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"STATISTICAL ANALYSIS OF RISK FACTORS OF KNEE OSTEOARTHRITIS"

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ABSTRACT

Knee joint (OA) is a condition in which the cartilage covering the knee joint, synovial membrane and the subchondral bone surface is progressively de- graded, accompanied by pain, muscle weakness, disability movement and ability to carry out daily activities; walking, stairs climbing, sit down and lower your knee function. From 1990 to 2018, trends in osteoarthritis of the knee increased by 75%, the third fastest-growing condition associated with disability. The risk factors of knee OA is determined in this study. The data was collected from the public sector hospitals (Allied hospital and civil hospital) of city Faisalabad. By preparing the questionnaire, we directly interviewed the patients on di erent risk factors like gender, obesity, older age, smoking, certain occupation, history of knee trauma, certain occupation etc. The convenient sampling is used for the selection of samples. A total of 100 samples are collected in which 500 samples are cases and 500 samples are control with the ratio of 1:1. For the data analysis di erent statistical techniques are used: Chi-Square, Cramer's V-statistic, Binary logistic regression and Odds ratio have been utilized to indicate the e etc of various risk factors.

Introduction

According to the Journal of the American Medical Association (JAMA), more than 10 million Americans have osteoarthritis of the knee, the most common population being that of 45 years. This situation is more serious because cartilage of the knee joint wears away and causing in a combination of bone on bone contact between the surfaces of the joint. Joint swelling, pain, joint sti ness and snoring Arthritis of the knee can be detected by radiographic examination indicating bone spurs, tight joint space and bone de ciency. In other words, OA involves joint degeneration, including the subchondral bone and articular cartilage. However, the capsules, ligaments and synovial membranes are degenerated. Eventually, this will result in loss of function and pain Michael et al. (2010).

Arthritis

The word arthritis means joint animation. "Arthritis" is not a single disease; it refers to an informal form of pain or joint disease. There are over 100 di erent types of arthritis and related diseases. Common symptoms of arthritis include swelling, pain, and sti ness and reduced range of motion. Its Symptoms can come and go. They can be light, moderate and serious. They may remain in the same condition for several years but may improve or worsen over time. Extreme

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arthritis can cause chronic pain, making daily activities impossible and make it hard to walk or climb stairs. Arthritis causes permanent joint changes. These changes may be visible, like as knobby gure joint but the damage is usually also visible on X-rays. Certain types of arthritis can also a ect the heart, eyes, lungs, kidneys, skin, and joints. The most common forms are osteoarthritis (degenerative joint disease) and Rheumatoid arthritis.

Knee Osteoarthritis

Knee joint (OA) is a condition in which the cartilage covering the knee joint, synovial membrane and the subchondral bone surface is progressively degraded, accompanied by pain, muscle weakness, disability movement to carry out daily activities; walking, stairs climbing, lower down your knee function. In 2005, the prevalence of adult osteoarthritis in the United States was approximately 27 mil- lion Lawrence et al. (2008). Prevalence is a di erent form of involvement in joints and examinations (radiotherapy and clinical examination): at the symptomatic level, the knee is the joint that is most an ected Dillon et al. (2006).

The popularity of knee osteoarthritis is rising fast due to demographic changes, the main risk factors for knee osteoarthritis are obesity, aging, smoking, sedentary lifestyle, recurrent knee injuries, women and re-employment. The US Disease Control reports that from 2002 to 2012, Murphy et al. (2008) the popu- larity of osteoarthritis symptoms in the knee can reach 50% by the age of 85. In United States, the number of (TKR) total knee joint replacements doubled from two million to four million Weinstein et al. (2013). The increase in obesity results not only in an increased percentage of knee osteoarthritis but also in the age of outset and earlier medication. As a result, the time before osteoarthritis reaches the age of health insurance, the duration of illness is long, health is more serious and risk factors increase the rate of surgery. Aging and obesity will be the cause of the osteoarthritis knee joint.

