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RESEARCH ARTICLE

CHARACTERISTICS AND SEVERITY OF OSTEOARTHRITIS AMONG PATIENTS IN MOGADISHU SOMALIA: A SINGLE CENTER CROSS-SECTIONAL STUDY

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Abstract

Introduction: Osteoarthritis (OA) is a progressively debilitating condition indicated by subarticular bone remodeling, osteophyte growth, ligament laxity, inflammation, and periarticular muscle weakness. We provide an in-depth analysis of knee and hip osteoarthritis and its severity.

Methods: This cross-sectional study is based on healthcare data recorded in the Kalkaal Hospital involving patients attending the orthopedic department. The entire dataset was examined, and data from 127 patients aged 25 years or older were included. The stage of the OA was evaluated using Kallgren and Lawrence (K&L) score. The researcher determined the normality of the data using the Kolmogorov-Smirnov test, the Mann-Whitney U test for variables comparing the two groups, and the Chi-square test for categorical variables.

Results: We analyzed the entire dataset and identified 127 patients aged 25. The respondents had a mean age of 61.9 years (SD 13.29, range 25–90 years), with 59 men and 68 females. A univariate analysis reveals a statistically significant difference in the severity of OA between education (P = 0.010), prior surgery (P = 0.003), osteophytes (p = 0.046), and HIP OA (p = 0.016).

Conclusion: In conclusion, the severity of OA increased with higher education, the presence of osteophytes, and prior surgeries(osteotomies). Finally, patients with HIP OA were most likely to have severe compared to patients with other types of OA. Most educated individuals live in urban areas and have low-activity jobs. This need to be addressed because it is detrimental to arthritis treatment. Additionally, past osteotomies slowed the progression of osteoarthritis.

Introduction:-

Osteoarthritis (OA) is a progressive disorder of the joint tissues that involves the cartilage. This disease is characterized by subarticular bone remodeling, osteophyte formation, ligament laxity, periarticular muscle weakening, and synovial inflammation[1]. These alterations are caused by an imbalance in the equilibrium between the breakdown and repair of joint tissue. The primary symptoms of OA are joint pain, stiffness, and motor

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difficulties. The disease progresses slowly, eventually leading to joint failure with pain and disability but slower [2]. Cartilage is a buffer that allows smooth movement of joints during motion. When there is damage to the cartilage, the adjacent bones at the joint rub against each other, and the resultant friction causes inflammation, pain, and stiffness[3].

There is a dearth of data about OA in Somalia and throughout Africa. Osteoarthritis is the most common type of arthritis in Africa, with prevalence rates ranging from 55.1 percent to 82.7 percent in urban and rural areas of South Africa [4]. OA is prevalent in low- and lower-middle-income nations. With changing demographics and the rise of non-communicable diseases, tailored public health policies are critical to addressing this growing epidemic among the aging population[5].

Stage 0 of OA is termed "normal" knee health. There are no indications of OA at this stage, and the joint is not impaired or painful. Treatment is not required in this stage, given that no signs exist [4,5]. In Stage 1 of OA, classified as "minor," the patient shows minor bone spur growth. Bone spurs are bony growths that develop on adjacent bones in a joint. There might be a minor cartilage loss in this stage, but it does put the joint space at any significant compromise. Usually, a person with stage 1 OA does not experience any discomfort or pain, and there is minor wear on the joint components[5,6].

Given that there are no outward symptoms at stage 1 of OA, patients are usually not required to undergo any treatment. However, the doctor should assess if the patient has a predisposition to OA or is at high risk. If a patient has a high susceptibility to or risk of developing OA, it is recommended that they engage in regular activity to alleviate any minor symptoms and slow the progression of arthritis. [6–8].

Stage 2 of OA is classified as the "mild" stage of the condition. X-rays of the knee joint at this stage will demonstrate continued growth of the bone spur. Usually, at this stage, the cartilage is healthy in size. There is a joint space between the bones and no rubbing and scraping between adjacent bones. Stage 2 is characterized by the sufficient presence of the synovial fluid that allows normal joint motion. A person at this stage is likely to experience pain after walking or running for a long time of the day; the person may experience stiffness at the joint after long hours of use and tenderness when bending or kneeling[6,7].

