EFFECTIVENESS OF KNEE BRACES IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS IN PATIENTS AGED 36 YEARS AND ABOVE IN MULAGO NATIONAL REFERRAL HOSPITAL. A CROSS-SECTIONAL STUDY.

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Abstract
Background
Unloader knee braces were effective in the treatment of knee OA and it was a form of management that was recommended by the Osteoarthritis Research Society International (OARSI). The study aims to assess the effectiveness of knee braces in management of Knee osteoarthritis in the management of knee osteoarthritis in patients aged 37 years and above at Mulago National Referral Hospital.

Methodology
The study was descriptive, and cross-sectional employing a quantitative data collection approach from 45 respondents. It included all male and female patients who were diagnosed with knee osteoarthritis in the Orthopedic workshop.

Results
Knee braces had a significantly high efficiency of 84.4%, in relieving knee OA symptoms such as pain and decline in the quality of life thereby improving their lifestyle, support and stability, improved walking speed, and reduced pain. 7(15.6%) felt no help was brought by knee brace use. 10(22.2%) experienced improvement in their lifestyle, 8(17.8%) had better support and stability only 5(11.1%) had improved walking speed, 15(33.3%) experienced reduced and knee stiffness and 7(15.6%) experienced none of the changes. Out of 38 respondents who felt a knee brace had helped with their condition 7(19%) experienced a high extent of change, 18(47%) experienced a moderate change and 13(34%) experienced a slight change in their condition with the use of knee braces.By gender 30(66.7%) were female while 15(33.3%) were male.

Conclusion
The use of Knee braces is highly effective in the management of Knee OA by relieving most symptoms and improving the quality of life of patients with Knee OA.

Recommendation
MNRH administration should relocate and put in proximity to the different disciplines involved in the management of knee OA to ensure the different professions jointly manage the disease.

Background of the study
Knee osteoarthritis is a form of degenerative joint disease that affects the articular cartilage, joint lining, ligaments, and the underlying bone (Hunter *et al*, 2019). The main aim of the knee brace is to apply corrective forces on load distribution to decrease internal pressure on the medial compartment of the knee thereby reducing on load applied and this is what contributes to pain reduction and increased function recovery (Moyer *et al*, 2015). Unloader knee braces were effective in the treatment of knee OA and it was a form of management that was recommended by the Osteoarthritis Research Society International (OARSI) (McAlindon *et al*, 2014). However, the use of knee braces as a form of management of knee OA was withdrawn from the most recent OARSI because of inconclusive evidence regarding their symptomatic benefits (Bannuru *et al*, 2019). Nevertheless, they were strongly recommended in the up-to-date American College Rheumatology guidelines (Kolasinski *et al*, 2020) and this shows an absence of consensus on the effect of knee braces in the management of knee OA in addition to the usual care.

Knee braces were found effective in reducing pain and improving function in patients with knee osteoarthritis In Tanzania and concluded that knee braces should be considered a viable treatment option for knee osteoarthritis (Sweya *et al*, 2018). The effectiveness of knee braces in the management of knee osteoarthritis in Uganda reported that knee braces were effective in reducing pain and improving function in patients with knee osteoarthritis. Patients reported that wearing knee braces improved their mobility, reduced knee pain, and increased their overall joint function (Kahangi and Dameron, 2017). There is no conclusive data about the effectiveness of knee braces in the management of Knee osteoarthritis in Uganda. The study aims to assess the

effectiveness of knee braces in management of Knee osteoarthritis in the management of knee osteoarthritis in patients aged 37 years and above at Mulago National Referral Hospital.

Methodology
Study Design

The study was descriptive, and cross-sectional employing a quantitative data collection approach. The quantitative study design was selected because of its flexibility in collecting data for the study in the shortest time possible.

Study Area
The study was conducted in Mulago National Referral Hospital at the Orthopedic workshop, Kampala district. The hospital serves a large population of the entire country of Uganda. The study setting was selected because it is one of the biggest orthopedic referral health facilities in Uganda with a total of 40 orthopedic health workers.

Study population
The study included all male and female patients who were diagnosed with knee osteoarthritis aged 36 years and above and were present at the Mulago orthopedic workshop. This population was used because of the increasing cases of knee osteoarthritis among these patients at the orthopedic workshop and only those that were willing got involved in the study.

Sample Size Determination
The sample size was determined by the Yamane formula (1967) as follows. The respondents included.

$$n = \frac{N}{1+N(e)^2}$$

Where;
n = sample size
N = population size =45
e = precision level (0.01)

Therefore sample size, $\quad n= \quad \dfrac{45}{1+45(0.01)^2}$

n = 44.7
n ~ 45 respondents

Sampling Technique
A non-probability convenient sampling technique was used to select respondents that were available at the time of data collection at Mulago Workshop, for quick and easy data collection, easy access to participants, and its effectiveness.

Sampling Procedure
The respondents were sampled on a first come first serve basis.

Data Collection Method
Data was collected using self-administered questionnaires.