Anatomy and Pathological Process

The proximal humorous and the distal femur both found in the knee joint. The cartilage at the end of the femur and tibia contains an additional cell-matrix containing proteoglycan type 2, which acts to increase shock absorption and proper joint nutrition by drawing uids into the joint Goldring and Goldring (2006). There is evidence that as age increases, the size of type 2 collagen bers decreases, so that fewer nutrients penetrate the joint surface, resulting in reduced protection for the collagen along the surface of the bone.

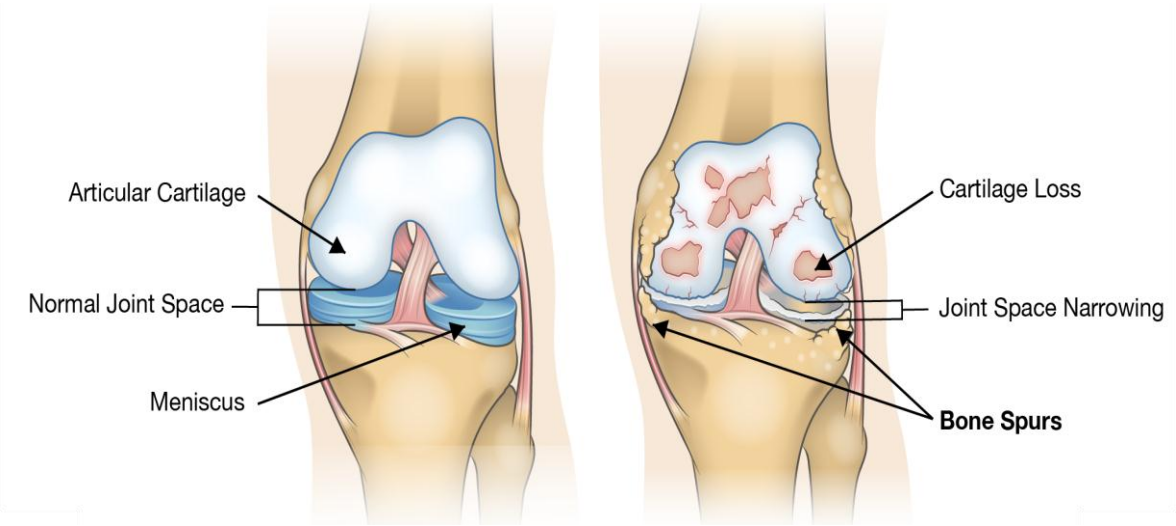

Figure 1: Osteoarthritis of the Knee.

The synovial joint is made up of 3 joints. The primary tibiofemoral joint, the articulation, it is situated between the curved femoral condyles and the inward tibial condyles. A patella femoral joint is located between the patella and the femur. The tibio bular joint is detected between the bula and

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the tibia. Osteoarthritis can take place only in the two main knee joints, the rst being the Patellofemoral joint and the second being the tibiofemoral joint, as they must support more movement than the knee joint. "The knee osteoarthritis pathogenesis has been associated to biochemist- cal and biomechanical knee cartilage changes" Uth and Trifonov (2014). Cartilage protects the bone surface from painless movements and reduces friction between them. In knee OA, cartilage mass and thickness is reduced, becomes softer and thinner, and cracks may appear. The cartilage damage cannot be recovered. The surface of the bone will also be a ected, the bone will swell and turn into osteophytes Buckwalter et al. (2005), Pearle et al. (2005).

Characteristics / clinical performance

The symptoms of the knee OA are a kind of torment toward the start of the movement, then pain during the movement, and permanently pain. Patients with OA would practice a decrease in functions such as pain, sti ness, reduced range of motion (ROM) and altered activity in daily life. Further desirable features of the knee joint are increased bone shape (clicking sounds), the exibility of the hinge line and increased sensitivity to moisture and cold Arya and Jain (2013).

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We can divide knee OA into ve steps:

Stage 0: This is the "normal" health of the knee and there is no pain in the joint function.

Stage 1: The spurs of the patient at this stage are very short (growth), without discomfort or pain.

Stage 2: At this point, the patient will feel the symptoms for the rst time. After a full day of strenuous exercise and walking, the patient feels pain and the sti ness of the joints is greater. This is not a serious disease, but X-rays have shown larger bony spines. The cartilage of the knee joint may remain normal.