The doctor should assess the signs and symptoms of OA, upon which an early stage of OA may be detected and diagnosed[3]. If so, an intervention plan may be developed and applied to prevent the condition's progression. A physician may recommend several nonpharmacological treatments to relieve the discomfort at the mild stage of OA. These include orthosis (braces and perhaps other mobility aids), physical therapy/yoga, and lifestyle changes[9].

Stage 3 of OA is classified as the moderate stage of the condition. While at stage 2, OA cartilage is healthy, when OA progresses to stage 3, the cartilage is damaged, and there is a narrow space between adjacent joint bones. People with stage 3 of OA usually experience pain when they walk, run, kneel, or bend. The person is likely to experience stiffness when sitting down for a long time or walking up after sleep early in the morning. The patient may complain of joint swelling after a long period of motion[10]. The doctor is likely to recommend nonpharmacological therapies or OTC pain relievers, and if they are no longer effective, the physician may prescribe a class of medications known as glucocorticoids[6,7,10].

Stage 4 OA is considered severe. At this stage, the individual with knee OA suffers significant pain and discomfort when moving the joint. The pain is exacerbated by the significant decrease in joint space between bones. The narrow space characterized by almost entirely gone cartilage leaves the joint stiff and even immobilizes the patient. The dramatic reduction of the synovial fluid makes it ineffective in reducing the friction on the moving parts of a joint[6,7].

The available treatments for Stage 4 OA include bone realignment surgery and total knee replacement (TKR). Patients with advanced OA may benefit from bone realignment surgery, which involves slicing the bone above or below the knee to shorten, extend, or realign it. The body's weight is shifted away from the points of the bones with the most remarkable spur growth, and there is bone damage. Replacement (TKR), also known as arthroplasty, replaces the damaged joint with a plastic and metal device. The side effect of TKR include infections and blood clots, which can take a long time for the patient to recover[6,7]. Additionally, a single intra-articular injection of platelet-rich plasma (PRP) efficiently relieves pain and improves daily activities and quality of life in patients with

advanced knee osteoarthritis. Intra-articular injection of PRP is equivalent to one corticosteroid dose for people aged 67 years and older with late stages of knee OA[11].

OA imposes a physical, psychological, and socioeconomic devastating impact. It is frequently accompanied by substantial disability, including impairments in movement and daily living tasks. Distress, diminished self-worth, and loneliness are among the psychological consequences. The high prevalence of OA in the population imposes a significant economic burden[12]. Each year, approximately 1 million total hip replacements are expected to be performed worldwide between 1995 and 2020 [12]. To our knowledge, there is little to no record in Somalia on OA; therefore, we discuss osteoarthritis in detail, including the disease process, risk factors, treatment options, and severity, as defined in the literature and the findings of a study of OA patient data.

Methods:-

Study design and Setting:

This observational study is based on healthcare data recorded in the Kalkaal Hospital involving a patient at the orthopedic department between March 2021 to July 2021. Kalkaal Hospital is a multispecialty hospital in Mogadishu, Somalia, located in Hodan District, Banadir Region.

Study participants and variables:

The entire dataset was examined, and data from 127 patients aged 25 years or older were included. The variables included in this study are demographic (age, gender, education, and income), risk factors of OA (marital status, smoking, physical activity, obesity, and previous surgical intervention), and the symptoms (osteophytes, pain, and narrowness of the joints) type of OA (hip, and knee OA).

Data sources and Handling Bias:

The hospital records provided demographic information, diagnosis, and symptoms. The information on OA risk factors was gathered by calling each patient and interviewing them using a predefined questionnaire. To minimize recall bias, the researchers ensured that the questionnaires were as high-quality as possible and that the interviewers were well-trained and could give the interviewees enough time to recollect long-term memories.

