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ORIGINAL PAPER

Effect of clinic-based and telemonitored home-based intervention on pain intensity, functioning and quality of life in patients with knee osteoarthritis

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ABSTRACT

Introduction and aim. The study assessed and compared the effects of clinic-based and telemonitored home-based interventions on pain intensity, functioning and quality of life in patients with knee osteoarthritis (KOA).

Material and methods. Forty-two patients were recruited purposely and randomly allocated into clinic-based (CBG) and telemonitored home-based group (THG) equally. The CBG and THG received isometric exercises to strengthen the quadriceps and hamstring muscles using theraband. THG received the exercise at home they were monitored on phone thrice in a week, while the CBG did the exercise in the hospital. The subjects performed four sets of eight repetitions three days in a week for eight weeks. Pain intensity, functioning and health related quality of life (HRQoL) were assessed at pretreatment, 6th and 8th week of intervention. Data was analyzed with descriptive and inferential statistics. Alpha level was set at 0.05.

Results. There was a significant reduction ($p<0.001$) among pre-treatment, 6^{th} and 8^{th} week intervention in pain intensity, functional pain intensity and quality of life of CBG and THG. CBG showed significant reduction ($p<0.001$) in pain intensity, function and increase in HRQoL than THG at 8^{th} week.

Conclusion. Clinic-based and telemonitored home-based interventions were both effective in the management of KOA but clinic-based intervention was better than telemonitored home-based intervention.

Keywords. clinical-based, knee osteoathritis, telemonitored, tera-band

Introduction

Osteoarthritis is the most prevalent musculoskeletal disease worldwide among people older than 60 years and it accounted for 3–9% of years lived with disability worldwide, one of the significant contributors to years lived with disability among the musculoskeletal conditions and fourth leading cause of years lived with disability globally.[1,2] It is estimated that by 2030, the proportion of people with OA will have risen from 20% to 30% in those aged 60 years or over.[3] Increasing life expectancy, decreasing physical activity and increasing body weight are all considered as underlying factors. Being a leading

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musculoskeletal cause of disability in elderly persons all over the world and a major cause of physical limitations and reduced quality of life, OA, among other types of arthritis, is the most common type of joint disease in adults worldwide.[4,5] Osteoarthritis can affect any joint, but preferentially affects the knee, hand, hip and spine. Knee osteoarthritis (KOA) accounts for approximately 85% of the burden of osteoarthritis worldwide.[6] KOA is a common progressive multifactorial joint disease and is characterized by chronic pain and functional disability.[2] Thus, individuals with KOA suffer from progressive increased impact on their activities of daily living, which leads to losses in labor relations, leisure, social life, and sleeping quality, leading also to important decrease in their quality of life.[7]

Physiotherapy treatment for KOA involves therapeutic exercises which are used in almost all treatment sessions in the management of KOA.[8] Exercise therapy is particularly helpful in decreasing pain and improving joint motion, for which high-quality evidence has been available in the past decade.[9,10] Exercise therapy consisting of strengthening exercise and general aerobic exercise is now seen as one of the key elements of OA management.[2] Literature has recommended that patients with symptomatic OA of the knee to participate in self-management programs, strength training, low-impact aerobic exercise, and neuromuscular education, and to engage in physical activity consistent with national guidelines.[11]