Stage 3: The third stage is moderate OA of the knee. Stage 3 patients feel persistent pain during joint movement. The sit ness of the knee joints can also occur, especially after prolonged sitting and after the morning. The ligaments between the bones are severely damaged and the distance between the bones becomes smaller and smaller.

Stage 4: It is the utmost serious phase of OA. The articular distance of the knee joint would be considerably decreased, the ligament will be totally in uenced, and the synovial liquid will be decreased. As a result, the patient ex- princes sign can't pain and discomfort when moving and walking the concerted.

Di eretial diagnosis

The nding can be made by clinical assessment and can be an rmed by an x- ray examination report. A most common feature is narrowing of joint space, sub-chondral sclerosis, subchondral bone, osteophyte formation, and subchondral cyst design. Very early the knee joint, radiographic ndings may slightly show a reduction of the joint distance. If it is reduced, the patient wills always nd the same problem, but he will also feel the horizontal subluxation of the tibia bone. If it decreases further, the joint line will vanish totally. Below X-ray picture shows that the average joint is smaller than the side long joint Arya and Jain (2013).

Figure 2: Stages of the osteoarthritis of the knee.

Some di erent diagnoses may include iliotibial band syndrome, bursitis, ligament weakness (lateral

and medial collateral cartilage), and meniscal lesions, these all a ect the comfy tissues of the knee. Another type of joint pain can likewise prompt the di erential determination of the knee joints, such as gout and pseudogout, rheumatoid joint pain and septic joint pain Ringdahl and Pandit (2011).

Physical examination

First, review his ndings when examining the patient.

X-ray: Basic radiography is used for the failure of cartilage, bone spur formation, reduced joint space and other causes of joint pain.

Arthrocentesis: This is the method that doctors are performing. Dur- ing this process, a sample of the joint uid is collected using a sterile needle, which can be checked for infections, gout and cartilage fragments.

Arthroscopy: This is a careful strategy where a camera is embedded into an in uenced joint to get visual data about harm to the joints brought about by OA.

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MRI: MRI doesn't utilize radiation yet is more costly than X-rays. It gives a view that o ers improved pictures of ligament and di erent structures to identify initial deformity of OA. The European Union against Rheumatism has created indicative crite- ria for the determination of OA of the knee. The gure below shows the most important factors McAlindon et al. (2014).

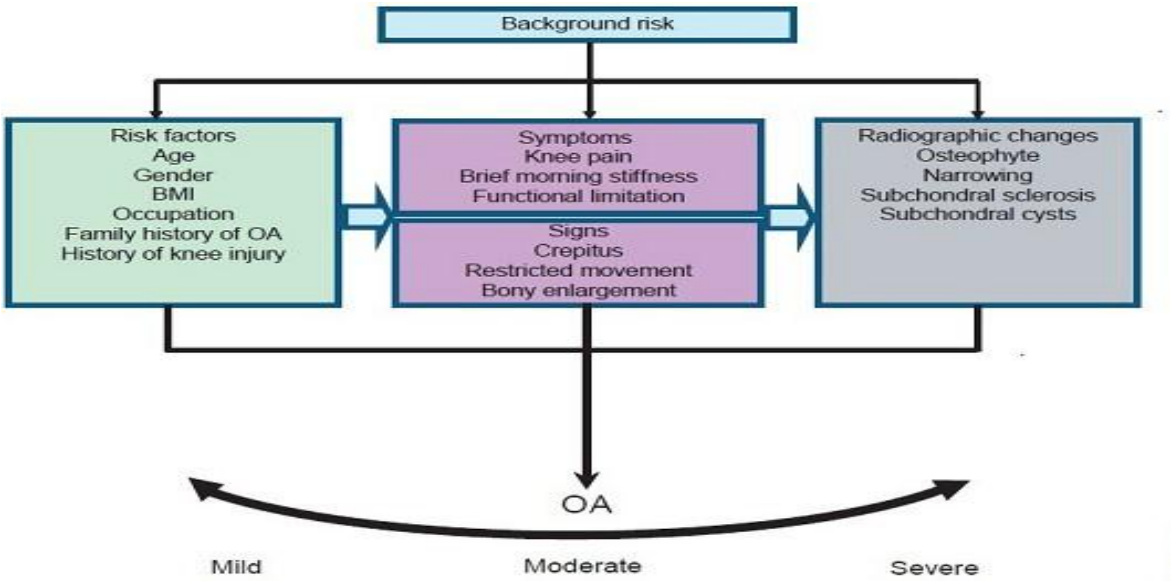

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Figure 3: EULAR evidence-based recommendations for the diagnosis of knee os- teoarthritis.