Diagnostic approach:

The Kallgren and Lawrence (K&L) scores were used to determine the OA's stage. OA can be classified according to its radiological, clinical, or subjective manifestations. The Kallgren and Lawrence (K&L) score is the most commonly used method for OA evaluation[13]. There are four stages for measurement of the severity of the disease, from 0 to 4. According to Kellgren and Lawrence's score, these stages are strongly associated with the hypothesized sequential emergence of osteophytes, cysts, joint space loss, and sclerosis. This criterion has been adopted by the World Health Organization (WHO) to measure OA's severity. The joint structure can be visualized using cross-sectional imaging methods such as magnetic resonance imaging (MRI)[13].

Data analysis:

The data was collected using a questionnaire, and the analysis tool was Statistical Package for Social Science (SPSS) version 25. All variables, including the mean and standard deviation or frequency, were subjected to descriptive analysis. The researcher used the Kolmogorov-Smirnov test to determine the data's normality[14], the Mann-Whitney U Test variables between the two groups[15], and the Chi-square test for categorical variables[16].

Ethical approval:

The Kalkaal Hospital's review board assessed and approved the research protocol. The patient's consent was obtained their data were anonymized for analysis. All the work was done following the Helsinki Declaration's ethical criteria for research.

Results:-

We reviewed the complete dataset and included data from 127 patients aged 25. The mean age of the respondents was 61.9 years (SD 13.29, range 25–90 years), and there were 59 males and 68 females. They had been diagnosed with osteoarthritis, 21 with stage 3 and 106 with stage 4. Additionally, the Mann–Whitney U test of age and severity of OA suggests a statistically insignificant difference ($p = 0.065$) between the moderate and severe instances. Knee

OA accounts for 76.85 percent of most patients, hand OA accounts for 21.63 percent, and hip OA accounts for 10.70 percent.

The univariate analysis shown in Table 1 compares the severity of OA to independent variables such as demographics, OA risk factors, and symptoms. As demonstrated in Table 1, there are statistically significant differences in education (P = 0.010), prior surgery (P = 0.003), osteophytes (p = 0.046), and HIP OA (p = 0.016).

A comparison of the characteristics of patients with hip osteoarthritis and those with other types of OA revealed that while the stage of OA was significantly different (p = 0.016), other variables such as crackle sound (p=0.064), smoking (p=0.89), surgery (p=0.443), vigorous activity (p=0.387), marital status (p=0.877), gender (p=0.265), and age (p=0.818) were not significantly different, as shown in Table 2.

When the patient characteristics of the group with knee OA were compared to those of the group with other types of OA, the results indicated a significant difference in crackle sound symptoms (p=0.003); however, other variables were not statistically significant (p>0.05) as shown in Table

Discussion:-

In this study, a comparison of patient characteristics was made between moderate and severe OA, patients with hips and those with other kinds of OA, and lastly, patients with knee OA and those with other kinds of OA.

The mean age of the responders was 61.9 years, including 59 males and 68 females. All had been diagnosed with osteoarthritis, with 21 suffering from stage 3 and 106 with stage 4. Stage 3 patients had an average age of 54.93 years (standard deviation, 15.369), while stage 4 patients had 64.33 years (standard deviation, 15.369). (STD, 14.033). Quintana's investigation found a higher prevalence among older groups.

According to this study, severe instances of OA are more advanced in age than in mild cases[17]. As depicted in the literature, knee OA was the most common type of OA[18,19]. The severity of OA due to the effect of gender was not statistically significant (p=0.329) [20].

The findings indicated a statistically significant difference in education level (p=0.010), showing that the severity of OA worsened with more education. A greater education level is related to a more severe form of OA, attributed to the time spent sitting at work and home. Individuals with OA who are more educated reside in metropolitan settings and engage in sedentary behavior.

According to the results, previous surgeries prevented the progression of osteoarthritis. In this study, patients who underwent previous surgical treatments to treat OA were associated with less severe OA (p = 0.003). Hence, it further asserted that it is reasonable to suppose that **osteotomies** might postpone the development or progression of knee OA[21].

Among the symptoms of OA, all the patients in the two groups experienced pain, joint stiffness, and swelling; therefore, no yes was done on these variables. As an exception, results show that the presence of osteophytes is disproportionally associated with the severity of osteoarthritis (p =0.046). Osteophytes, as demonstrated in the literature, do not affect the risk of structural advancement. They are highly related to malalignment on the osteophyte's side, and any relationship with advancement is somewhat explained by the association with malalignment[22].

