

# The Role of Ultrasound Therapy on The Treatment of Osteoarthritis in Knee Joint

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**Abstract**— Being the most common musculoskeletal progressive condition, osteoarthritis is an interesting target for research. It is estimated that the prevalence of knee osteoarthritis (OA) among adults 60 years of age or older is approximately 10% in men and 13% in women, making knee OA one of the leading causes of disability in elderly population. Today, we know that osteoarthritis is not a disease characterized by loss of cartilage due to mechanical loading only, but a condition that affects all of the tissues in the joint, causing detectable changes in tissue architecture, its metabolism and function. While radiographs and magnetic resonance imaging (MRI) have long been used in the assessment of osteoarthritis (OA), ultrasound imaging has been rapidly accepted by musculoskeletal providers in both the assessment and treatment of OA. A limiting factor in the use of ultrasound is the proper training required by the user for results to be reliable and reproducible. A standardized ultrasound protocol can potentially address this limiting factor. The critical information to consider in a standardized protocol include proper patient positioning, probe alignment, probe orientation, and identification of the appropriate anatomic landmarks. The outlined protocol considers these factors with the purpose of providing a step-by-step method to assess and monitor knee OA.

**Key words:** :Osteoarthritis (OA), Knee osteoarthritis, Joint degeneration, Cartilage loss, Joint tissues, Radiographic assessment, Magnetic resonance imaging (MRI)

## 1.Introduction

Osteoarthritis (OA) is the most prevalent degenerative joint disease, reflecting considerable ramifications in the assessment and treatment of chronic pain and disability <sup>[1]</sup>. Knee OA can affect the medial, lateral, and patellofemoral joint and usually develops slowly over time, and results in decreased function with activities of daily living. The degeneration that occurs with knee OA is multifactorial with both inflammatory and biomechanical processes co-occurring. It is also influenced by a combination of factors, that include family history, age, obesity, lower limb alignment, joint shape, trauma, and chronic inflammation <sup>[2]</sup>. The risk factors related to the development of knee OA can be divided into two categories: non-modifiable and modifiable. Non-modifiable risk factors include hereditary and congenital abnormalities that affect the bone, cartilage, and connective tissue of the knee. Modifiable risk factors are able to be adjusted and the most common is excess body weight <sup>[2]</sup>. Excess weight increases joint loading, and for every pound of weight gained the knee is exposed to an extra two to four pounds of extra force <sup>[2,3]</sup>. Thirteen percent of women and 10% of men aged 60 years and older have symptomatic knee OA <sup>[4]</sup>. The proportion of people affected with symptomatic knee OA is likely to increase due to the aging of the population and the rate of obesity or overweight in the general population <sup>[5]</sup> Ultrasound is a user-dependent tool and requires proper training for its results to be reliable and reproducible <sup>[6]</sup>. As ultrasound use continues to grow in acceptance and incorporation into medical training, standardized protocols can improve users' skills <sup>[7]</sup>. Developing a standardized protocol can also enhance diagnostic accuracy and improve communication among peers

in the medical community. While prior publications have reported the benefit of standardized scan protocols, step-by-step protocols for assessing knee OA have not been outlined [8][9][10]. The purpose of the report is to provide a step-by-step method for patient positioning, probe alignment, probe orientation, and landmark identification in the assessment and monitoring of knee OA. The protocol is divided into anterior, medial, lateral, posterior, and standing evaluations of the knee.

### 1.1 Aim Of Study:

To study the effect of ultrasound therapy on the treatment of Osteoarthritis in knee joint.

## 2.Methodology

### 2.1 Study design and patients:

- This a review analytical cross-sectional study was conducted to study the effect of ultrasound therapy on the treatment of Osteoarthritis in knee joint by using self-made questionnaire. This study was done from 1st of august 2023 up to 28 of November, at AL-Jalah Trauma Hospital, Benghazi Medical center, and AL-Mahara Clinic.
- A total of 300 patients from both genders enrolled in this study, who's diagnosed with knee osteoarthritis, undergoing hospitals and clinics for knee physiotherapy.

### 2.2 Data collection and procedure:

- Data collection was based on questionnaire made by google for, were divided to three sections, first section contains general information of patients (age, se) and patients history with the disease of knee osteoarthritis (diagnosis, type of physiotherapy treatment).
- Third contain question related to disease wither the patients can perform normal task or not and medical, surgical history of patients, impact of disease and treatment on their lives.

### 2.3 Statistical analysis:

In this study statistical analysis was performed by using SPSS Soft-Ware package for windows version 28. Descriptive statistics were presented, categorical variables were expressed as frequencies and percentages.

## 3.Results and Discussions

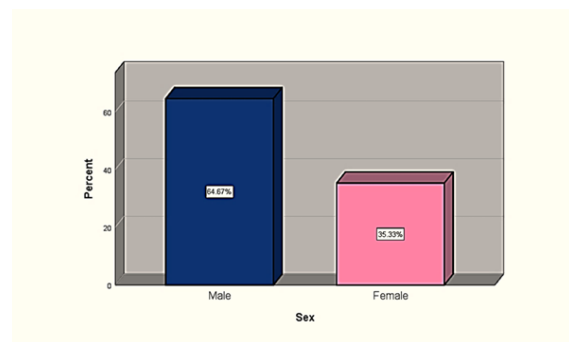
### 3.1 Results:

Table (1): A total of 300 patients participates in this study, as they were attending AL-Jalah Trauma Hospital, Benghazi Medical center, and AL-Mahara Clinic for physiotherapy sessions, as seen near half the patients were found 66 years old and over, while 28.3% of them were between 56-65 and last were age group between 46-55.

**Table 1. Age frequency and percent.**

Age			
		Frequency	Percent
Valid	46-55	74	24.7 %
	56-65	85	28.3 %
	66 and over	141	47 %
	Total	300	100 %

Figure (1): As noted most of patients in this study were male 64.67%, while female was 35.33% and could be male were attending clinic and hospitals for physiotherapy more than female at the time.



