The Relationship between Demographic Information and Spinal Issues

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Background: This cross-sectional study primarily focuses on the various chronic spinal issues that can develop in patients after years of use, often due to general wear and tear on the spine. These spinal problems encompass a wide range of conditions that severely impact patients livelihoods, quality of life, and mobility.
Methods: The demographic information was obtained by patient surveys, where patients (n=30) from a chiropractic clinic near Cleveland, Ohio, were asked for their age, gender, race, and occupation. The occupation was then placed into either sedentary or manual, based on the description of employment given by the patient. The spinal condition data was found via MRI or X-ray, which was then interpreted by a radiologist to find the exact condition the patient had.
Results: When controlling for sample participants within the 60+ age group, it appears that there is a higher frequency of osteophytes and thoracolumbar curve within sedentary workers (62.5% and 50% respectively) compared to manual workers of the same age group (20% for each). Additionally, manual workers in the 60+ age group appeared to have a higher frequency of loss of disc height and degenerative joint disease (DJD) (80% and 60% respectively), while sedentary workers in the same age group had a lower frequency (50% and 25% respectively). When analyzing patients of the 50-59 age group, manual workers appeared to have a significantly higher frequency of loss of disc height (60%) compared to sedentary workers of the same age group (20%). When comparing the age groups of 60+ and 50-59 while controlling for only sedentary workers, it appears that sedentary workers aged 60 and older had a higher frequency of osteophytes (62.5%) compared to sedentary workers aged 50-59 (20%).
Conclusions: These findings may indicate a higher frequency of certain spine conditions based on the patient's demographic information.

Keywords: spine, low back pain, demographics, patient information, race, gender, age group, occupation, spinal issues, osteophytes, loss of disc height, disc narrowing, spondylosis, DJD, degenerative disc disease, thoracolumbar curve, spondylolisthesis, canal stenosis

Introduction

Background and Context:

This study primarily focuses on the various chronic spinal issues that can develop in patients after years of use, often due to general wear and tear on the spine. These spinal problems encompass a wide range of conditions that severely impact patients livelihoods, quality of life, and mobility.

Common spinal issues include: degenerative joint/disc disease (DJD), the breakdown of intervertebral discs due to aging; disc herniation, when the inner gel of a disc pushes through the outer layer; spinal stenosis, the narrowing of the spinal canal; scoliosis, abnormal lateral curvature of the spine; spondylosis, age-related wear and tear affecting the vertebrae and discs; spondylolisthesis, when a vertebra slips forward over the one below it; and many more chronic conditions. These issues, along with general loss of disc height, osteophytes, and canal dilation, were measured in this study.

The likelihood of having a spinal condition is attributed to multiple risk factors, including age, occupation, and demographic information.

Problem Statement and Rationale:

This study aims to correlate demographic information about the age, occupation, race, and gender of patients with their spinal conditions to attempt to find trends or patterns in the types of spinal conditions faced by those of different backgrounds. This research will help in finding a way to associate the history and background of a patient with the frequency of having certain types of spinal issues.

Significance and Purpose:

Using this research, medical professionals could attempt to look for the spinal issues that a patient is more likely to have, given

their demographics. Through this practice, certain issues will be highlighted that will then be more likely to be found, and treatment can begin sooner to improve the patients quality of life.

Objectives:

The objective of this study is to collect demographic data from patients with spinal issues in order to find trends that relate certain attributes with a higher frequency of certain conditions.

Analysis of demographic data in relation to spinal conditions will reveal identifiable trends linking patient life attributes and backgrounds to the specific spinal conditions diagnosed.

Scope and Limitations:

This study is limited by the location and number of patients within the data set. All of the data has been gathered from patients at a chiropractic clinic near Cleveland Ohio, so it may have regional biases. There were only patients of Caucasian, African-American, and Asian background, so the study is missing data for those of other races. There were more sedentary workers than manual workers and more Caucasians than African-Americans in the patient population, so the data may be slightly biased towards diverse results for sedentary workers and Caucasians. In addition, there are only thirty patients within this study, so certain attributes may appear more frequently than usual due to the small sample size. This study should be followed by studies with larger patient populations to confirm and expand its findings.

Methodology Overview:

Patients at a chiropractic clinic with spinal issues were surveyed to find their demographic information. Then, the patients underwent medical imaging, either through magnetic resonance imaging or x-rays. The results of the imaging, along with the patient's demographic information, was placed in a spreadsheet, where it was then manually reviewed to find trends.