A comparison of patient characteristics between patients with hip osteoarthritis and those with other OA types showed a significant difference in the stage of OA (p = 0.016). The study by Wright et al., an acetabular osteophyte, showed no association with hip OA progression.

In comparing the patient characteristics of the group with knee OA and other types of OA, the results indicated a significant difference in crackle sound symptoms (p=0.003). In addition to discomfort, noise in the knee joint is a common symptom that frequently results in outpatient clinic sessions in patients with knee OA[23]. According to research, it is critical to distinguish between normal and pathologic noise. Noise following surgery is frequently only the perception of noise previously due to emotional worries [23].

Limitations

In this study, some limitations must be considered. Due to the cross-sectional nature of the data, variation in the severity of osteoarthritis cannot be inferred because the data cannot be utilized to study behavior over time to identify the difference. The data lacked sufficient detail on sedentary behavior, income, and occupation characteristics. Although educational attainment is usually a proxy for socioeconomic class, it is less likely to be affected by sickness than by money and career. However, education is a distal variable that can help understand the link between sedentary behavior and severity. There is a need for a more quality research study involving longitudinal studies, which expands the potential areas for intervention efforts.

Conclusion:-

In conclusion, the results of this study indicate that the severity of OA increases with high education**.** High education might be because most educated people have long-sitting jobs with low activity; sitting for extended periods is detrimental to arthritis treatment. Furthermore, previous surgeries(osteotomies**)** prevented the progression of osteoarthritis. Osteotomy is not as good in relieving pain as total knee replacement, and osteotomy typically fails sooner than TKA, necessitating repeated surgery. In this study, patients who underwent previous surgical treatments to treat OA were associated with less severe OA. Hence, it can be said that **osteotomies** might postpone the development or progression of knee OA. Among the symptoms, the presence of osteophytes is disproportionally associated with the severity of osteoarthritis.

Current Knowledge on Severity of OA

1. The protein makeup of cartilage degenerates as a result of biological processes.
2. Inflammation of the cartilage can cause new bone spurs (osteophytes) to sprout around the joints.

The benefit of the study

1. A growing body of studies doubts the significance of OA severity variations among various factors.
2. This study contributes to the literature by emphasizing the importance of various osteoarthritis factors in Somalia, including education as a distal variable related to lifestyle, previous osteotomies, and new bone spurs (osteophytes) as OA symptoms.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Research conception and design, Drafting of the manuscript, and Statistical analysis, and proofreading: AAA, SAM and NAK respectively.

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Tables and figures

Table1:- Comparison of various patient characteristics with the severity of OA.

	Progression of OA		
	Moderate	Severe	P-Value
Age	54.93(STD, 15.369)	64.33(STD, 14.033)	0.065
Gender (M: F)	9:12	50:56	0.717
Education(low/high)	10/11	22/84	0.010
Income(low/high)	10/5	8/11	0.154
Marital Status (Not married/married)	3/11	3/15	0.732
Smoking (Yes/No)	5/16	11/94	0.094

Surgery (Yes/No)	9/11	16/87	0.003
Osteophytes (Yes/No)	2/3	67/18	0.046
HIPOA(Yes/No)	2/13	11/10	0.016
Hand OA(Yes/No)	4/11	4/17	0.588
Knee OA(Yes/No)	13/2	14/7	0.172
Obese	2/3	34/51	1.0

Table2: - Comparison of patient characteristics between those with hip osteoarthritis and other types of OA.

	HIP OA		
	NO	YES	P-Value
Age	23	13	0.818
Gender (M: F)	8/15	7/6	0.265
Education (low/high)	11/12	5/8	0.587
Surgery (Yes/No)	15/6	7/5	0.443
Crackle Sound (Yes/No)	19/4	7/6	0.064
Stage (3/4)	13/10	2/11	0.016

Table3:- Comparison of patient characteristics between those with knee osteoarthritis and other types of OA.