**Figure1 . Gender curve.**

**Table (2):** Close to half the patients were diagnosed with osteoarthritis in both knees with 41.3%, while 30.3% with left knee joint, and only 28.3 % of them with right knee joint.

**Table 2 .Diagnosis frequency and percent.**

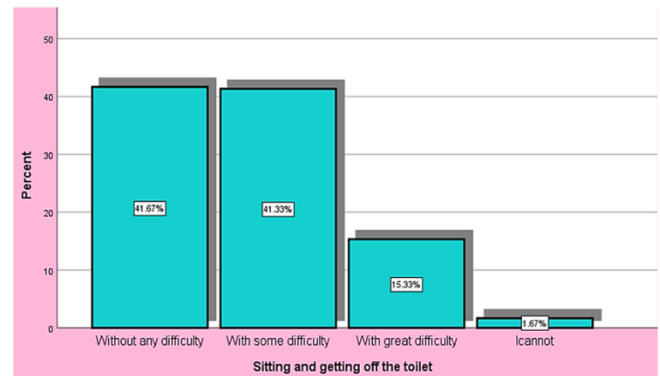
Diagnosis			
		Frequency	Percent
Valid	RT knee joint	85	28.3 %
	LT knee joint	91	30.3 %
	Both knee joint	124	41.3 %
	Total	300	100 %

**Table (3) :** Were showing type of physiotherapy sessions for patients in this study ,as 28.7 % of them have (U.S , superficial , Ex sessions) ,following by (U.S ,deep, Ice bag, Ex ) with 22% , (U.S superficial, Tens , IR ) 19% , (U.S, Deep Tens , EX) 13.7% ,( U.S superficial, hot bag, Ex) 6% , (Tens , Ice bag , Ex) 5.3% and last sharing the same percent 2.7% (U.S Deep , hot bag, Ex ) and (U.S Deep ,IR,EX ).

**Table 3 .Treatment frequency and percent.**

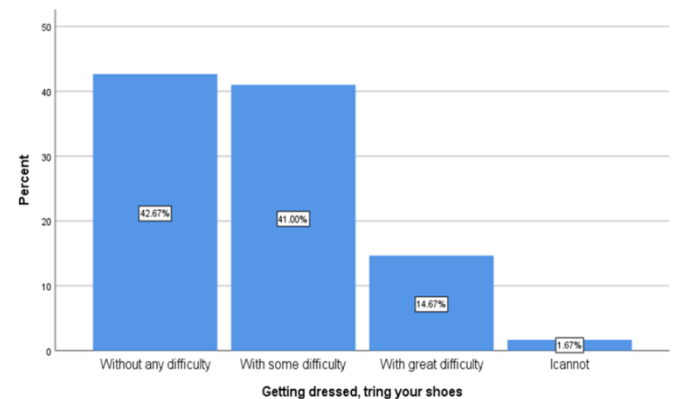
Treatment			
		Frequency	Percent
Valid	U.S, deep, Ice bag, Ex	66	22 %
	U.S, superficial, Ex	86	28.7 %
	Tens, Ice bag, Ex	16	5.3 %
	U.S, Deep Tens, EX	41	13.7 %
	U.S superficial, Tens, IR	57	19 %
	U.S Deep, IR, EX	8	2.7 %
	U.S superficial, hot bag, Ex	18	6 %
	U.S Deep, hot bag, Ex	8	2.7 %
	Total	300	100 %

**Figure (2):** As seen were showing if the patients able to sitting and getting of toilet, as found 41.67% of them able without difficulty, while nearly to the previous percent 41.33 % able but with some difficult, also 15.33% of them able with great difficulty, and only 1.67% cannot.



**Figure 2 .Sitting and getting curve.**

**Figure (3):** As noted below 42.67% found able to getting dressing, tiring their shoes, while 41% able with some difficulty ,14.67% also able but with great difficulty, and 1.67% cannot.



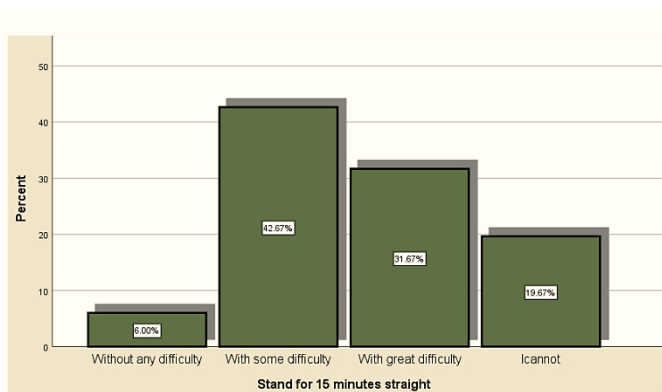
**Figure 1.Getting dressed, trying their shoes.**

Table (4): As seen 12 % of patients found able to Stand up after sitting on a regular chair without supports sideways without any difficulty, while of them 53.3 % able with some difficulty, also 30% found able with great difficulty, and 4.7% cannot.

**Table 4. Stand up after sitting on a regular chair without supports Sideways frequency and percent.**

Stand up after sitting on a regular chair without supports		Sideways	
		Frequency	Percent
Valid	Without any difficulty	36	12 %
	With some difficulty	160	53.3 %
	With great difficulty	90	30 %
	I can not	14	4.7 %
	Total	300	100 %

**Figure (4):** As noted below 6 % found able to Stand for 16 min straight without any difficulty, while of them 42.67 % able with some difficulty, also 31.67 % found able but with great difficulty, and 19.67% cannot.