Methods

Research Design:

This study is cross-sectional; it is a look at multiple variables captured from a population at a certain point in time, which are then analyzed to find trends.

Participants or Sample:

The sampling frame of this study were all patients within the Cleveland, Ohio chiropractic clinic who reported back or spine issues. The participants in this study were a convenience sample of patients at a chiropractic clinic who reported back or spine issues and who also underwent further imaging. Patients were selected based on whether they had relevant spinal issues that were observed by the interpreting physician. Exclusion criteria for this study were abnormalities of the spine that did not fit specifically into degenerative spinal issues, such as infections, tumors, and spinal trauma.

Data Collection:

The demographic information was obtained by patient surveys conducted from June 2025 to August 2025, where patients were asked for their age and occupation. The occupation was then placed into either sedentary or manual based on the description of employment given by the patient. The spinal condition data was found via MRI or X-ray (23 X-rays and 7 MRIs), which was then interpreted by a physician to find the exact condition the patient had. All images were of sufficient quality for the assessed findings, and used views of the cervical, thoracic, and lumbar spine.

Variables and Measurements:

The variables under measurement were the demographics (age and occupation) of each patient and the particular set of spine conditions that they were diagnosed with. The ages of each patient were grouped into the following sets: 60+, 5059, 4049, 3039, and 2029. The occupations were grouped into either sedentary work or manual labor using the Bureau of Labor Statistics Occupational Requirements Survey classifications, based on the patients description of their employment.

Procedure:

First, the patients were surveyed to find their age, gender, race, and occupation. This data was then placed into the categories described above. Following that, the result of each patients imaging was interpreted by a radiologist at the hospital where the imaging was conducted, from which the spine conditions were found using ICD-11 diagnostic definitions. These readings were blinded and conducted by a single reader, so inter-rater reliability was not assessed. The demographic data, along with the spine conditions, were placed into a spreadsheet, which was manually reviewed and organized to find trends in certain condition frequencies for each particular group. The spinal conditions were counted once per patient, so multi-level issues were still only tallied once per patient encounter

Data Analysis:

This study employed qualitative analysis through manual review of spreadsheets organized by different demographic characteristics. The number of each spinal condition that was suffered

by those in a particular group was noted. Then, the numbers of each condition were used to find trends in the conditions that appeared the most for each group. The conditions were filtered based on those that appeared most often, so conditions that were only present in insignificant numbers were omitted from the results, as the patient population did not represent them enough to be accurate.

Ethical Considerations:

The patient data was completely de-identified, with all possible markers or names removed. Because this existing data was anonymous, informed consent was unnecessary. There was no incentive provided to the patients or researchers, and all data was based directly on clinical results.

Results

Table 1 Demographic Information

Demographic Information			
Age Group	**Number of Patients**	**Occupation Type**	**Number of Patients**
60+	13 (43%)	Sedentary Work	18 (60%)
5059	10 (33%)	Manual Labor	12 (40%)
4049	5 (17%)		
3039	1 (3%)		
2029	1 (3%)		
Total	**30**		**30**

Table 2 Breakdown of Total Spinal Issue Counts

Condition	Count	% (out of 30)
Loss of Disc Height	15	50.00%
Osteophytes	13	43.30%
Spondylosis	9	30.00%
DJD	9	30.00%
Thoracolumbar Curve	6	20.00%
Canal Stenosis	6	20.00%
Disc Herniation	4	13.30%
Central Canal Dilation	1	3.30%

Table 3 Most Frequent Issues by Age Group

Age Group	Most Frequent Issues
60+	Loss of Disc Height (61.5%), DJD (38.5%), Osteophytes (46.2%), Thoracolumbar Curve (38.5%), Spondylosis (30.7%)
5059	Loss of Disc Height (40%), Osteophytes (30%), Canal Stenosis (30%), DJD (30%), Spondylosis (30%), Disc Herniation (30%)
4049	Loss of Disc Height (60%), Osteophytes (60%), Spondylosis (40%)
3039	Osteophytes (100%)
2029	Central Canal Dilation (100%)

Table 4 Most Frequent Issues by Occupation

Occupation	Most Frequent Issues
Sedentary Work	Osteophytes (50%), Loss of Disc Height (44.4%), DJD (22.2%), Spondylosis (27.8%), Thoracolumbar Curve (27.8%), Disc Herniation (16.7%)
Manual Labor	Loss of Disc Height (58.3%), DJD (41.7%), Osteophytes (33.3%), Spondylosis (33.3%)

