SURVIVAL ANALYSIS -OSTEOARTHRITIS

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Abstract

In the era of data, huge amount of data is made available to the public on hand to the decision makers. Using the publicly available data, this paper would discuss about how we can address the major issue of osteoarthritis. Furthermore, it would talk about the survival analysis cases in terms of osteoarthritis, major factors related to knee problems and provide the necessary steps to cure the condition.

1 Introduction:

osteoarthritis(OA) is the most common chronic Joint-condition. A joint is where two bones come together. The ends of these bones are covered with protective tissue called cartilage. With OA, this cartilage breaks down, causing the bones within the joint to rub together. This can cause pain, stiffness, and other symptoms. OA is most common in older people and can occur to any age of older generation. A is also called degenerative joint disease, degenerative arthritis, and wear-and-tear arthritis. OA affects more than 30 million people of United States.

1.1What are the causes of OA?
OA causes joint damage which is the most common disease. Other causes include the following:
- Torn cartilage
- Dislocated joints
- Ligament injuries

1.2Factors:
Some of the main factors causing OA are:
- Overuse of joints
- Obesity
- Posture
- Family History
- Age
- Previous Injury

2 Business Objectives

Survival analysis can act as a great tool for analyzing the time to an event type of data, which is very common in any clinical trial and it has the capability to answer to estimate and interpret survival functions from the survival data.

Survival analysis can be applicable in predicting and analyzing the cases of knee/hip replacement cases from publicly available datasets. This could help the patients in understanding the factors they need to aware of and healthcare businesses in suggesting the right choices to their clients.

3 Business Understanding

Analyzing the factors causing the OA and looking at its characteristics, business can answer the questions of when and to which type of patients to recommend for Hip/knee replacement. Understanding the factors of patient who are affected by knee/hip replacements and predicting the cause for the Knee/hip replacement looking at the similar factors of other patients through data could be business success criteria.

4.Data Planning

Survival analysis playing a prominence in answering how data can help reduce the problem of knee/hip replacement, using the below discussed data we can study about the characteristics of patients having this feature are in need of

The data provided has the following:
- Accelerometry Data: The accelerometry dataset contains for each person the average over the valid monitoring days of each physical activity measure and provides variables that indicate.
- All Clinical: These datasets contain data from smaller clinical datasets that have one row per participant combined into one dataset for each visit. This contains the unique Clinical datasets which is later used to join with multiple datasets according to the ID. This dataset set does not include MRI, XRAY has it has multiple variables.
- Biomarkers: These datasets contain meta-data describing the collection of biospecimens (e.g., which urine void was collected, fasting time before specimen collection, time of day the specimen was collected). The clinical readings of the screening knee x-rays that were done at each clinical site are also included in this dataset.
- Bone Ancillary Study: This study looked at both systemic and local bone measures as predictors of knee progression. It had information about the same participants who were invited to return at the 48-month visit for re-evaluation of the same Parameters. The data included serum 25-vitamin D, intact parathyroid hormone (PTH), and femoral neck bone mineral density (BMD); unilaterally obtained – usually the right hip; unless the participant had a prior total hip replacement (THR), in which case the left hip was scanned unless there was also a left hip THR. These measurements were obtained at the ancillary study baseline and follow-up visits.
- Medical History: The Medical History datasets contain a number of indicator variables for classes or types of medication (does the participant take that class of medication or

not). Some medication use variables are composed of high level terms which encompass multiple medications or a whole class of medications, while some variables refer to specific ingredients.

- Xray: They include information on exam type (pelvis, hand, fixed-flexion knee, etc.), date of imaging, radiography technician ID, side (left, right, bilateral, neither), whether the radiograph was completed for that participant, and if not, why not. In addition, the datasets contain quality ratings such as whether it was considered of acceptable quality, centering, alignment,completeness of depiction, etc.
- MRI: It includes information on MR series type (e.g., R SAG 3D DESS WE; L COR IW TSE; etc), date of imaging, MR technologist ID, side (left, right, bilateral), whether the MRI exam was completed for that participant, and if not, why not.
- Nutrition Description: It states the history of nutrient that a patient is consuming and what deficiency of nutrients it has. They monitor it closely.

5 Conclusion

Osteoarthritis (also known as OA) being a common joint disease that most often affects middle-age to elderly people can be cured and predicted with the help of data and analyzing the factors leading to the OA,we can together come up with a better cure for knee/hip replacements issues.When data incorporated into the machine which are becoming smarter day to day we can make the breakthrough in predicting the right cases for knee/hip replacements.