Telemonitoring is a convenient way for patients to avoid travelling and to perform some of the more basic work of healthcare for themselves.[12] The objective of telemonitoring is to allow patients and medical experts to carry on their sessions through telecommunication networks as if they are in the same place.[13] The usual pattern of managing patients with KOA requires patients to keep attending the clinic for one-on-one sessions with the physiotherapists. However, patients who live far away from the clinics may find it difficult to attend clinic regularly due to distance and cost of transportation.[14] In order to address these problems which could make treatment ineffective, telephysiotherapy which entails the use of telecommunications technology as a medium for providing information for therapeutic exercises to patients at homes that are at a distance from the physiotherapy clinics should be considered.[15] The applications of telemonitoring and its effectiveness have been documented in rehabilitation of stroke and patients with total knee replacement.[16,17] The efficacy of telephone-based rehabilitation technology on the outcomes of pain and physical function and quality of life in patients with KOA were documented.[18] Bennell et al. investigated the clinical and cost effectiveness of adding nurse-delivered telephone coaching to a physiotherapist-delivered physical activity intervention for people with KOA. Better outcomes were achieved in group of patients that received physiotherapy treatment with nurse-delivered telephone coaching than those that received only physiotherapy treatment. The usual pattern of managing patients with KOA requires patients to keep attending the clinic for one-on-one sessions with the physiotherapists. However, patients with KOA often require multiple clinic visits for care and are often faced with accessibility challenges of cost, distance and transportation.[14] In order to address these challenges, effectiveness of telemonitored home-based intervention and clinic-based intervention be considered in the management of patients with KOA. Although, similar studies have been reported in the literature, most of these works were carried out where there are better facilities in terms of stable electricity, consistent internet with uninterrupted signal and adequate funding.[16-18] It is imperative to carry out the study in a location where some of the aforementioned challenges in the management of patients with knee osteoarthritis are bedeviling the management.

Aim

The objectives of the study were to evaluate the effect of clinic-based and telemonitored interventions on pain intensity, function and quality of life and to compare the effects of such in patients with knee osteoarthritis.

Material and methods

Participants

Participants for this study were individuals diagnosed with osteoarthritis of the knee joint referred to Out-patient Physiotherapy Clinic of State Hospital Abeokuta.

Inclusion criteria

Eligible for participation in this study were:

i. Patients diagnosed with osteoarthritis of the knee of not less than six weeks.

ii. Patients that have means of communication via mobile telephone.

iii. Patients who understands English or Yoruba language.

Exclusion criteria

Excluded from participation in this study were:

i. Participants that have any other knee joint diseases.

ii. Participants with history of knee joint trauma.

iii. Participants with history of knee surgery or arthroplasty.

Sampling technique

A purposive sampling technique was used for this study to recruit subjects with knee osteoarthritis.

Research design

The research design was Quasi experimental study

Sample size determination

The sample size for the study was determined using the formula.[15]

$$n = \frac{c \times \pi1(1-\pi1) + \pi2(1-\pi2)}{(\pi1-\pi2)^2.}$$

Where:
n is the size per group
C is 7.9 for 80% power
$\pi1 = 0.25$ (proportion estimate)
$\pi2 = 0.65$ (proportion estimate)

Therefore:

$$n = \frac{7.9 \times 0.25(1-0.25) + 0.65(1-0.65)}{(0.25-0.65)^2}$$

Thus, n (size per group) = 20.49
= 21

This was increased to 25 per group because of attrition (25 participants for clinic-based group and 25 participants for telemonitored home-based group).

Randomization

The randomization of the participants to the clinic-based group and telemonitored home based group was shown in Fig 1

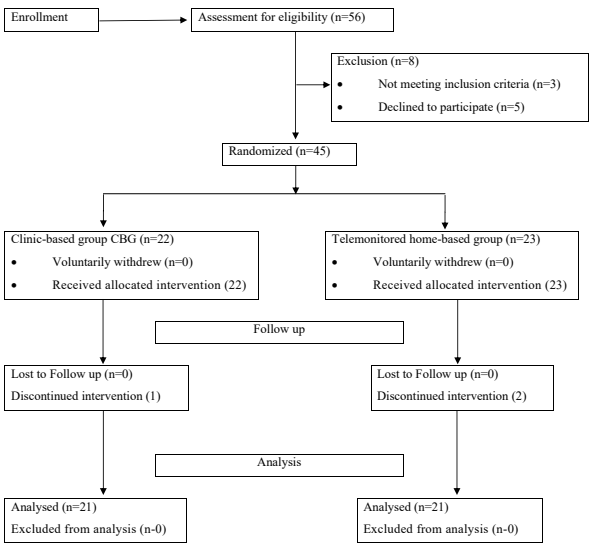

Fig. 1. CONSORT patient flow for the study

Instruments

The instruments that were used for this study include:

Quadruple Visual Analog Scale (QVAS)

This was used to assess pain intensity experienced by the participants at the time of assessment, typical or average pain, pain at its best, and pain at its worst, respectively.[21] It consists of 4 items with each item numbered 0 to 10. With 0 indicating no pain and 10 is worst possible pain. A Yoruba translated version of the QVAS was used for participants who had preference for the Yoruba language.