Examination: When the patient moves and rests, pays attention to the position of the joints. This should be possible by requesting that the patient recreates his everyday exercises, for example, climbing stairs and sitting all over on a seat, etc. Palpation: Temperature di erence, swelling and tendon tone. Likewise, beware of bone motive (bone cells) that forms on the edges of the joints. These osteophytes are a serious sign of OA of the knee. Basic check of functions: Coordination, the test of muscular strength, equalization and strength of joints, mobility. These components can be tried through e ective testing, such as passive manual testing. When testing joint muscle stability, proprioception and strength is very important.

Main Objective

- The objectives include studying the frequency of di erent risk factors and their relationship to OA of the knee
- To explore and analysis the possible risk factors for OA of the knee
- To identify the important risk factors for OA of the knee.

REVIEW OF LITERATURE

Klussmann et al. (2010) discussed occupational risk factors and the other number of individual risk factors related to the development and development of knee joint diseases. They collected data from patients with asymptomatic os- teoarthritis of the knee and underwent semi-standardized interviews. To analyze the data, they used conditional logistic regression. Out of a total of 739 cases, this study included 571 controls. Men and women can describe several individual and professional predictors of osteoarthritis of the knee, namely obesity, kneeling / squatting, genetic susceptibility, and sports that pose a signi can't risk of trauma. In women, the knee joint is deformed and the knee is already sore in childhood and every day when lifting and carrying heavy objects. They concluded that it was all linked to an increase in osteoarthritis of the knee.

Petrella (2000) determined the e ectiveness of exercise treatment in os- teoarthritis of the knee. They used medline search systems for the medical, sport and rehabilitation literature between June 1996 and January 2000. They con- cluded that the available evidence indicates bene cial short term e ects of exercise treatment in patients with osteoarthritis of the knee. They also conclude that the doctors should recommend exercise to all patients with mild/moderate disease.

Vina et al. (2018) also worked to identify the radiological deterioration of knee osteoarthritis (KOA) with race and sex over 4 years and to assess the role of recognized risk factors in the observed race/sex comparison. They found 694 white men and 929 women and African Americans (AA) (92 men and 167 women) at risk of KOA radiation. They studied that the risk of intermediate grade deterioration OARSI JSN was higher in AA men than in WH women, although adjustments of KOA risk factors weaken the association. Compared to WH women, WH men have a lower risk of K-L grade deterioration. They concluded that risk factors such as obesity, a history of a knee injury, and knee OA swelling fundamentally explain racial / gender di erences in KOA improvement and exercise speed.

Manlapaz et al. (2018) studied the relationship between falling in adults with knee OA and clinical attributes of knee OA such as balance, pain, unsteadi- ness, muscle power, and physical function. They used the methodology of uni- variate logistic regression analysis. The information was collected from the Clin- ical Trial Registry in Australia New Zealand. They examined those Sixty-three members with knee OA (30 females, 33 male). They Concluded that the study con rmed that balance, knee muscle power and presentation of physical capabil- ity signi cantly di ered between those with and without the history of falling. A thoughtful of these risk factors may help in applying a suitable evaluation and involvement policy to reduce falls in this patient population.

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METHODOLOGY

Research involves studying new knowledge through variables by examining data. This study aims to study di erent risk factors for hygienic and OA of the knee. The purpose of this chapter is to explain the design and procedures of the study. The main types of studies, sampling plans, research tools, regions, and hospitals selected descriptions of the variables and statistical methods used for the analysis are discussed. Analyze and summarize the data collected in this study according to the framework.

Study plan

This is a case-control study in a hospital environment to study the risk factors for OA of the knee. A retrospective or case-control study is an analytical study that compares individuals with a speci c disease (case) to individuals without disease (control). The report of each group with a speci c exposure history is then compared. Advantageously, the same population of the case is controlled to reduce the risk that certain other di erences between the populations lead to di erences in the disease under study.

Inclusion Criteria

The inclusion criterion is an observed criterion for the inclusion of cases or controls in a study. This criterion is given below.

This study included patients of all ages and all genders. For cases, patients from the selected hospital came to the OPD for treatment of knee OA. This is where one consults a doctor according to their issues. Outpatient means patients who are not admitted to the hospital. For controls, the patients admit in the medical units of the selected hospital are used for collecting the sample.

Research methods

For data collection purposes, questionnaire is developed for cases and controls. A questionnaire is a set of questions used for data collection. With the help of medical consultants (orthopedic surgeons) and supervisors, the questionnaire is designed. The data collected from the public hospitals namely; Allied hospital and District Headquarter hospital in district Faisalabad. The cases and witnesses from both hospitals used direct personal interviews. The data was collected using convenient sampling and we collected 500 case samples and 500 control samples. The main risk factors for this study are distinct from the existing literature.

Software

After collecting the data, a statistical analysis was carried out using SPSS 21 and Minitab 17 software.

Statistical Tests of the Association

The Chi-square is the most regularly utilized strategy for testing the freedom of categorical factors. The Cramer's V statistic is used for nominal variables. For odds ratios and their con dence intervals you can also use logistic regression.

$$\chi^2 = \frac{\Sigma(o_i - e_i)^2}{e_i}$$

This technique was developed by Karl Pearson in 1900. When all $o_i = e_i$ the statistics value is zero. The range varies from 0 to ∞. In chi-square, the p-value is always one-sided.

Generalized Linear Models (GLMs)

Macaulay and Nelder (1982, seçond edition, 1989) popularized the term linear model (GLIM or GLM) refers to a large class of models. In these models, the response variable Y_i is accepted to follow a family dispersion with an average μ, which is viewed as a function (for the most part non-direct) of $X^T \beta$. A few people call them "nonlinear" because μ is generally a nonlinear capacity of the covariates; however, Macaulay and Nelder believe them to be linear because the covariates in uence the appropriation of Y_i just by a linear combination of $X^T \beta$. Each GLM has three components: $X^T \beta Y_i$

Binary Logistic Regression

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Binary logistic regression applied to predict the response "Knee OA condition YES or NO" because the response variable is of binary nature. If the response variable is categorical, logistic regression is used to predict the probability of the response variable. The categories are of two types nominal and ordinal. When the response variable is nominal with two categories then we use binary logistic regression, if more than two categories then we use multinomial logistic regression. It was developed in 1958 by a statistician David Cox.

Assumptions

- The measurement of response variable must be on a dichotomous scale.
- You have one or more either continuous or categorical independent variables.
- You should have independence of observations and the dependent vari- able should have mutually exclusive and exhaustive categories.
- There needs to be a linear relationship between any continuous inde- pendent variables and the logit transformation of the dependent variable.

Multinomial Logistic Regression

With several descriptive variables, we consider a common logistic regression model. K predicts the binary response of Y by $x_1, x_2 \ldots x_k$. The model of the log odds is:

$$Logit\,[P(Y=1)] = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k$$

Controlling the other x's, on the log odds that Y = 1 the parameter β_i refers to the e ect of x_i . For instance, $exp(\beta_i)$ is the multiplicative impact on the chances of a 1-unit increment in x_i, at xed degrees of the other x's.

Odds, Odds Ratio

The probability that the event will occur divided by the probability that the event will not occur is called the odds of an event. Mathematically, probability of event f is:

Its range is from zero to in nity. On the o chance that the likelihood of ac- accomplishment is more prominent than the likelihood of disappointment, the odds will be greater than 1. This is the primary reason behind the utilizing of odds in dichotomous data. Regarding the chances, the likelihood of the event of the occasion F can likewise be communicated as:

$$P(E) = \frac{Odds(F)}{1+Odds(F)}$$

Relative risk

On the o chance for the two groups in table 2 × 2, p_1 and p_2 are the probability of success, at that point, the relative risk is characterized as the probability of progress proportion:

$$R.R = \frac{p1}{p}$$

If $p_1 = p_2$, the relative hazard would be equivalent to 1.00. This implies the response bunch is autonomous of di erent groups. The worth of any positive real number is the relative risk value. The relationship between the relative risk and the odds ratio is as follows:

$$OR = \frac{\frac{p1}{1-p}}{\frac{p2}{1-p}} = \frac{1-p2}{1-p_1}$$
2

In the case of retroactive studies, a conditional distribution of the explanatory variable can be developed inside a xed response level. In general, the probability of an interesting response outcome

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cannot be estimated. The sampling distribution can be much skewed, unless the sample size is huge, its certainty C.I is very complicated.

RESULTS AND DISCUSSION

This work is built on the 1000 samples counting 500 patients (cases) and 500 controls aged between 15 to 95 years. Both les contain 148 males and 352 females included right now in study. The total 39 variables are included in this study. These risk factors depend on the segment, social, clinical and dietary propensities for the samples.

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Association through Chi-square

Table 5: Association of risk factors of Knee OA.

Variables	Chi square	Asymp. Sig. (2-sided)	Cramer's V-statistic	Approx. Sig.
Residential Area (Locality)	.363	.261	1.934	0.007
Gender	0.000	1.000	0.000	1.000
Marital status	7.753	0.051	0.88	0.051
In heritage OA	109.786	<0.001	0.331	<0.001
In heritage persons	110.028	<0.001	0.332	<0.001
Education type	1.621	0.203	0.040	0.203
Occupation Job Nature	37.536	<0.001	0.194	<0.001
Smoking type	3.091	0.213	0.056	0.213
Test Investigation	86.203	<0.001	0.294	<0.001
Kellgren-classi cation	1000.00	<0.001	1.000	<0.00
Exercise	24.870	<0.001	0.158	<0.001

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Pain Swelling	76.978	<0.001	0.277	<0.001
Sti ness level	38.780	<0.001	0.197	<0.001
Physical activity a ects at work	20.563	<0.001	0.143	<0.001
Knee Noise	171.937	<0.001	0.415	<0.001
Historyof Knee Trauma	11.993	0.001	0.110	0.001
Patient Chronic Disease	95.758	<0.001	0.309	<0.001
Patient BP	77.682	<0.001	0.279	<0.001
Patient Diabetic	47.543	<0.001	0.218	<0.001
Patient Uric acid	60.001	<0.001	0.245	<0.001
Patient Heart Problem	30.880	<0.001	0.176	<0.001
Patient Kidney Problem	133.461	<0.001	0.365	<0.001
Patient Neuro and Paralysis problem	78.749	<0.001	0.281	<0.001
Patient Chest Infection	1.837	0.175	0.043	0.175
Patient Hyperten- Sion	714.697	<0.001	0.121	<0.001

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Patient Hepatitis	11.588	0.001	0.108	0.001
Patient Liver Problem	29.50	<0.001	0.172	<0.001
Patient stomach Problem	9.262	0.002	0.096	0.002
Patient Medication against chronic Disease	126.573	<0.001	0.356	<0.001
Anxiety level	36.664	<0.001	0.191	<0.001
Limb deformity	18.591	<0.001	0.136	<0.001
Meat per weekdays	2.988	0.225	0.055	0.225
Vegetable per Weekdays	<0.001	1.000	1.000	1.000
Pulses per Weekdays	1.001	0.317	0.032	0.317
Chicken per Weekdays	30.862	<0.001	0.176	<0.001
Patient satisfaction towards doctor	13.995	0.007	0.118	0.007
Treatment symptoms type	49.478	<0.001	0.222	<0.001

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	B	S.E.	Wald	Sig.	Exp(B)	95% C.I	
						Lower	Upper
Residential Area(Locality)	.222	.241	.849	.357	1.248	.779	2.001
Age	.031	.013	5.887	.015	1.032	1.006	1.058
Weight	.048	.010	24.134	.000	1.049	1.029	1.070
Height	.847	.447	3.589	.058	2.332	.971	5.598
Gender	1.516	.533	8.079	.004	4.554	1.601	12.952
Marital Status Married Widow Divorced	 -.141 -1.543 -1.777	 1.338 1.128 1.206	 .011 1.870 2.173	 .916 .171 .140	 .869 .214 .169	 .063 .023 .016	 11.962 1.951 1.797
Children Alive	-.071	.067	1.093	.296	.932	.816	1.064
Children Dead	.079	.162	.240	.624	1.083	.788	1.487
Inheritage OA	4.745	1.083	19.205	.000	114.958	13.771	959.628
Education	.530	.306	3.005	.083	1.699	.933	3.093
Occupation (Job Nature) Own Business Daily worker Farmer Government job Private job NA	 -.198 .953 .206 -1.773 -.409 .716	 .435 .599 .587 .763 .616 .518	 .207 2.530 .123 5.398 .442 1.913	 .649 .112 .726 .020 .506 .167	 .820 2.593 1.228 .170 .664 2.046	 .349 .802 .389 .038 .199 .742	 1.925 8.388 3.883 .758 2.220 5.641

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Smoking Regular Irregular	 -1.662 -.929	 .591 .607	 7.913 2.337	 .005 .126	 .190 .395	 .060 .120	 .604 1.299
Test Investiga-Tion	-4.938	1.078	20.971	.000	.007	.001	.059

We see that the risk factors, Residential Area (Locality), in heritage OA, in heritage persons, Occupation Job nature, Test Investigation, Kellgren classi - cation, History of Knee Trauma, are essentially connected with knee OA by the result of Cramer's V-measurement and chi-square. The correlation between gender and osteoarthritis of the knee was found to be insigni cant, with a p-value equal to 1, which means that there is no cor- relation between gender and osteoarthritis of the knee. It means that gender and osteoarthritis of the knee are independent of each other. The factors Patient Heart problem, Patient Kidney problem, Patient Neuro and Paralysis attack are signi can't risk factors by the result of Cramer's V-statistics and chi-square. Marital status and the knee OA association is found to be insigni cant with p-value (0.051), it means that there is no link between marital status and knee OA. According to above table, risk factors Patient Hypertension, Patient Hep- atitis, Patient Liver problem and Patient stomach problem are signi cantly asso- ciated with knee OA.

The association between the Education type and the knee OA is found to be insigni can't with p-value (0.203) which means that there is no association between the Education types and knee OA it means that the Education type and knee OA are independent to each other. The factors Exercise, Pain Swelling, Sti ness level, Physical activity af- fect at work and Knee Noise are signi cantly associated with knee OA. The association between the Smoking type and the knee OA is found to be insigni cant with p-value (0.213) which means that there is no association between the Smoking types and knee OA it means that the Smoking type and knee OA are independent to each other. The association between the Pulses per week days and the knee OA is found to be insigni cant with p-value (0.317) which means that there is no association between the Pulses per week days and knee OA it means that the Pulses per week days and knee OA are independent to each other.

Logistic Regression

Table 6: Evaluation of Risk Factors of Knee OA

Exercise	1.083	.347	9.709	.002	2.952	1.494	5.833
Sti ness Level Low sti ness High Sti ness	 -3.482 -1.194	 .993 .315	 12.284 14.368	 .000 .000	 .031 .303	 .004 .164	 .215 .562
Physical activity	1.749	.460	14.439	.000	5.750	2.333	14.175
Knee Noise	1.798	.312	33.141	.000	6.039	3.274	11.139
History of Trauma	-1.357	.451	9.060	.003	.258	.106	.623
Blood Pressure	-1.546	.312	24.588	.000	.213	.116	.393
Diabetic	-.697	.269	6.716	.010	.498	.294	.844

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Uric acid	1.328	.344	14.916	.000	3.773	1.923	7.403
Heart problem	-1.495	.452	10.968	.001	.224	.093	.543
Kidney problem	-3.162	.546	33.475	.000	.042	.015	.124
Chest Infection	.204	.697	.086	.770	1.226	.313	4.808
Hypertension	1.638	1.035	2.506	.113	5.146	.677	39.115
Hepatitis	-.790	.399	3.909	.048	.454	.208	.993
Liver issue	-3.110	.919	11.451	.001	.045	.007	.270
Stomach issue	-1.181	.394	8.982	.003	.307	.142	.665
Anxiety level Low anxiety High anxiety	 -1.333 1.184	 .728 .315	 3.349 14.160	 .067 .000	 .264 3.268	 .063 1.764	 1.099 6.056
Limb Deformity	3.066	1.340	5.238	.022	21.460	1.553	296.481
Meat per week-days At least once in a week Occasionally	 .004 -.317	 .400 .431	 .373 .542	 .992 .462	 1.004 .728	 .459 .313	 2.199 1.695

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Chicken per weekdays At least once in a week Occasionally	1.110 .453	.599 .585	3.426 .600	.064 .438	3.033 1.573	.937 .500	9.821 4.951
Patient satis-faction towards doctor Very satisfy somewhat satisfy neither satis ed nor dissatis ed somewhat dissatisfy	-.266 -1.028 -1.417 -2.106	.897 .861 .888 2.482	.088 1.426 2.549 .720	.766 .232 .110 .396	.766 .358 .242 .122	.132 .066 .043 .001	4.441 1.934 1.381 15.765
Treatment symptoms type Getting Worse Improving	.776 -.997	.593 .313	1.714 10.117	.191 .001	2.174 .369	.680 .200	6.950 .682

The variable residence area found insigni cant predictor of outcome (p=0.357) estimate (0.222), it describes that the urban patients are less likely to occur disease than rural patient's and (OR=1.248, 95% C.I: 0.779, 2.001), OR shows that chance of knee OA in rural is 1.248 times greater than urban area. The p-value of Wald test for age (p=0.015) indicates that age is a sig- ni cant predictor of outcome with an estimate (0.031) and (OR=1.032, 95% CI: 1.006, 1.058) it indicates that when the age of patients increase then increase in the risk of knee OA disease. The estimate of predictor weight of patients shows that for every unit increase in the value of the weight of the patients, the log odds of disease increases

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by (1.049) and Wald test for the weight of patients, (p=0.000) found to be highly signi cant variable and (OR=1.049, 95% C.I: 1.029, 1.070). So, it indicates that if the weight of patient increases the chance of disease also increase. The estimate of predictor height of patients shows that for every unit increase in the value of the height of the patients, the log odds of disease increases by (2.332) and Wald test for the height of patients, (p=0.058) found to be in- signi cant variable and (OR=2.332, 95% C.I: 0.971, 5.598). So, indicates that the height of patient has found to be an insigni cant variable.

Summary

In osteoarthritis, the dynamic separation of the joints is caused by permanent loss of joint capacity and joint ligament. The side e ects of osteoarthritis are all around portrayed and even though the hidden pathophysiology of manifestations is broadly contemplated, this is still a large area of testing for osteoarthritis analysts. To reduce the side e ects of osteoarthritis, the human need to maintain his weight, do exercise regularly, take proper medication for his pain on time, use osteoarthritis drugs that reduce the disease which can treat joint.

The data has collected from the public sector hospitals (Allied hospital and civil hospital) of city Faisalabad. By preparing the questionnaire, directly interviewed the patients on di erent risk factors like gender, obesity, older age, smoking, certain occupation, history of knee trauma, certain occupation etc. The convenient sampling is used for the selection of samples. Total 1000 samples are collected in which 500 samples are cases and 500 samples are control with the ratio. In Faisalabad, we found that 148 men and 352 women had osteoarthritis of the knee, so the prevalence of osteoarthritis of the knee was 40% higher among men. 205 cases were from urban areas and 295 cases were from rural areas. The risk of osteoarthritis of the knee decreases if 148 patients exercise regularly. 140 patients have a history of knee trauma which increases the risk of osteoarthritis of the knee.

Conclusion

This study was carried out in the city of Faisalabad, revealing that age is a risk factor for outcome. The risk of osteoarthritis of the knee is greatly increased due to weight and physical activity, heart problems, kidney infections, hepatitis, liver infection. Regular smoker, high anxiety level, exercise, knee noise and a history of trauma are a signi cant risk for osteoarthritis of the knee. Uric acid is a very important factor for osteoarthritis of the knee. Locality, height, alive child, education, married, divorced, daily worker, public servant, private employer and non-regular smoking; in the context of logistic regression these are independent risk factors.

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