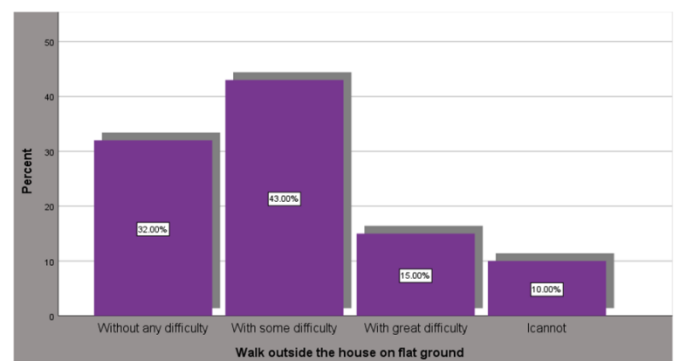
**Figure 4. Stand for 15 minutes straight.**

**Table (5):** As seen 4.7 % found able to eating and lowering objects weighing two kilograms from a shelf higher than their head without any difficulty, while of them 37 % able with some difficulty, also 30.3% found able with great difficulty, and 28 % cannot.

**Table 5 . Eating and lowering objects weighing two kilograms from a shelf higher than your head frequency and percent.**

Eating and lowering objects weighing two kilograms from a shelf higher than your head		Frequency	
		Frequency	Percent
Valid	Without any difficulty	14	4.7 %
	With some difficulty	111	37 %
	With great difficulty	91	30.3 %
	I can not	84	28 %
	Total	300	100 %

**Figure (5):** Showing ability of patients to walk outside the house on flat ground, as 32% were able without any difficulty, while of them 43 % able with some difficulty, also 15% found able with great difficulty, and 10% cannot.



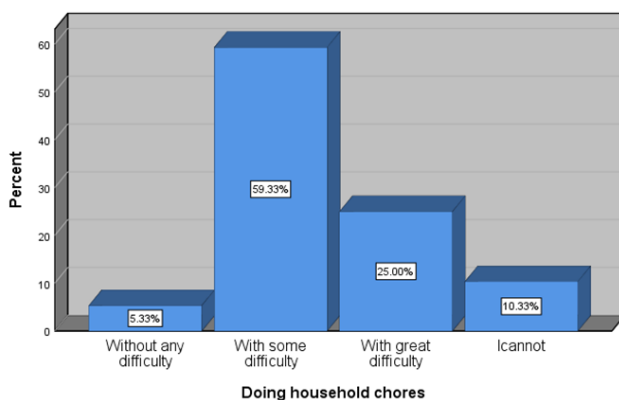
**Figure.5 Walk outside the house on flat ground.**

**Table (6):** As seen 11.7% found able to eating and lowering objects weighing two kilograms from a shelf higher than their head without any difficulty, while 38.7 % of them were able with some difficulty, also 33.3% found able with great difficulty, and 16.3 % cannot.

**Table 6 . Climbing stairs two or more floors frequency and percent.**

Climbing stairs two or more floors			
		Frequency	Percent
Valid	Without any difficulty	35	11.7 %
	With some difficulty	116	38.7 %
	With great difficulty	100	33.3 %
	I can not	49	16.3 %
	Total	300	100 %

**Figure (6):** As seen 5.33% found able to doing household chores without any difficulty, while 59.33 % of them found able but with some difficulty, also 25% were able with great difficulty, and 10.33 % cannot.



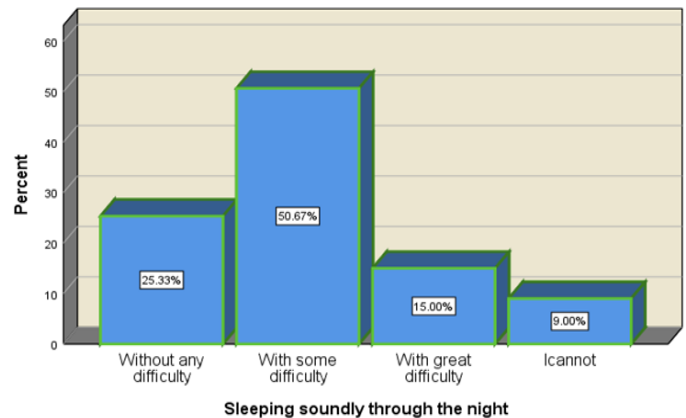
**Figure.2 Doing household chores curve.**

**Table (7):** As seen 4.3% found able to move something heavy without any difficulty, while 30.3 % of them found able but with some difficulty, also 36.7 % were able with great difficulty, and 28.7 % cannot.

**Table 7 . Moving something heavy frequency and percent.**

Moving something heavy			
		Frequency	Percent
Valid	Without any difficulty	13	4.3 %
	With some difficulty	91	30.3 %
	With great difficulty	110	36.7 %
	I can not	86	28.7 %
	Total	300	100 %

**Figure (7):** As noted as seen 25.33% found able to sleeping soundly through the night without any difficulty, while 50.67 % of them found able but with some difficulty, also 15% were able with great difficulty, and 9 % cannot.



**Figure 3. Sleeping soundly through the night.**

**Table (8):** As noted 4.3 % found able to dealing with the stress of daily life without any difficulty, while 30.3 % of them found able but with some difficulty, also 36.7 % were able with great difficulty, and 28.7 % cannot.

**Table 8 . Dealing with the stress of daily life frequency and percent.**

Dealing with the stress of daily life			
		Frequency	Percent
Valid	Without any difficulty	135	45 %
	With some difficulty	119	39.7 %
	With great difficulty	43	14.3 %
	I can not	3	1 %
	Total	300	100 %

**Figure (8):** Showing ability of patients to carry out family social activities as found, 60 % were able without any difficulty, while 29.67 % of them found able but with some difficulty, also 9 % were able with great difficulty, and 1.33 % cannot.

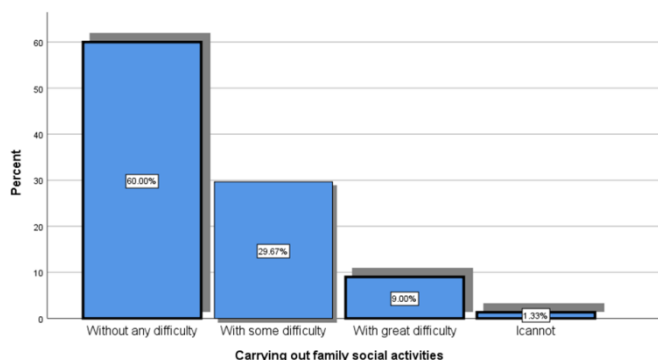


Figure 8 .Carrying out family social activities.