Data collection tools
Tools included pencils, pencils, and self-administered questionnaires.

Data collection procedure
A research assistant was trained on data collection, and reading questions to the respondents. The principal researcher and research assistant explained the purpose of the study to the respondents who later had to fill out the consent form before giving them the questionnaires. The researcher assured the respondents of privacy and confidentiality. The researcher collected data by administering questionnaires to the respondents who were present at the time of data collection. After finishing filling out the questionnaires, the researcher corrected them and cross-checked them for completeness and correctness before leaving the study area.

Definition of Variables
Independent variables
The independent variable for the study was the presumed cause of the dependent variable and it was the severity of knee osteoarthritis amongst patients aged 36 years and above.

Dependent variables
The dependent variable was the presumed effects of the independent variable. It was adherence to knee braces in the management of knee osteoarthritis amongst patients aged 36 years and above.

Quality control
Reliability and validity of research instruments
The researcher pre-tested the questionnaires among patients with knee osteoarthritis at Kirudi Hospital before data collection because the facility had similar settings and handled cases like the Mulago orthopedic workshop. Data was analyzed and adjusted accordingly, and questionnaires were checked for data accuracy, consistency, adequacy, quality, and completeness, and any identified mistakes were corrected.

Inclusion criteria
All Patients aged 36 years and above with knee osteoarthritis who had used knee braces for over one month and were present in Mulago National Referral Hospital at the Orthopaedic workshop at the time of data collection and consented to participate in the study were included in the study.

Exclusion criteria
All Patients aged 36 years and above with knee osteoarthritis who had used knee braces for over one month were present in Mulago National Referral at Orthopaedic workshop at the time of data collection and did not consent were excluded from the study.

Data analysis and presentation

Data management was done by data editing before leaving the study area to ensure that no mistakes or areas were left blank and if any were found, they were corrected. The questionnaires were counted to ensure that all were returned and kept in a safe place. Data collected was analyzed using Statistical Package for Social Science (SPSS) version 20 and Microsoft Excel. Quantitative data was analyzed using univalent, multivalent, and bivalent such as frequency, percentage distribution figures, and bar graphs.

Ethical considerations

An introductory letter seeking permission to carry out research was delivered to the MNRH Research and Ethics Committee. The purpose of the study was explained to the respondents and consent was obtained before giving out questionnaires and interview schedules. Each respondent was assured of privacy and confidentiality since no names were written on the interview schedule and questionnaire. Sensitive issues were explored before and a good relationship was established with the respondents.

Results

Table 1: Distribution of the Socio-demographic characteristics of the respondent.

Variable	Frequency(n=45)	Percentage%
Age		
36- 40	3	6.6
41- 45	5	11.1
46- 50	17	37.7
51 and above	20	44.4
Gender		
Female	30	66.7
Male	15	33.3
Highest Education Level		
None	7	15.6
Certificate	15	33.3
Diploma	10	22.2
Degree	10	22.2
Masters	3	6.7
Marital status		
Married	10	22.2
Single	5	11.1
Widowed	25	55.6
Divorced	5	11.1
Religion		
Christian	15	33.3
Muslim	25	55.6
Others	5	11.1
Language spoken fluently		
English	12	26.7
Luganda	15	33.3
Lusoga	6	13.3
Lunyankole	6	13.3
Other	6	13.3

Source: Field data (2023)

Findings in Table 1 show that, out of 45 respondents who participated in the study, 30(66.7%) of the respondents were female while 15(33.3%) were male, demonstrating a female majority. The age of respondents was assessed and it was found that 3(6.6%) were aged 36-45 years, 5(11.1%) were aged 41-45years, 17 (37.7%) were aged 46-50years and most respondents were 20(44.4%) aged 51 years and above. The marital status of the respondents was determined 10(22.2%) were married, 5(11.1%) were single, 25(55.6%) were widowed and 3(11.1%) were divorced. In terms of the highest level of education, 15(33.3%) held certificates, 10(22.2%) had diplomas,

10(22.2%) possessed degrees, and 3(6.7%) had master's degrees and 7(15.6%) had no certification. In the context of religion, the majority of the respondents were Muslims constituting 25(55.6%), followed by Christians with 15(33.3%) and the others with 5(11.1%). The study also pointed out that the most frequently spoken language at 15(33.3%) was Luganda while 12(26.7%) spoke English, 6(13.3%) spoke Lusoga, 6(13.3%) spoke Lunyankole, and 6(13.3%) spoke other languages.

Effectiveness of Knee Braces in the Management of Knee OA in Mulago National Referral Hospital.