	KNEE OA		
	NO	**YES**	**P-Value**
Age			0.077
Gender (M: F)	5/4	10/17	0.329
Education (low/high)	6/3	10/17	0.121
Income(low/high)	5/3	18/16	0.536
Smoking (Yes/No)	2/7	7/19	0.781
Surgery (Yes/No)	4/5	18/6	0.097
Fall (Yes/No)	5/4	22/5	0.12
Crackle Sound (Yes/No)	3/6	26/10	0.003
Stage (3/4)	2/7	13/14	0.172

Figure 1:- Comparison of patient Education(low/high)with severity of OA: p = 0.010.

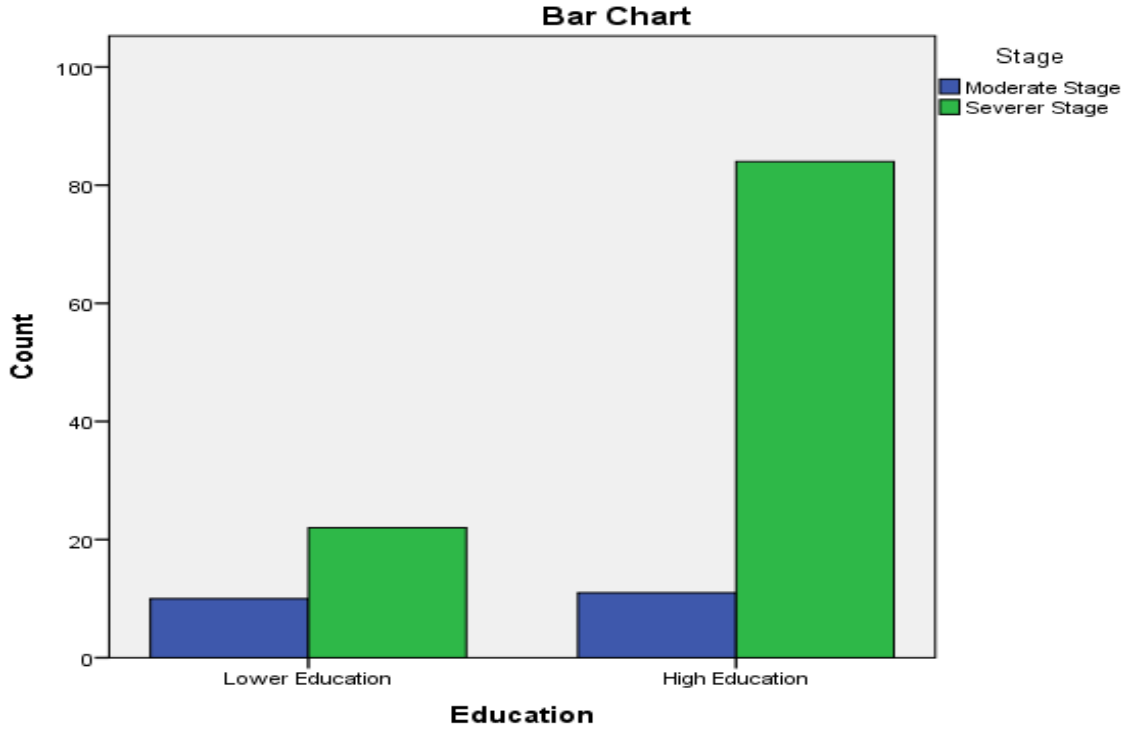


Figure 2:- Comparison of patient's previous surgery with the severity of OA: p=0.003.