**Table (9):** As seen was describe if patients able to coping with feeling anxious or nervous as found if ,62.7% were able without any difficulty, while 30 % of them found able but with some difficulty, also 5.3 % were able with great difficulty, and 2 % cannot.

**Table 1 . Coping with feeling anxious or nervous frequency and percent.**

Coping with feeling anxious or nervous			
		Frequency	Percent
Valid	Without any difficulty	188	62.7 %
	With some difficulty	90	30 %
	With great difficulty	16	5.3 %
	I can not	6	2 %
	Total	300	100 %

**Figure (9):** As seen was describe if patients able to coping with feeling upset or depressed, as 39.0% of patients were able without any difficulty, while 41.33 % of them found able but with some difficulty, also 15.75 % were able with great difficulty, and 3.67 % cannot.

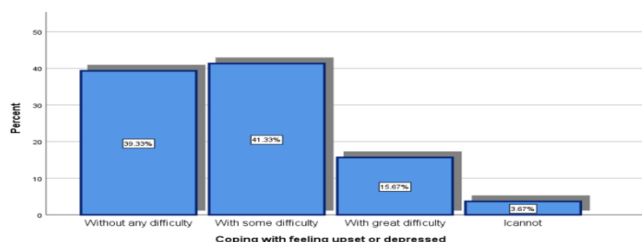


Figure 9 .Coping with feeling upset or depressed curve.

**Table (10):** As seen 11.7 % of patients found able get up in the morning and start your daily life the usual without any difficulty, while 50.3 % of them found able but with some difficulty, also 28.3 % were able with great difficulty, and 9.7 % cannot.

**Table 10 . Get up in the morning and start your daily life the usual frequency and percent.**

Get up in the morning and start your daily life the usual			
		Frequency	Percent
Valid	Without any difficulty	35	11.7%
	With some difficulty	151	50.3 %
	With great difficulty	85	28.3 %
	I can not	29	9.7 %
	Total	300	100 %

**Figure (10):** As seen was describe if patients able to doing their job the way they used to do, as 18% of patients were able without any difficulty, while 44.67 % of them found able but with some difficulty, also 25.67 % were able with great difficulty, and 11.67 % cannot.

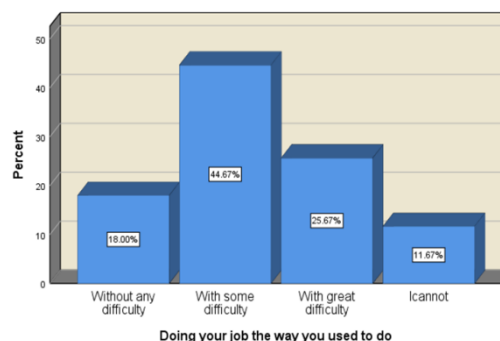


Figure 10. Doing your job way you used to do curve.

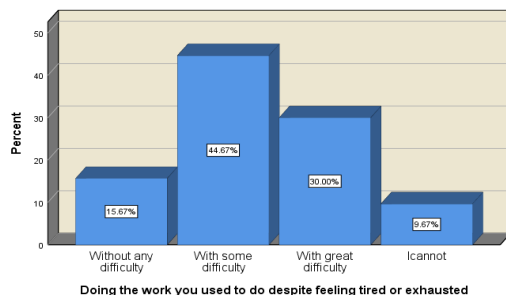
**Table (11):** As seen was describe if patients able to dealing with their anxiety about their future, as 48.7 % of patients were able without any difficulty, while 36 % of them found able but with some difficulty, also 14 % were able with great difficulty, and 1.3% cannot.



**Table 11. Dealing with your anxiety about your future frequency and percent.**

Dealing with your anxiety about your future			
		Frequency	Percent
Valid	Without any difficulty	146	48.7 %
	With some difficulty	108	36 %
	With great difficulty	42	14 %
	I can not	4	1.3 %
	Total	300	100 %

**Figure (11):** As seen was describe if patients able to doing the work you used to do despite feeling tired or exhausted, as 15.67 % of patients were able without any difficulty, while 44.67% of them found able but with some difficulty, also 30 % were able with great difficulty, and 9.67% cannot.



**Figure 11. Doing the work you used to do feeling tired or exhausted.**

**Table (12):** As noted bellow describe pain scale for each patients in the scale, as 24.3% of them with pain degree (80), while 20% of them with (60 and 70 degree), 50 degree for (18%) of patients, 90 degree for (6.7%) of them, while degree (0,10,20,30,40,100) taking the rest of percent respectively (1%, 0.3% , 1.3% ,4% ,1.7% ,2.7% ).

**Table 12. Pain Scale frequency and percent.**

Pain Scale			
		Frequency	Percent
Valid	0	3	1%
	10	1	0.3 %
	20	4	1.3 %
	30	12	4 %
	40	5	1.7 %
	50	54	18 %

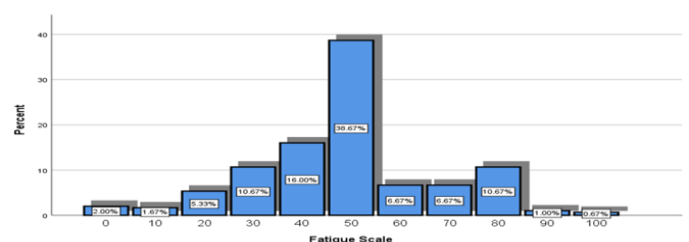
	60	60	20 %
	70	60	20 %
	80	73	24.3 %
	90	20	6.7 %
	100	8	2.7 %
	Total	300	100 %

**Table (13):** As noted bellow describe the impact of arthritis on your life now, as 32.3% of patients said arthritis effect on their life with degree (50), in addition 14.7% of them found effect with degree (60) ,15% with (80), 12 with (70), while the rest degree (0 ,10, 20, 30, 40, 5%, 5%, 5.7 % ,0.7%).