Table 2: shows the parameters involved in the effectiveness of knee braces

Variable	Frequency(n=45)	Percentage (%)
Have you been prescribed a knee brace as part of your treatment for knee OA?		
Yes	30	67
No	15	33
How long have you been using Knee braces?		
More than 1 month	18	40.0
2 to 5 months	12	26.7
6 months to 1 year	10	22.2
More than 1 year	5	11.1
Do you wear your knee braces regularly as advised by your health care provider?		
Always	7	15.6
Sometimes	20	44.4
Rarely	15	33.3
Never	3	6.7
Do you feel that wearing knee braces has helped in the management of your condition?		
Yes	38	84.4
No	7	15.6
What positive changes have you noticed since you started using knee braces?		
Improvement in lifestyle	10	22.2
Better support and stability	8	17.8
Improved walking speed	5	11.1
Reduced pain and knee stiffness	15	33.3
None	7	15.6

Source: field data (2023)

Table 2 shows that more than half of the respondents 30(67%) were prescribed braces to manage arthritis 15(33%) were not. A fair number of respondents 18(40.0%) had been using knee braces for more than 1 month, 12(26.7%) for 2 to 5month, 10(22.2%) for 6 months to 1 year, and 5(11.1%) for more than 1 year. An overwhelming number of respondents 20(44.4%) wore the braces sometimes as prescribed by the healthcare provider, 7(15.6%) wore them always, 15(33.3%) rarely, and 3(6.7%) never wore them at all. Out of 45 respondents, more than half 38(84.4%) felt that knee braces had helped in the management of their conditions and only 7(15.6%) felt no help was brought by knee brace use.

10(22.2%) of the respondents experienced improvement in their lifestyle, 8(17.8%) had better support and stability only 5(11.1%) had improved walking speed, 15(33.3%) experienced reduced and knee stiffness and 7(15.6%) experienced none of the changes.

Figure 1: A pie showing to which extent knee braces have helped in the management of knee OA
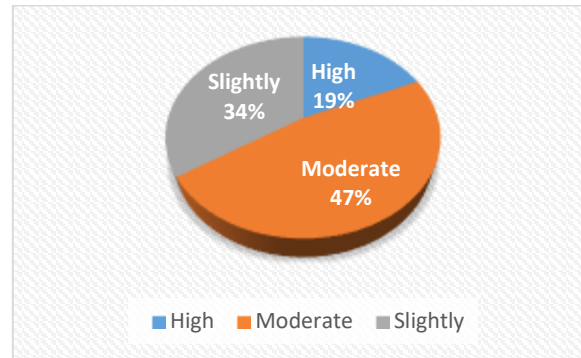

Figure 1 shows that out of 38 respondents who felt a knee brace had helped with their condition, 7(19%) experienced a high extent of change, 18(47%) experienced a moderate change and 13(34%) experienced a slight change in their condition with the use of knee braces.

Discussion

Out of 45 participants in the study, more than half of the respondents 30(67%) were prescribed knee braces for the management of knee OA while 15(33%) of the respondents were not, table 2. This outcome suggests that knee braces play an important role in the management of knee OA. On the other hand, it's important to note that 33% of the respondents were not prescribed them and this may have been due to reasons like them not being suitable for every patient and the gaps in the effectiveness of knee braces in the management of knee OA. This result is consistent with the findings by Bannuru and McAlindon *et al.*, (2019) which showed that unloader knee braces were effective in the treatment of knee OA and it was a form of management that was recommended by the Osteoarthritis Research Society International (OARSI).

From the data obtained, almost all the respondents 38 (84.4%) felt that knee braces had helped in the management of their conditions, table 2. This finding suggests that knee braces were effective enough to bring about a relative change and improvement in the symptoms brought about by knee Osteoarthritis. This result is consistent and agrees with the findings of Xavier *et al*., (2020) in a study to assess the three-month efficacy which showed that there were pain, function, and quality of life improvements with the use of knee braces and the custom-fitted unloader knee brace with external rotation functions which resulted in better comfort, more frequent daily use and greater reduction of knee adduction moment pre and post-treatment.

More than half of respondents 30(67%) did not wear the braces as prescribed by the healthcare provider, table 2. This was perhaps because some of the respondents may have tried using them and they had not experienced any changes in their condition fast enough. These findings were similar to the findings of a study carried out in Australia by Yu *et al.*, (2016) who reported that neither patellofemoral nor tibiofemoral customized bracing resulted in a significant difference in overall pain and functional improvements compared to the control unbraced group in individuals with knee OA.

Conclusion

The use of Knee braces is highly effective in the management of Knee OA by relieving most symptoms and improving the quality of life of patients with Knee OA.

Recommendation

MNRH administration should relocate and put in proximity to the different disciplines involved in the management of knee OA to ensure the different professions jointly manage the disease. teamwork should be encouraged among the different disciplines who manage patients with knee OA.

Acknowledgment

List of Abbreviations

ADL: Activities of Daily Living.
KAM : Knee adduction moment
KOA: Knee Osteoarthritis
MNRH: Mulago National Referral Hospital
MOH: Ministry of Health.
NSAIDs: Non-Steroidal Anti –Inflammatory Drugs
OA: Osteoarthritis
OPD: Outpatient department
QoL: Quality of life.
UAHEB: Uganda Allied Health Examination Board
UIAHMS: Uganda Institute of Allied Health and Management Sciences.
WHO: World Health Organization

Author Biography
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PUBLISHER DETAILS: