Magnetic Resonance Imaging Findings in Cervical and Lumbar Spine Pathologies and their impact on the Patients' Quality of life

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Summary

AIM

This study was designed to evaluate the relationship between the magnetic resonance imaging (MRI) findings in cervical and lumbar spine pathologies and quality of life of the affected patients.

MATERIALS AND METHODS

This was a cross-sectional study conducted among 242 patients diagnosed with cervical and lumbar spine pathologies. The Short-Form-36 questionnaire was used to collect data on the quality of life (Qol) outcomes. The data were analyzed using statistical tools.

RESULTS

The Qol domains, all showed poor scores for lumbar pathologies; Physical-Function = 33.63 ± 12.07 and Role-Physical = 38.25 ±24.11). The Qol of patients with cervical pathologies were all poor with exception of role emotion (RE) reaching the 50% marks (51.65±22.91). The Chi-square ($\chi 2$) revealed statistically significant relationships between cervical spine pathologies and QoL parameters such as Vitality ($\chi 2 = 228.663$, p= 0.044) and social function ($\chi 2 = 269.089$, p = 0.0000). There were statistically significant relationships between the lumbar spine pathologies and the QoL parameters; general health ($\chi 2 = 308.916$, p =0.000) and bodily pain ($\chi 2 = 154.393$, p = 0.000).

CONCLUSION

Spondylotic changes were the commonest disease entity in both spinal regions. Participants with lumbar spine pathologies had poor quality of life in all subscales of the QoL domains and there was significant negative impact of the pathologies on the patients' QoL. MRI practitioners can explore this aspect for protocol decision-making processes to optimize patient's healthcare.

***Keywords**: Cervical, Lumbar, Pathologies, Magnetic resonance findings, Quality of life*

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Introduction

There is a multitude of pathologies affecting the cervical and lumbar spines and their prevalence is increasing with the aging population. The World Health Organization (WHO) has postulated that the proportion of the population of people older than 60 years will double from 11% in 2010 to 22% in 2050 with concomitant epidemiological shift to increased prevalence of old age related pathologies[1-2.] The spectrum of lumbar and cervical spine pathologies includes degenerative, traumatic, infectious, neoplastic, congenital, inflammatory, autoimmune, and vascular pathologies [3.] The most common of these pathologies is spondylosis which is a degenerative process of the spine with a gradual onset. Alone or in combination with other factors, it causes spinal cord compression and canals stenosis[4-6]. Degenerative changes are common causes of low back pain in our environment [7].

Several previous studies have reported cervical spinal pathologies and poor quality of life to be more common among the male population when compared to their female counterparts [5-6, 8-13]. Endo *et al*[14] and Nikooy *et al* [15,] reported females to be highly affected with cervical spinal pathologies and poor quality of life. Lumbar spine abnormalities are more frequent in the female population [15-18]. However, de Schepper *et al* [19] reports that males were highly affected in their study with lumbar pathologies.

Imaging of the spine plays an ever increasingly essential role in the diagnosis and treatment of cervical and lumbar spine disorders. The diagnostic approach for the evaluation of spinal pathologies should take into account the clinical manifestations of the conditions and the associated quality of life of the individual[20]. Conventional radiography, computed tomography and magnetic resonance imaging (MRI) scans are the modalities of choice for the assessment of spinal pathologies. MRI currently, is an excellent imaging modality of choice for the demonstration of pathologies and other abnormalities related to the spinal column and the intervertebral disc when compared with plain radiography and computed tomography, either separately or combined[5,6] . It gives thorough information about the morphology and integrity of the intervertebral discs, intervertebral foramina, vertebrae, facets, joints and ligaments on both T1 and T2 weighted images especially sagittal plane images with sensitivity of almost 100%. It is also a non-invasive procedure [20-22]. The superior soft tissue resolution of MRI and its ability to detect lesions within the spinal cord, bone marrow and the intervertebral disc without radiation exposure to the thyroid gland gives MRI advantage over other imaging modalities.

In recent times, evaluation of the quality of life (QoL) has taken the center stage in health policy decision-making. Pathologies of the lumbar and cervical spine can affect the QoL of the sufferer. Previous studies reported that by the 7th decade, prevalence of spinal pathologies would have reached 95% in many individuals, and this increased the dependence rate and also decreased the quality of life (QoL) in the older population [6, 22]. It is therefore necessary to take into account the clinical manifestations of the conditions and the associated quality of life of the individual in the diagnostic approach for the evaluation of spinal pathologies [20]. To the best of our knowledge, there is dearth of reports on the radiographers' ability to make clinical decisions as regards MRI protocols to be adopted in patients presenting with different spinal pathologies and their associated quality of life, especially in our locality. It is therefore imperative to evaluate the QoL of patients diagnosed with lumbar and cervical spine

pathologies so as to improve the diagnostic services rendered to them. This study was designed to determine the relationship between MRI findings in lumbar and cervical spine pathologies and quality of life of the affected patients in Rivers State, Nigeria. We hypothesized that there was no statistically significant relationship between the cervical and lumbar spine pathologies diagnosed on MRI and QoL parameters of the patients.

Materials and Methods

A total of 242 patients diagnosed with cervical and lumbar spine pathologies derived from the formula for unknown population given below, were selected purposively and studied prospectively.

$$n = \frac{Z\alpha^2 pq}{d^2}$$

Where,

n = Expected sample size

Zα = significant level usually set at 95% confidence level, Zα is 1.96 (two sided).

p = proportion of the population with similar attributes under study = 50% (0.5).

d = Margin of error tolerated or absolute error = 6.3% (0.063)

q = 1-p = 1-0.5 = 0.5

$$n = \frac{(1.96)^2 \text{ X } 0.5(1-0.5)}{(0.063)^2}$$

$$n = \frac{0.9604}{0.003969}$$

n = 242

This study was conducted in selected hospitals and diagnostic centers in Rivers State, Nigeria with MRI and or physiotherapy services after obtaining an ethical approval (UPTH/ADM/90/SII/VOL.XL/897) from University of Port Teaching Hospital, Rivers State, Nigeria. The study was conducted according to the requirements of declaration of Helsinki.

Only centers with 0.35 Tesla MRI machines were used for this study, because most centers in this study location has 0.35T and to also avoid bias in the image acquisition process.

Only participants who were able to complete the quality of life questionnaires by self or with the help of others and with complete identification information were included in this study.

The cervical and lumbar spine MRI examinations were performed using open type MRI machines (Brivo MR235, General Electric, and Siemens Magnetom C) with 0.35 Tesla using (medium and large neck spine array volume coils) and (planar surface and multi-coil phased array) for cervical and lumbar spine, respectively.

The patients were examined lying supine with head and neck in a neutral position for cervical spine whiles the body was in a neutral position for lumbar spine. The scanning parameters included; Fast spin-echo sequence was used to obtain T1 and T2 weighted images in axial and sagittal planes. Coronal images for T1W and T2W and Short Tau Inversion Recovery (STIR) sequences were also acquired for adequate assessment of the spine.

The imaging parameters were; T1W sagittal image: TR/TE= 337-495/15-19, Field of view (FOV)= 240mm-260mm, slice thickness = 4-5mm, Flip angle = 90^0, matrix size = 206 x 256 and number of excitation (Nex)= 3-4, and T2W sagittal image: TR/TE = 3200-4700/110-125, FOV = 240-260mm, slice thickness = 4-5mm, Nex = 3-4 and Flip angle = 90^0. Axial image T2W: TR/TE= 2221-3400/120-125, FOV= 240 x 240mm, slice thickness =4-5mm, Nex= 3-4 and Flip angle = 90^0.

The acquired images were interpreted by the researcher and at least two consultant

radiologists with more than three years of experience in MRI spine reporting.

The assessment of the participant's quality of life (QoL) before MRI investigations and physiotherapy procedures were done using generic Short Form-36 (SF-36). The SF-36 is a comprehensive scale for the measurement of quality of life (non-health-related and health-related) through self-administered questionnaires, and made up of 8 subscales consisting of Physical function (PF), Role function (RF), Bodily pain (BP), General health(GH), Vitality(VT), Social function (SF), Role emotion (RE) and Mental health (MH)[24-25].

The SF-36 questionnaire was slightly modified by the researcher to include sections; A, B and C. The section A assessed the participants' socio- demographic variables such as age, gender, educational status and marital status. Section B evaluated body parts examined on MRI and MRI findings and section C assessed the QoL outcomes.

Apart from patients who underwent MRI of the cervical and lumbar spine at the study centers, patients that attended physiotherapy clinics due to cervical and or lumbar spine pathologies diagnosed on MRI before the commencement of physiotherapy treatment, were asked if they were willing to participate in this study. Patients who consented were recruited to participate in the study. Each participant filled in the modified SF-36 questionnaire based on their QoL as at the time of administering the questionnaire and interview. The Radiographers, Physiotherapists, Nurses and patient's relatives involved in this study were properly informed about the study and their consents and supports were properly sought.

A pilot study was conducted using 30 questionnaires among patients with spinal pathologies before the commencement of this study and the Cronbach alpha reliability test conducted. The questionnaires had an acceptable internal consistency (Cronbach's alpha = 0.81). The validity of the questionnaire was calculated using the index of item objective congruence (IOC) method used by a previous author [26]. This was done by computing the index of item-objective congruence (IOC).

Based on the index parameter, an IOC score > 0.6 is assumed to show adequate content validity and all the scores obtained in this study for all the items of the questionnaire after IOC analysis were >0.6. The gender and age group of the subjects, spectrum of pathologies and QoL outcome responses were collected using data proforma and analyzed using descriptive statistics (mean standard deviation, tables, frequency, percentages and bar chart). Shapiro-Wilk test was used to test for the normality of the variables. Inferential statistics such as Kruskal-Wallis, Mann-Whitney U and Chi-square tests were used to evaluate the relationship between the spectrum of cervical and lumbar spine pathologies and the quality of life outcomes that was established in this study.

Data processing and analysis were done using Statistical Package for Social Sciences (SPSS) version 20 (SPSS, Inc, Chicago, IL USA). A p-value of <0.05 was considered statistically significant.

Results

Descriptive statistics of the participants

The majority of the participants 64.88% (n = 157) were males and females 35.12% (n = 85) with a male to female ratio of 1:1.9. Greater number of the participants 45.87% (n = 111) were within the age group of 40-59 years (Table 1).

Table 1: Descriptive of the Socio- Demographic Variables of the Participants

S/No	Socio-demographic Variables	Frequency	Percentage
A	**Gender**		
	Male	153	63.22
	Female	85	36.78
	Total	**242**	**100**
B	**Age Group (Yrs)**		
	Less than 20 years	9	3.72
	20-39	88	36.36
	40-59	111	45.87
	60 years and above	34	14.05
	Total	**242**	**100**

Table 2: Quality of Life of Individuals with Cervical and Lumbar Spine Pathologies

Quality of life scores	Cervical Pathology	Lumbar pathology	General
Physical functioning (PF)	33.46±12.26	33.63±12.07	33.56±12.11
Role Physical (RP)	40.93±21.90	38.25±24.11	39.26±2330
Role Emotion (RE)	51.65±22.91	48.79±26.88	.49.86±25.45
Vitality (VT)	45.88±15.18	46.99±12.87	46.57±13.76
Mental Health (MH)	44.01±15.81	43.31±14.92	43.57±15.23
Social functioning (SF)	42.03±20.79	38.82±21.31	40.03±21.14
Bodily Pain (BP)	35.38±29.53	36.82±28.39	36.28±28.77
General health (GH)	42.03±11.30	39.14±12.57	40.23±12.16
Physical component -Summary score (PCS)	37.95±10.57	36.95±10.56	37.33±10.55
Mental component - Summary score (MCS)	45.89±9.55	44.48±10.97	45.01±10.46
Total quality of life	40.94±6.59	39.60±6.29	40.10±6.42

Relationships between spinal pathologies and QoL outcomes

The spectrum of the spinal pathologies were assessed and lumbar spine pathologies were highest 62.40% (n=151) while cervical spine pathologies accounted for 37.6% (n=91). Out of 91 cases of cervical spine pathologies, the majority 64.84 % (n=59) of the participants had single pathology (figure 1 in the appendix). In the single cervical spine pathology cases, cervical spondylosis was highest 34.07(n=34).The majority 74.83% (n=113) of the participants with lumbar spine pathologies had single pathology and the least 9.93 %(n=15) had multiple pathologies(figure 1), with lumbar spondylosis as the most common pathology (figure 2 in the appendix)

The Qol domains, components and total, all showed poor scores for lumbar pathologies with some values, which are PF = 33.63 ± 12.07, RP = 38.25 ±24.11, VT= 46.99±12.87 and MH = 43.31±14.92.

The physical component summary [PCS] and mental component summary scores are 36.95 ±10.56 and 44.48±10.97 respectively. The total Qol score for lumbar pathologies was 39.60±6.29 (Table 2).