**Table 13. The impact of arthritis on your life now frequency and percent.**

The impact of arthritis on your life now			
		Frequency	Percent
Valid	0	5	1.7 %
	10	3	1 %
	20	20	6.7 %
	30	15	5 %
	40	15	5 %
	50	97	32.3 %
	60	44	14.7 %
	70	36	12 %
	80	45	15 %
	90	17	5.7 %
	100	2	0.7 %
	Total	300	100 %

**Figure (12):** As seen it was showing the fatigue scale for each patient, as 36.67% of patients found with degree of fatigue (50), also 16% of them with (40), 10.57% of patients with degree (30,80) ,6.67% of them with degree (60,70), while the rest degree (0, 10, 20, 90, 100) taking the rest of patient's percent's respectively (2%, 1.67%, 5.33%, 1 % ,0.67%).



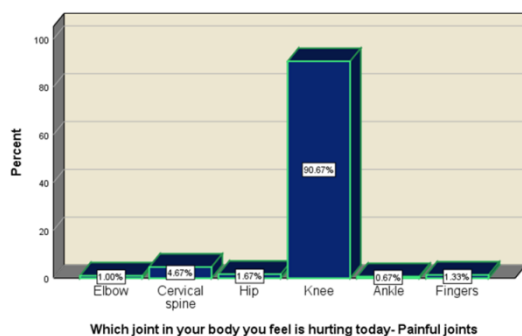
**Figure 12. Fatigue scale curve .**

**Table (14):** Describe as seen below, how long will it take before they able to move and start living their life normally as found 95.3 % were able within a minute, while 4.7% able but within an hour.

**Table 14. How long will it take before you able to move and start living your life normally frequency and percent.**

How long will it take before you able to move and start living your life normally			
		Frequency	Percent
Valid	Minutes	286	95.3 %
	Hours	14	4.7 %
	Total	300	100 %

**Figure (13):** As seen bellow which joint in their body they feel is hurting today- Painful joints, as fond most of them answer knee joint with 90.67%, while the rest percent's where (cervical spine, hip, fingers, elbow, ankle) (4.67%,1.67%,1.33 %,1%,067%) respectively.



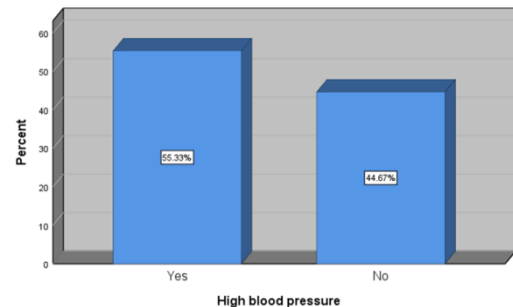
**Figure 13. Which joint in your body feel is hurting curve.**

**Table (15):** As noted bellow majority of patients their age over 50 with 89.3 % while only 10% found below.

**Table 15 . Age over 50 years frequency and percent.**

Age over 50 years			
		Frequency	Percent
Valid	Yes	268	89.3%
	No	32	10.7 %
	Total	300	100 %

**Figure (14):** As seen more than half the patients suffer from hypertension with 55.33%, while 44.67% not.



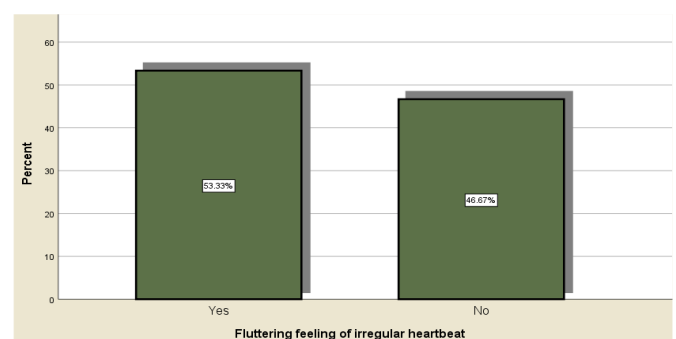
**Figure 14 .High blood pressure curve.**

**Table (16):** As written bellow about 34% of patients doesn't suffer from chronic heart disease, while 66 % of them have.

**Table 16 . I suffer from heart disease frequency and percent.**

I suffer from heart disease			
		Frequency	Percent
Valid	Yes	102	34 %
	No		

**Figure (15):** As seen bellow about 53.33% of patients suffer from fluttering feeling of irregular heartbeat, while 46.67 % of them don't have.



**Figure 15 .Fluttering feeling of irregular heartbeat.**

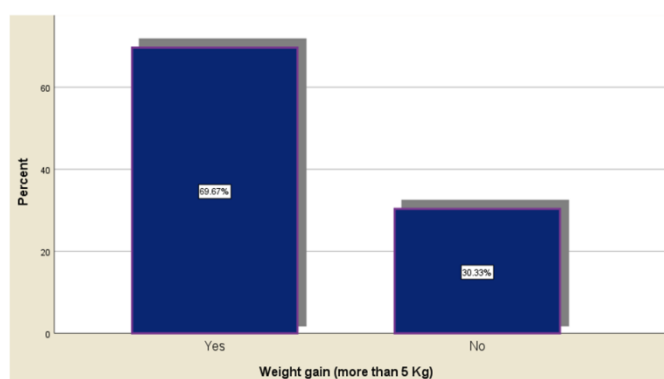
**Table (17):** As noted bellow about 53 % of patients suffer from fluttering feeling of irregular heartbeat, while 47 % of them don't have.



**Table 17 . Diabetes frequency and percent.**

Diabetes			
		Frequency	Percent
Valid	Yes	159	53 %
	No	141	47 %
	Total	300	100 %

**Figure (16):** As seen bellow about 69.67 % of patients having weight gain (more than 5 Kg), while 30.33 % of them don't have.