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)

WOMAC is a self-administered health-status instrument for patients with KOA, consists of 24 items within three subscales: pain (5 items), stiffness (2 items) and physical function (17 items). This questionnaire which is valid, reliable and responsive was developed by Bellamy.[22] All WOMAC subscales (pain, stiffness, and physical function) were internally consistent with Cronbach's coefficient alpha of 0.91, 0.81, and 0.84, respectively. The Yoruba version of WOMAC translated from English by Ojoawo and Akinwunmi was used for participants who do not understand English.[23]

WHOQoL-BREF

This instrument comprises 26 items, which measure the following broad domains: physical health, psychological health, social relationships, and environment. WHOQoL-BREF has been shown to display good discriminant validity, content validity and test-retest reliability. Their sensitivity to change is currently being assessed.[1] The WHOQoL-BREF is a sound, cross-culturally valid assessment of QoL, as reflected by its four domains: physical, psychological, social and environment.[24]

Theraband

This was used to strengthen the muscles around the knee joint. The band is made by Fixtur Displaysm FDS Illinois. It consists of 5 sizes resistance band in different colors made from rubber latex.

Mobile phone

This was used to communicate with the participants on home treatment.

Tape rule

15 0cm or 60 inches long China made butterfly tape rule was used to measure waist and hip girth measurement.

Stadiometer

This consists of height meter and weighing scale made by Maney Medical Technology Co. Ltd, Shanghai to measure the height and weight of participants.

Procedure

Ethical approval was obtained from the Health Research and Ethics Committee of Institute of Public Health, Obafemi Awolowo University Ile-Ife, Nigeria and Department of Planning Research and Statistics, Ogun state Ministry of Health. The eligible patients were duly

informed of the rationale and procedure for the study and were enlightened about the aim of the research in improving Physiotherapy services to patients with knee osteoarthritis. Informed consent was obtained from each patient and confidentiality was ensured.

Each participant was then randomly allocated into one of the two groups without considering the severity of the condition in order not to introduced bias using fish bowl methos Fig 1. An opaque envelope with 50 small papers was used for the randomization. Twenty-five papers were inscribed with CG while the remaining twenty-five papers inscribed with TG. Subjects were asked to pick a paper from the envelope as they were coming into the department. Those that picked CG were allocated to clinic-based intervention group (CBG) and those that picked TG were allocated into telemonitored home-based intervention group (THG).

Clinic-based group intervention

Assessment of the patient was done at pretreatment using WOMAC, WHOQoL-BREF and QVAS. Participant's weight, height, waist and hip circumference were measured using appropriate instrument (Fig. 2). Strengthening exercises was administered to this group, three times a week for 8 weeks in the clinic. Patient sat comfortably of a chair with arm. Theraband was anchored at one end to the chair's foot and the other end of the band to the ankle of the patient. Patient was instructed to push the theraband by extending the leg. The ability to push the band and sustain it with a bearable resistance was used as a requirement for the choice of the band. Once the specific band has been chosen, patient then used it for strengthening both the harmstrings and quadriceps muscles using is the procedure of Lee et al.[25] For the quadriceps strengthening, the participant sat on a chair with the knee maintained in 90 degree flexion and the theraband was locked with the foot of the chair on one end with the band wrapped around the ankle on the other end as shown in plate 1. The patient extended the knee while the theraband stretched out, thereby strengthening the quadriceps muscle (Fig. 3). The stretching was sustained for 10 second with a period of wrest for 4 second, 10 repetitions were carried out for a session. The patient was also asked to lie prone on the treatment bed, the theraband was attached to the foot of the bed on one hand and wrapped ankle joint on the other hand. The limb was flexed at the knee, thereby strengthening the hamstring muscle. The stretching was sustained for 10 second with a period of wrest for 4 second, 10 repetitions were carried out for a session. They were reassessed at the end of third, sixth and eight week of intervention.

