers discovered that when intervention groups were compared to control groups, the changes in knowledge and behavior in the multimedia education group were significantly greater than those in the traditional education group.[34] In a similar study, Gholamzadeh et al found a significant difference between the mean scores of home safety before and after the intervention ($P < 0.001$) in the intervention group. There were also some

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positive changes in the mean scores of fear of falling and quality of life, but these changes were not significant (P = 0.30) (P = 0.32). As a result, the authors emphasized the importance of continued use of multimedia-based health education programs to improve fall risk awareness and preventive behavior, particularly among older adults.[35]

IMB model and research outcome.

Our study is the first to assess the relevance of the IMB model for OP self-management behaviors. Middle-aged and older adult patients with OP have poor self-management behavior. Medical system support can help patients develop good self-management behavior. OP-related knowledge can change patients' cognition, help improve patients' self-confidence (self-efficacy), and establish good self-management behaviors. Therefore, it should be considered in health managemen

Rarely are falls and fall-related injury reductions attainable without any behavioral alteration.[11,36] Theories are important in the process of behavioral change because they not only allow us to recognize the mechanisms underlying change and understand the root causes of problems, but they also serve as a road map for developing effective interventions and preventive measures.[37]The constructs of the Information, Motivation, and Behavior Model (IMB model) were used as the conceptual framework for this study, The chosen model was effective since the information provided to the experimental group resulted in increased fall prevention awareness and behavioral modification.

While the experimental group showed significant differences in fall awareness before and after the intervention, there was no significant difference among individuals in the control group who did not receive theory-guided multimedia-based health education. This finding was congruent with that of Cardoso et al. who discovered a significant improvement in sixty-eight senior Brazilians' attitudes and adherence to fall prevention measures after applying a theory-based educational intervention. However, in their study, the Health Belief Model was used; in this study, we used the IMB model.

Conclusion

This study discovered that multimedia-based health education improved fall prevention awareness and behavior among older adults at selected health facilities in Ekiti State, Nigeria. As a result, every opportunity should be taken to increase awareness and educate older persons about fall prevention at home and wherever they travel. Such opportunities could be found in health institutions, churches, town halls, and via electronic media such as radio, television, and social media platforms such as WhatsApp and Facebook. This will assist in reducing the prevalence of falls and their repercussions, such as bodily and psychological stress, as well as death, among older persons.

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APPENDIX 1

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Figure 1 *The conceptual model adapted from the Information, Motivation and Behavioral Skills Model.*