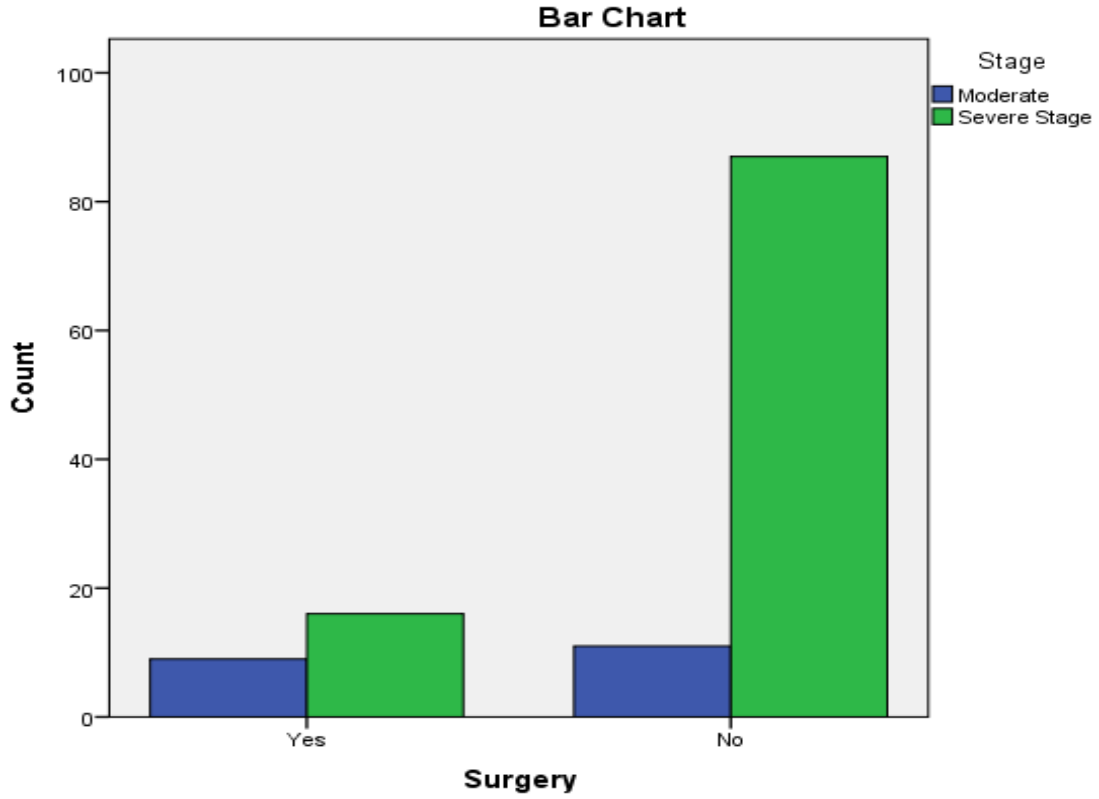


Figure 3:- Comparison of HIPOA type of OA with the severity of OA: p=0.016.

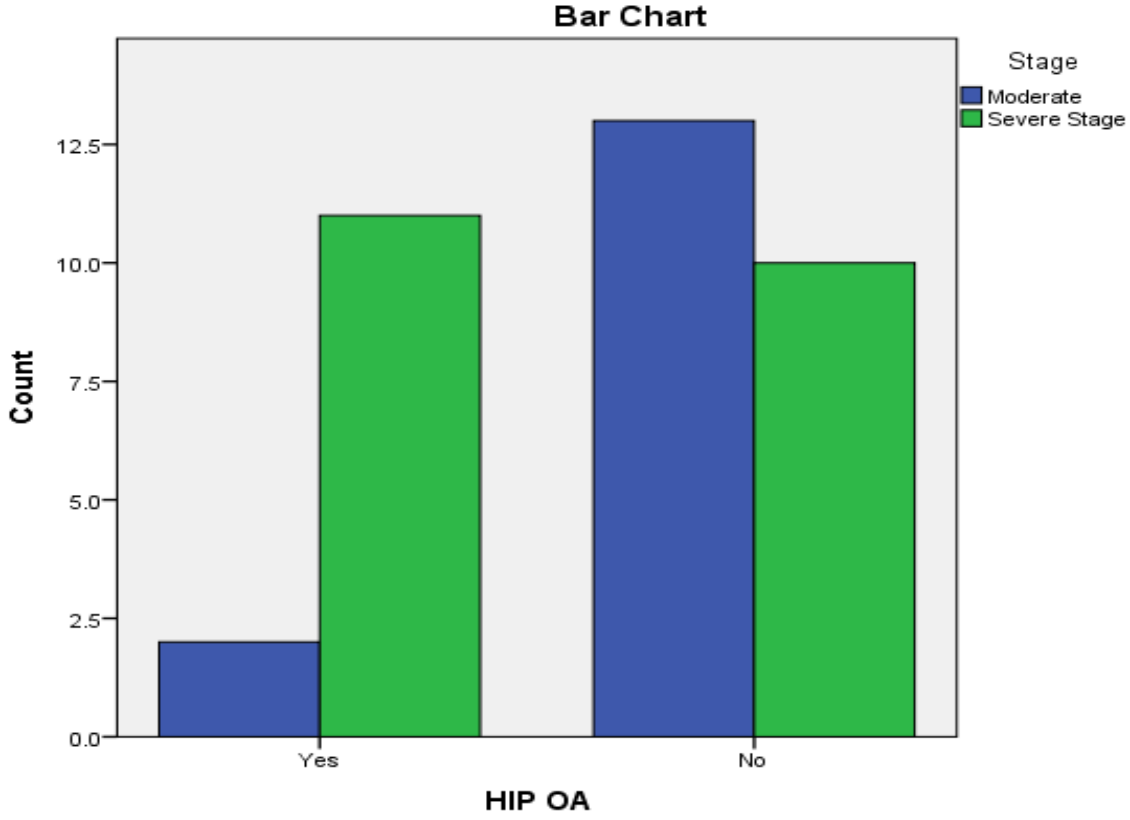
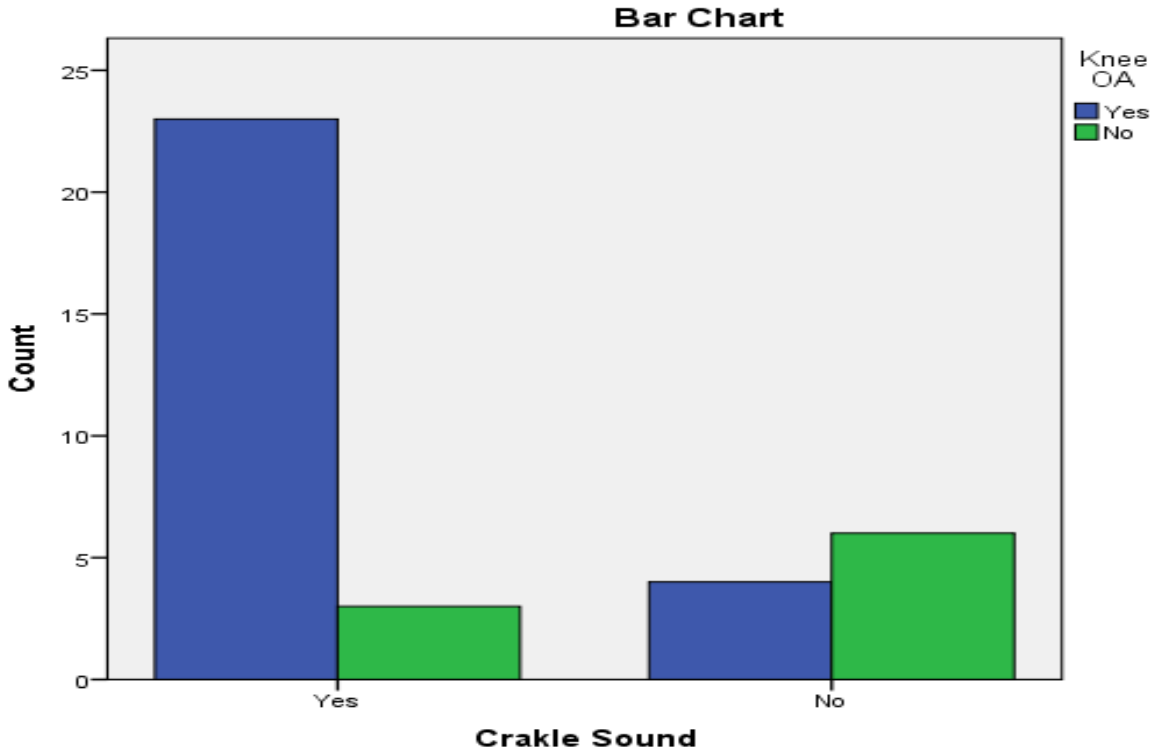


Figure 4:- Comparison of Presence of Crackle Sound with Presence of Knee OA: 0.003.



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