Telemonitored home-based group intervention

Assessment of the patient was also done at pretreatment using WOMAC, WHOQoL-BREF and QVAS. Participant's weight, height, waist and hip circumference were measured using appropriate instrument. They were required to perform the same exercise programmes given to the CBG at home three times a week for eight weeks. The exercises were demonstrated to them by the Physiotherapist in the clinic and they were asked to perform the exercise to be sure it is well understood. The participants were also provided with the pictorial representation of the exercises and this was taken home by each participant as a guide to ensure compliance and adherence. Mobile telephone monitoring through calls and SMS was ensured two times a day, a wakeup call of 30 minutes before the exercise and a call during the exercise to monitor their compliance. This was done on three occasions of the treatment programmes in a week. They were provided with log-book for proper documentation of the treatment procedure. This group of patients only reported to the clinic at the end of third, sixth and eight week for reassessment.

Fig. 2. A patient with the application of theraband at the starting point to perform quadriceps muscle strengthening exercise

Fig. 3. A patient with the application of theraband at the final point performing quadriceps muscle strengthening exercise

Outcome measures

Pain intensity was assessed with QVAS; WOMAC was used to assess the functional pain, stiffness and physical function, and WHOQoL-BREF was used to measure the quality of life. These measurements were carried out

pretreatment, third week, six week and eight weeks of the intervention.

Data analysis

The data was analyzed using Statistical Package for Social Sciences SPSS (IBM version 23, Armonk, NY, USA). Descriptive statistics and inferential statistics of Mix Method ANOVA was used to compare the mean value of pretreatment, 3rd, 6th and 8th week treatment of pain intensity, function pain, stiffness, physical difficulty and quality of life within the groups. Mixed Method ANOVA was also used to compare the pain intensity, function pain, stiffness, physical difficulty and quality of life of clinic-based and telemonitored home-based intervention between the groups. A post hoc analysis was employed where necessary. Alpha level was set at 0.05 was considered as statistically significant.

Results

Physical characteristics of participants

Presented in Table 1 is the physical characteristics of the subjects. The mean age, body mass index (BMI) and WHR of CBG were 55.55±8.53yrs, 28.01±6.51kg/m² and 0.87±0.04 respectively while the mean age, BMI and WHR of THG were 62.94±05.67 years, 28.95±5.92 kg/m² and 0.94±0.12 respectively. There was no significant difference (p>0.05) between weight and Body mass index of CBG and THG .

Table 1. Descriptive statistics of participants in CBG and THG (n=42)*

Variables	CBG (n=21) Mean±SD	THG (n=21) Mean±SD	Total group (n=42) Mean±SD	t	p
Age (yrs)	55.55±8.53	62.94±5.67	59.05±8.13	-3.110	0.004
Height (m)	1.65±0.04	1.58±0.08	1.62±0.07	3.567	0.001
Weight (kg)	76.55±18.57	72.06±15.38	74.42±17.05	0.807	0.425
BMI (kg/m²)	28.01±6.51	28.95±5.92	28.46±6.17	-0.466	0.644
Hip Cir (cm)	101.85±11.51	111.22±6.66	106.29±10.53	-3.026	0.005
Waist Cir (cm)	89.20±12.96	104.50±16.72	96.45±16.58	-3.169	0.003
WHR	0.87±0.04	0.94±0.12	0.90±0.09	-2.350	0.024

* CBG – clinic-based group, THG – telemonitored home-based group, SD – standard deviation, BMI – body mass index, Hip Cir – hip circumference, Waist cir – waist circumference, WHR – waist to hip ratio

Within group effect of telemonitored home-based intervention on pain intensity, function and quality of life

Shown in Table 2 is mixed method ANOVA comparing the mean value of the pretreatment, 3rd week, 6th week and 8th week intervention on pain intensity, function and quality of life of participants in THG. The results revealed a significant difference (p<0.001) in the physical function, functional pain and joint stiffness between pretreatment and each of 6th and 8th week intervention

Table 2. Within group effect of telemonitored home-based intervention on pain, intensity, function and quality of life (n=21)*

Variables	Pre	Week 3	Week 6	Week 8	Chan	p
PI	56.46 (33.87)[a]	55.76 (34.57)[a]	53.61 (28.46)[a]	49.63 (19.72)[a]	5.83	0.219
HQoL	79.65 (8.84) [f]	79.06 (8.54)[f]	80.61 (8.22)[f]	82.61 (9.40)[f]	2.96	0.415
FPain	8.06 (2.36) [g]	7.17 (2.94)[h]	5.11 (2.02)[i]	4.00 (1.94)[j]	4.06	<0.001
JStifnes	3.56 (1.38)[k]	3.44 (1.29) [l]	2.67 (0.97)[m]	2.11 (0.75)[n]	1.45	<0.001
Phyl Dif	33.22 (8.82)[o]	30.11 (12.46)[p]	22.77 (5.26)[q]	19.55 (3.60)[r]	3.67	<0.001

* PI – pain intensity, HQoL – health related quality of life, FPain – functional pain intensity, J Stiffness – joint stiffness, Phyl Diff – physical difficulty, Post Hoc analysis using LSD of mean values with the same superscript (a, b, c, d, e, f, g, h, i, j, k l, m, n, o, p, q, r) shows no significant difference but means with different superscript shows a significant difference

Within group effect of clinic-based intervention on functional pain, joint, stiffness and physical difficulty

Shown in Table 3 is the Mixed Method ANOVA comparing the mean value of the pretreatment, 3rd week, 6th week and 8th week of functional pain, stiffness and physical difficulty of participants in CBG. There was a significant difference (p<0.001) in functional pain when pretreatment, 6th week and 8th week intervention was compared. There was also a significant difference (p<0.001) in physical difficulty when pretreatment, 6th week and 8th week of intervention were compared. There was also a significant difference in functional pain and physical difficulty when 6th week and 8th week intervention was compared.

Table 3. Mix-method ANOVA, comparing the pretreatment, 3rd 6th and 8th weeks of pain intensity, functioning, quality of life, functional pain, joint stiffness and physical difficulty of clinical based group (n=21)*

Variables	Pre	Week 3	Week 6	Week 8	Chan	p
PI	72.50 (31.77)[a]	65.61 (38.16)[b]	78.67 (40.17)[a]	64.98 (43.63)[c]	5.46 (2.14)	0.05
HQoLife	79.65 (8.84)[h]	79.06 (8.54)[h]	80.61 (8.22)[h]	82.61 (9.40)[d]	1.96 (2.13)	<0.001
FPain	7.75 (4.56)[a]	6.90 (2.99)[b]	4.20 (2.89)[c]	3.00 (2.55)[e]	4.75 (3.24)	<0.001
JStifnes	3.15 (1.18)[g]	2.60 (0.50)[h]	2.00 (1.03)[j]	1.50 (0.96)[k]	1.65 (0.89)	<0.001
Phyl Dif	26.90 (14.25)[l]	23.70 (12.19)[m]	13.40 (8.49)[n]	11.70±8.23[p]	4.20 (1.45)	<0.001

* PI – pain intensity, HQoL – health related quality of life, FPain – functional pain intensity, J Stiffness – joint stiffness, Phyl Diff – physical difficulty, Post Hoc analysis using LSD of mean values with the same superscript (a, b, c, d, e, f, g, h, i, j, k l, m, n, o, p, q, r) shows no significant difference but means with different superscript shows a significant difference

Between group effect of clinic-based intervention and telemonitored home-based intervention on pain intensity, function and quality of life

Presented in Table 4 is the mixed method ANOVA comparing the mean value of the pretreatment, 3rd week, 6th

Table 4. Mix-method ANOVA, comparing the mean CBG and THG values of outcome measures*

Variables	CBG n=21					THG n=21					
	Pre	Week 3	Week 6	Week 8	Change	Pre	Week 3	Week 6	Week 8	Change	p
PI	72.50 (31.77)[a]	65.61 (38.16)[a]	78.67 (40.17)[a]	64.98 (43.63)[a]	7.52 (1.23)	56.46 (33.87)[a]	55.76 (34.57)[a]	53.61 (28.46)[a]	49.63 (19.72)[a]	5.83	0.219
HQoLife	84.50 (8.20)[h]	85.95 (8.40)[h]	87.50 (7.69)[h]	90.20 (8.23)[h]	5.40 (2.13)	79.65 (8.84)[h]	79.06 (8.54)[j]	80.61 (8.22)[k]	82.61 (9.40)[l]	2.96	<0.001
FPain	7.75 (4.56)[a]	6.90 (2.99)[b]	4.20 (2.89)[c]	3.00 (2.55)[c]	4.75 (3.24)	8.06 (2.36)[a]	7.17 (2.94)[b]	5.11 (2.02)[d]	4.00 (1.94)[f]	4.06	<0.001
JStifnes	3.15 (1.18)[g]	2.60 (0.50)[h]	2.00 (1.03)[j]	1.50 (0.96)[k]	1.65 (0.89)	3.56 (1.38)[g]	3.44 (1.29)[i]	2.67 (0.97)[j]	2.11 (0.75)[k]	1.45	<0.001
Phyl Dif	26.90 (14.25)[l]	23.70 (12.19)[m]	13.40 (8.49)[n]	11.70 (8.23)[p]	4.20 (1.45)	33.22 (8.82)[l]	30.11 (12.46)[m]	22.77 (5.26)[o]	19.55 (3.60)[q]	3.67	<0.001

* pre – pretreatment, PI – pain intensity, HQoL – health related quality of life, FPain – functional pain intensity, JStiffness – joint stiffness, Phyl Diff – physical difficulty, Post Hoc analysis using LSD of mean values with the same superscript (a, b, c, d, e, f, g, h, i, j, k l, m, n, o, p, q) shows no significant difference but means with different superscript shows a significant difference

week and 8th week of pain intensity, function and quality of life of participants in CBG and THG. There was no significant difference (p>0.05) in pain intensity in pretreatment, 3rd week, 6th week and 8th week when CBG and THG were compared. There was a significant difference (F=20.859 p<0.001) in physical function in 3rd week, 6th week and 8th week when CBG and THG were compared. However, physical function improves significantly (p<0.001) in 8th week of CBG than THG.

Discussion

This study investigated the effect of clinic-based and telemonitored home-based intervention on pain intensity, functioning and quality of life in patients with knee osteoarthritis and compared the effects of clinic-based and telemonitored home-based intervention on those variables. Forty-two patients with knee osteoarthritis participated in the study. The participants of this study were on the average age of 60years; this was in line with the age prevalence of knee OA as documented in several studies.[26,27] Also, the mean body mass index BMI of the participants in this study was in over weight range. These physical characteristics profile of the participants, showed that majority of the participants are overweight. In essence, it implies that knee osteoarthritis is associated with increase BMI. Being overweight is a key factor for knee OA and provides substantial grounds for concern of disease severity and productivity losses.[28-30] Fowler-Brown et al. found that a 5 kg/m^2 increase in BMI was associated with a 32% increase in the probability of OA[28]. In a study, Felson et al. reported that obese individuals have 1.5 to 2 times the risk of developing knee OA as their leaner counterparts.[31] The weight of the body especially from the knee joint above constitute a greater percentage weight of the body. This is the location where there are intestinal structures and thoracic component. If these are added with excess body fat, it creates a greater weight for the knee joint promoting knee OA. It was observed from the result that there was a significant difference between the clinic-based and telemonitored home-based groups regarding the age, height, waist, hip and waist to hip ratio. Considering the age, though there was a difference but the age was still within the range of adulthood which could not really affect the exercise or intervention of the participants. Again, the hip, waist and waist to hip ratio are function of central obesity, the mean values of each of these variables were not too outrageous. More so, the exercises were in sitting position which may not have much relationship with the central adiposity.