Table 5 Age Groups Broken Down by Occupation

Age Group	Sedentary	Manual
60+ (n=13)	8	5
5059 (n=10)	5	5
4049 (n=5)	4	1
3039 (n=1)	1	0
2029 (n=1)	0	1

Discussion

Restatement of Key Findings:

When controlling for sample participants within the 60+ age group to reduce the confounding effect of age range, it appears that there is a higher frequency of osteophytes and thoracolumbar curve within sedentary workers (62.5% and 50% respectively) compared to manual workers of the same age group (20% for each). Additionally, manual workers in the 60+ age group appeared to have a higher frequency of loss of disc height and DJD (80% and 60% respectively) while sedentary workers in the same age group had a lower frequency (50% and 25% respectively).

When analyzing patients of the 50-59 age group, manual workers appeared to have a significantly higher frequency of loss of disc height (60%) compared to sedentary workers of the

Table 6 Spinal Issues of Age Groups 60+ and 50-59 Divided by Occupation

Age Group	Sedentary	Manual
60+ (n=13; Sedentary n = 8; Manual n = 5)	Osteophytes (62.5%) Thoracolumbar Curve (50%) Loss of Disc Height (50%) Spondylosis (37.5%) DJD (25%)	Osteophytes (20%) Thoracolumbar Curve (20%) Loss of Disc Height (80%) Spondylosis (20%) DJD (60%)
5059 (n=10; Sedentary n = 5; Manual n = 5)	Osteophytes (20%) Disc Herniation (40%) Loss of Disc Height (20%) Spondylosis (20%) DJD (20%) Canal Stenosis (40%)	Osteophytes (40%) Disc Herniation (20%) Loss of Disc Height (60%) Spondylosis (40%) DJD (40%) Canal Stenosis (20%)

same age group (20%).

When comparing the age groups of 60+ and 50-59 while controlling for only sedentary workers, it appears that sedentary workers aged 60 and older had a higher frequency of osteophytes (62.5%) compared to sedentary workers aged 50-59 (20%).

Unfortunately, statistical tests to analyze the significance of this study are not applicable, as the study size is too small to conduct accurate tests. Instead, this research should merely be interpreted as a pilot sample used as a preliminary investigation.

Implications and Significance:

These findings may be based in the higher amount of stress placed on the patients spines throughout years of use, which may explain the higher frequencies of issues at higer age groups, Additionally, the differences between sedentary and manual workers may be because of the differing daily motions and stresses that the workers place on their spine throughout the course of either manual labor (involving strenous lifting, bending, carrying, etc.) or work done at a desk.

These findings may point to higher frequenciesof certain spine conditions based on the demographic information of the patient. This could lead to a targeted diagnosis and exams for patients, which will allow for potential conditions to be identified quicker and easier.

Unfortunately, this study is of a small scale, so its results are uncertain. These results should be further explored and compounded with larger and more in-depth studies.

The observations found in this study agree with prior research within the field. Many other studies have also found that the frequency of spinal and low back issues increases with age increases or with higher strenuous workloads in occupational settings, like in the case of surgeons, foundry workers, farmers, nurses, and pilots, while those in high-stress sedentary occupations like pilots and professional drivers developed more frequent, but differing, spinal conditions [1–11]. Additionally, many prior studies have found that spinal conditions worsen with age, in particular with osteophytes [12–23].

Connection to Objectives:

The research objectives of this study were met, as trends concerning spine condition likelihoods were established based on certain groups of demographic information.

Recommendations:

Based on these findings, it could be recommended that osteophytes and thoracolumbar curve be looked for in patients who are sedentary workers. Patients of older age may be particularly screened for loss of disc height, which appears more often in higher age groups.

Limitations:

This study is limited by the location and number of patients within the dataset. All of the data was gathered from patients at a chiropractic clinic near Cleveland, Ohio, so it may have regional biases. There were only patients of Caucasian, African-American, and Asian background, so the study is missing data for those of other races. There were more sedentary workers than manual workers and more Caucasians than African-Americans in the patient population, so the data may be slightly biased towards diverse results for sedentary workers and Caucasians. In addition, there are only thirty patients within this study, so certain attributes may appear more frequently than usual due to the small sample size.

Because of this studys small sample size and uneven subgroups, these claims should be interpreted as preliminary observations from a convenience sample.

This study should be followed by studies with larger patient populations to confirm and expand its findings.

Closing Thought:

Through the careful analysis of when and how conditions affect patients, medical professionals can gain an advantage in diagnosis and ultimately treatment.

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