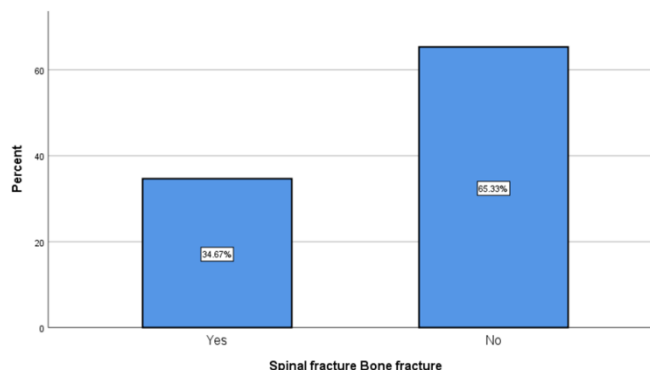
**Figure 16. Weight gain curve.**

**Table (18):** As noted bellow about 62.3 % of patients suffer from high body temperature, while 47 % of them don't have.

**Table 18 . High degree temperature frequency and percent.**

High degree temperature			
		Frequency	Percent
Valid	Yes	187	62.3 %
	No	113	37.7 %
	Total	300	100 %

**Figure (17):** As noted bellow about 34.67 % of patients suffer from previous spinal fracture (bone fracture), while 65.33% of them don't have injury.



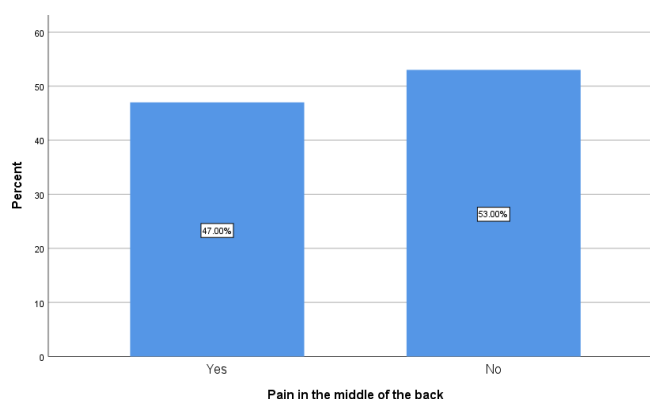
**Figure 17 .Spinal fracture (bone fracture) curve.**

**Table (19):** As noted bellow about 62.7 % of patients suffer from lower back pain, while 37.3% of them don't have.

**Table 19 .Lower back pain frequency percent.**

Lower back pain			
		Frequency	Percent
Valid	Yes	188	62.7 %
	No	112	37.3 %
	Total	300	100 %

**Figure (18):** As seen bellow about 47 % of patients suffer from pain in the middle of the back, while 53% of them don't have.



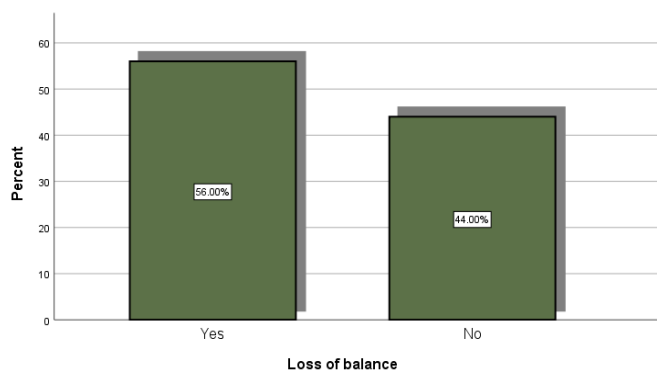
**Figure 18 .Pain in the middle of the back curve.**

**Table (20):** As seen their found about 57 % of patients suffer from pain in the neck, while 43% of them don't have.

**Table 20 . Pain in the neck frequency and percent.**

Pain in the neck			
Valid		Frequency	Percent
	Yes	171	57 %
	No	129	43 %
	Total	300	100 %

**Figure (19):** As seen their about 56 % of patients suffer from loss of balance, while 44% of them don't have.



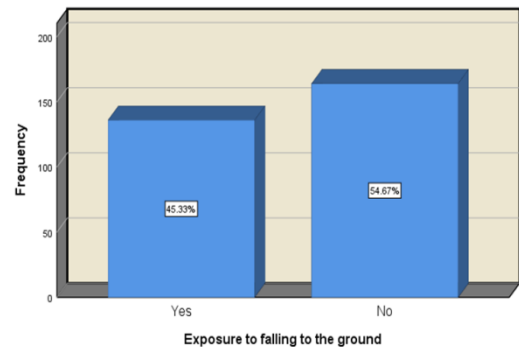
**Figure 19 .loss of balance curve.**

**Table (21):** As seen bellow , their about 45.3 % of patients suffer from loss of balance, while 54.7 % of them don't have.

**Table 21 . Exposure to falling to the ground frequency and percent.**

Exposure to falling to the ground			
Valid		Frequency	Percent
	Yes	136	45.3 %
	No	164	54.7 %
	Total	300	100 %

**Figure (20):** As seen bellow , their about 45.33 % of patients have exposure to falling to the ground, while 54.67 % of them don't have.



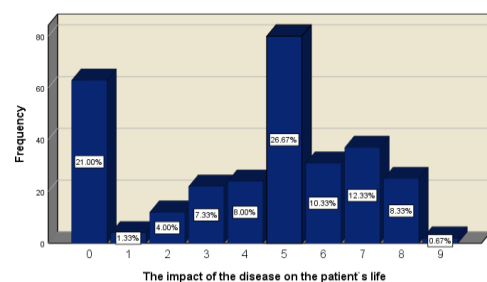
**Figure 20 . Exposure to falling to the ground curve.**

**Table (22):** As seen weakness in hand grip was found 35.3 %, while 64.7% don't of patients.

**Table 22 . Weakness in hand grip frequency and percent.**

Weakness in hand grip			
Valid		Frequency	Percent
	Yes	106	35.3 %
	No	194	64.7 %
	Total	300	100 %

**Figure (21):**As seen bellow ,the impact of the disease on the patient's life showing wide range , as 26.67% of patients found disease impact on their life with scale grade 5 of 10 ,while 21% of them without any effect on their lives, also 12.33 % of them found disease effect with grade 7 ,while 10.33% effect with grade 6 , following by 8.33% of them disease effect with grade 9, 8% found of them effect disease with grade 4 ,7.33% of them disease effect with 4 grade,4% effect with grade 4 , 1.33% effect with grade 1 and last 0.67% with grade 9.