It was observed from the study that there were significant differences in physical function of patients with knee osteoarthritis in the clinic-based group between pretreatment and sixth week, between pretreatment and eight week of intervention. A significant difference was also observed in functional pain between pretreatment and sixth week, between pretreatment and eight week of intervention. However, functional pain improved better in 8th week than 6th week. These results were consistent with the outcome of a study conducted by Odole et al.[18] They investigated the effects of a 6-week telemonitored program on pain intensity and physical function of patients with osteoarthritis of the knee. Statistical significant were found in physical function of patients between baseline and fourth week, baseline and sixth week of intervention. Exercise therapy has been found to reduce pain, improve physical function and quality of life in patients with knee osteoarthritis. Muscle strengthening exercises are important given that muscle weakness is almost universal in people with knee OA and is related to higher pain levels and reduced function.[32,33] A further benefit of strength training is the resulting increase in levels of physical activity that may come with increased muscle strength. In a study conducted by Maly and colleagues, they concluded that the feeling of stiffness in osteoarthritis is related with self-efficacy for physical activity, and stiffness also shows a moderate association with physiologic predictors of the risk of falls in older adults.[34] However, knee stiffness had significantly correlated with physical disabilities and it is an important symptom associated with knee OA and so, health care providers can improve physical activity of OA patients with training muscle strength exercises. Similarly, in this study there was an improvement in the quality of life of participants in the clinic based group between pretreatment and eight weeks. This improvement in the quali-

ty of life could most probably be as a result of improved functional activity level. Rétsági et al. in their study on relationship between physical performance and quality of life and the level of physical activity among the elderly reported a positive relationship between physical activity level and quality of life.[35,36]

More so, it can be observed in the study a significant improvement in the physical function of participants in the telemonitored home-based group between the pretreatment and eight weeks. A study conducted by Odole and Ojo, reported a significant improvement between the pretreatment and sixth week of the intervention.[18] This study was not in accordance with their study as improvement was only recorded between the pretreatment and eight week of intervention. Although, there was a significant improvement in functional pain between pretreatment and 6th week; pretreatment and 8th week in the telemonitored home-based intervention. Functional pain also improved better in the 8th week than in the 6th week of intervention in the THG. This was in accordance with the study conducted by Azma et al.[36] The specialist monitoring on phone of the quality of exercises, and assurance given to them on the efficacy of exercises could be responsible for the improvement recorded.

However, comparing the mean values of the pretreatment, 3rd week, 6th week and 8th week of functional pain, physical function and quality of life in CBG and THG, participants in the CBG showed a better global improvement than the THG. This could be as a result of the psychological effects of being seen by a professional. The self-confidence they developed and the motivation given to them by the professional maybe responsible for the global improvement.

This study shows that the outcomes of functional pain, physical difficulty and quality of life in patients with osteoarthritis of the knee under clinic-based group (physiotherapist administered knee exercises) are comparable to those in the telemonitored home-based group (self-administered knee exercises and telephone monitoring) following eight weeks of intervention.

Study limitations

The outcome measures used in the study were based on the reports of the patients. It was on the trust that patients reported the actual levels of their perception of all the outcome measures. Their telemonitoring was on the phone not on the video. It was on the trust as well that patients reported the performance of the exercises at home.

Conclusion

In conclusion, clinic-based and telemonitored home-based interventions were effective in the management of knee osteoarthritis but the clinic-based intervention proved more effective.

It is recommended that any of clinical based and home based theraband exercises can be recommended or combined for patient with KOA for a better result.

Declarations

Funding

The study did not enjoy funding from any organization nor from the government.

Author contributions

Conceptualization, O.A.O. and O.O.; Methodology, O.A.O. and O.O.; Software, M.C.E. and A.O.O.; Validation, O.A.O., O.O., K.K., M.C.E. and A.O.O.; Formal Analysis, O.A.O. and M.C.E.; Investigation, O.O. and K.K.; Resources, O.O.; Data Curation, A.O.O.; Writing – Original Draft Preparation, O.A.O. and O.O.; Writing – Review & Editing, A.O.O.; Visualization, A.O.O.; Supervision, O.A.O.; Project Administration, O.O.

Conflicts of interest

No conflict of interest from the authors.

Data availability

Data is available at request.

Ethics approval

Ethical approval was obtained (ERC/2021/07/15) from the Health Research and Ethics Committee of Institute of Public Health, Obafemi Awolowo University Ile-Ife, Nigeria and Department of Planning Research and Statistics, Ogun state Ministry of Health.

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