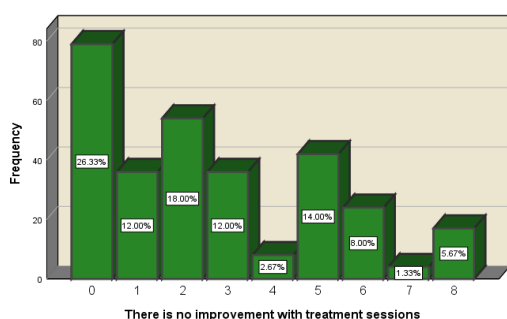
**Figure 21 .The impact of the disease on the patient's life curve.**

**Table (23):** As noted bellow if patients might feel isolated if it were not for the help of others in my life's affairs, as found nearly half the patients 40.7% of them not feeling isolated, while 21.3% of them feeling isolated with grade 5 of 10 ,8.7% feeling with grade 3, also 6% with grade 6, 4% of them feeling isolated with grade (7and 8), and last two 1.3% ,0.3% with grade (9,10) respectively.

**Table 23 . I might feel isolated if it were not for the help of others in my life's affairs frequency and percent.**

I might feel isolated if it were not for the help of others in my life's affairs			
		Frequency	Percent
Valid	0	122	40.7 %
	1	7	2.3 %
	2	18	6 %
	3	26	8.7 %
	4	16	5.3 %
	5	64	21.3 %
	6	18	6 %
	7	12	4 %
	8	12	4 %
	9	4	1.3 %
	10	1	0.3 %
	Total	300	100 %

**Figure (22):** Showing if their no improvement in treatment sessions, as showing 26.33% no improvement, while 18% of them said improvement with 2 grade, 14% of them with 5 grade ,12% of them with (1 and 3 ) grade ,also 8% of them with 6 grade last (5.67%,2.67%,1.33% ) of patients with following grade respectively (8,4,7).



**Figure 22 .There is no improvement with treatment sessions.**

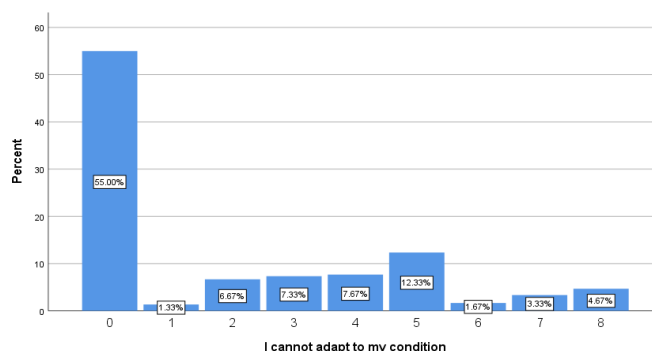
**Table (24) :**Shows how many times you will not be able to join him in therapy sessions ,as 49% of them found will able ,while 18.3% of them will not able to join them with scale 5 of

8 ,also 11.3% of them will not able with scale 2 of 8 , 5.7 % of them found the same like the previous with scale 5 and 7 of 8 ,last also found not able (1.7 % , 3 % , 3.7%) of patients with scale (1, 6,8) respectively .

**Table 24 . Many times, I will not be able to join him in therapy sessions frequency and percent.**

Many times, I will not be able to join him in therapy sessions			
		Frequency	Percent
Valid	0	147	49 %
	1	5	1.7 %
	2	34	11.3 %
	3	17	5.7 %
	4	5	1.7 %
	5	55	18.3 %
	6	9	3 %
	7	17	5.7 %
	8	11	3.7 %
	Total	300	100 %

**Figure (23):** As seen below 55 % of patients able to adapt to their condition, while 12.33 % of them found not able to adapt with scale 5 of 8, same for next percent of patients (1.33 % ,6.67%,7.33% ,7.67% ,1.67% ,3.33%,4.67%) with following scale (1, 2 ,3 ,4 ,6 ,7 ,8) respectively.



**Figure 23 .I cannot adopt to my condition curve.**

**Table (25):** Shows if the patients feel hopeless and hopeless because of his condition, as more than half the of patients 64% found not feeling hopeless, while the rest percent's (1.7 % , 4.3%, 2.3 % ,5.7% ,7.7% ,7.7% ,2.7 % ,3.3 % 0.7 %) found feeling with different in the scale (1, 2, 3, 4, 5, 6, 7, 8, 9) respectively.

**Table 25 . Sometimes I feel hopeless and hopeless because of my condition frequency and percent.**

Sometimes I feel hopeless and hopeless because of my condition			
		Frequency	Percent
Valid	0	189	64 %
	1	5	1.7 %
	2	13	4.3 %
	3	7	2.3 %
	4	17	5.7 %
	5	23	7.7 %
	6	23	7.7 %
	7	8	2.7 %
	8	10	3.3 %
	9	2	0.7 %
	Total	300	100 %

**Table 26 . Irregular in treatment sessions frequency and percent.**

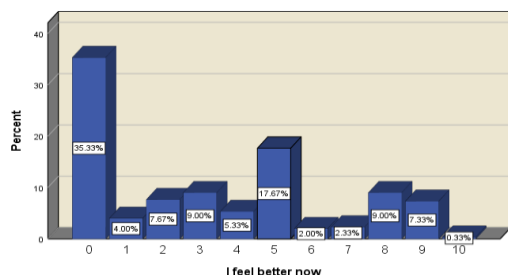
Irregular in treatment sessions			
		Frequency	Percent
Valid	0	156	52%
	1	7	2.3 %
	2	21	7%
	3	20	6.7%
	4	13	4.3%
	5	63	21%
	6	13	4.3%
	7	6	2%
	8	1	0.3 %
	Total	300	100%

**Table (27) and Figure (25):** As seen bellow 171 out of 300 cases had previously undergone physical therapy sessions.

**Table 27 . Cases that have previously undergone physical therapy frequency and percent.**

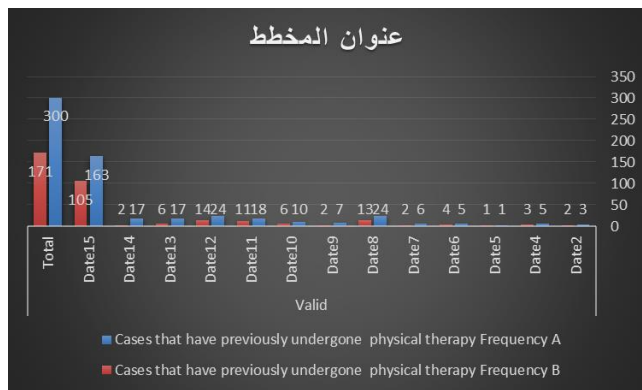
Cases that have previously undergone physical therapy			
		Frequency A	Frequency B
Valid	Date2	3	2
	Date4	5	3
	Date5	1	1
	Date6	5	4
	Date7	6	2
	Date8	24	13
	Date9	7	2
	Date10	10	6
	Date11	18	11
	Date12	24	14
	Date13	17	6
	Date14	17	2
	Date15	163	105
	Total	300	171

**Figure (24):** Describe if the patients feeling better after the sessions or not, as found 35 % of them not feeling better but the rest percent's of patients showing an improvement (4% ,7.67% ,9 % ,5.33 % ,17.67% ,2% ,2.33% ,9% ,7.33% ,0.33 %) with different scale ( 1, 2, 3, 4, 5, 6, 7, 8, 9, 10) respectively .

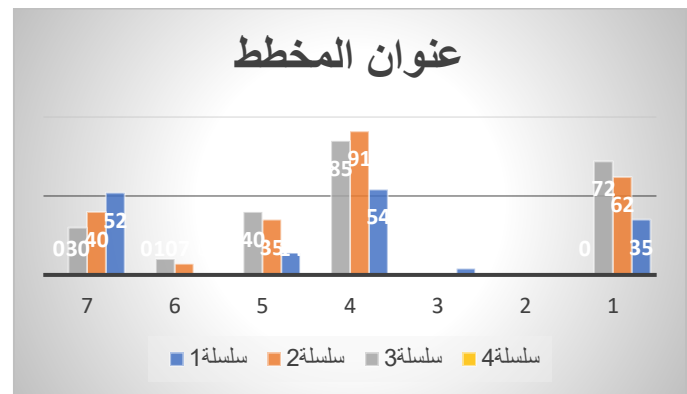


**Figure 24 . I fell better now curve .**

**Table (26):** As shows bellow half the patients were not irregular in treatments sessions with 52%, while the rest percent of them were irregular (2.3 % ,7 % ,7% ,6.7 % ,4.3 % ,21% ,4.3 % ,2% ,0.3 %) with different scale (1, 2, 3, 4, 5 ,6, 6, 7, 8) respectively.



**Figure 25 . Cases that have previously undergone physical therapy curve.**



**Figure.26 Cases that performed resistance exercises .**

**Table (28) and Figure (26):** Shows types of resistance exercise had done on the patients, as 72 of patients performed resistance exercises on their right knee ,62 of them on left knee and 35 of them perform in both knees. Also help device was used but only on both knees of 4 patients. While strengthening exercises had been used on right knee in 85 of patients ,while left knee in 91 cases and in both knees with 54 of them. Extension exercises had been used in 40 patients with their right knee ,35 patients with their left knee and 14 ones with their both knees. Aerobic exercise had been also used in 10 cases with their right knee and 7 cases with their left knee. Last was an aerobic exercise performed in 30 cases on their right knee, in 40 cases on their left knee and in 52 cases on their both knees.

**Table 28 . Cases that performed resistance exercises.**

Cases that performed resistance exercises			
	rt	lt	both
Resistance exercise	72	62	35
Help devices	0	0	4
Strengthening exercises	85	91	54
Extension exercises	40	35	14
Aerobic	10	7	0
An aerobic	30	40	52

## 5.2 Discussions:

This a review analytical cross-sectional study was conducted to study the effect of ultrasound therapy on reducing of Osteoarthritis in knee joint pain by using self-made questionnaire. This paper showing acceptable good result after sessions of physiotherapy (ultrasound therapy, tens, and (ice, hot bag) as noted significant decrease in pain post sessions.

Studies have proven that ultrasound therapy for osteoarthritis of knee joint promotes repair of full-thickness articular cartilage defects, formation of hyaline cartilage and helps in repairing tissue at the sites of defects. Ultrasound waves also soften and dissipated condensed fibrous connective tissue and delay progression of early osteoarthritis of knee [31,32].

A similar to ours result a study by F Tascioglu, S Kuzgun, O Armagan *et al.* on ultrasound therapy for knee osteoarthritis. Significant decreases were observed in all groups with regard to activity pain [33], also a study by Ozgonenel *et al.* [34] suggested that therapeutic ultrasound is an effective treatment modality in knee OA.

Also study Yang *et al* compared the ultrasound therapy of knee with placebo group and reported that ultrasound therapy not only improve the pain of the knee joint it also improved the swelling of joint and improve the physical activity of the patients [35][36].

### 5.3 Conclusion and future scope

Our study shows the effect the ultrasound on knee osteoarthritis, and in conclusion this method shows improvement in physical activity and reduce of pain in joints, result in enhancement of overall of life. Furthermore, studies required regarding the effect of ultrasound therapy over long period.

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