Table 3: Kruskal-Wallis Test Showing the Differences in Quality of Life Scores of Individuals with Different Number of Pathologies

Quality of life scores	Mean Rank			K	*P*
	Single	Double	Multiple		
Physical functioning (PF)	121.28	117.88	129.31	0.42	0.81
Role Physical (RP)	120.10	112.04	147.98	4.74	0.09
Role Emotion (RE)	124.13	117.28	109.29	1.32	0.52
Vitality (VT)	124.53	115.84	108.79	1.41	0.50
Mental Health (MH)	121.88	115.05	129.73	0.69	0.71
Social functioning (SF)	120.18	104.18	160.79	10.48	0.01*
Bodily Pain (BP)	118.99	122.32	138.58	1.81	0.41
General health (GH)	122.17	118.28	122.06	0.11	0.95
Physical component -Summary score (PCS)	119.92	116.67	145.13	3.09	0.21
Mental component -Summary score (MCS)	123.90	104.15	133.46	3.43	0.18
Total quality of life	119.99	110.76	150.96	5.30	0.07

KEY: *= Sign at p<0.05

Table 4: Mann-Whitney Test showing the Differences in Quality of Life Scores of Individuals with Cervical and Lumbar Pathologies

Quality of life scores	Mean Rank		U	*P*
	Cervical	Lumbar		
Physical functioning (PF)	120.21	122.28	6753.00	0.82
Role Physical (RP)	126.20	118.67	6442.50	0.39
Role Emotion (RE)	126.05	118.76	6456.50	0.40
Vitality (VT)	117.92	123.66	6545.00	0.54
Mental Health (MH)	123.38	120.36	6699.00	0.74
Social functioning (SF)	128.64	117.20	6221.00	0.21
Bodily Pain (BP)	118.89	123.07	6633.00	0.64
General health	132.56	114.83	5864.00	0.05
Mental component -Summary (MCS)	128.46	117.31	6237.50	0.23
Physical component -Summary (PCS)	125.46	119.11	6510.00	0.49
Total quality of life	129.11	116.91	6178.00	0.19

The Qol scores (domains, components and total) of patients with cervical pathologies were all poor with exception of role emotion (RE) reaching the 50% marks (51.65±22.91) and the other scores of some domains were PF = 33.46±12.26, RP= 40.93±21.90, VT = 45.88±15.18 and MH = 44.01±15.81.

The PCS and MCS were 37.95±10.57 and 45.89±9.55, respectively (Table 2). The Kruskal-Wallis test mean rank values for the individuals with different number of pathologies with values of significance were; PF: (single = 121.28, double = 117.88, multiple = 129.31, k = 0.42 and p= 0.81), RP: (single = 120.10, double = 112.04, multiple =147.98, k = 4.74 and p = 0.09) and SF: (single = 120.18, double = 104.18, multiple = 160.79, k = 10.48 and p = 0.01).

Table 5: The Relationship between Cervical Spine Pathologies and Quality of Life Parameters

QOL Parameters	Chi Square	df	P-value	Implication
General Health	395.598	480	.998	Not Significant, Failed to Reject Ho
Vitality	228.663	570	.044	Significant, Rejected Ho
Pain	132.154	120	.211	Not Significant, Failed to Reject Ho
Social Functions	269.089	270	.000	Significant, Rejected Ho
Limitation of Activities	344.274	390	.954	Not Significant, Failed to Reject Ho
Physical Health Problem	87.578	120	.989	Not Significant, Failed to Reject Ho
Emotional Health Problems	65.113	90	.978	Not Significant, Failed to Reject Ho
Mental Health	386.672	420	.573	Not Significant, Failed to Reject Ho
				Not Significant, Failed to Reject Ho

Df = Degree of freedom

Table 6: The Relationship between Lumbar Spine Pathologies and Quality of Life Parameters

QOL Parameters	Chi-Square	df	P-value	Implication
General Health	308.916	60	.000	Significant, Rejected Ho
Vitality	325.230	75	.000	Significant, Rejected Ho
Bodily Pain	154.393	18	.000	Significant, Rejected Ho
Social Functions	285.276	60	.000	Significant, Rejected Ho
Role Functions	166.702	30	.000	Significant, Rejected Ho
Physical Health	143.322	15	.000	Significant, Rejected Ho
Emotional Health	147.444	15	.000	Significant, Rejected Ho
Mental Health	307.416	65	.075	Significant, Rejected Ho
				Not Significant, Failed to Reject Ho

Df = Degree of freedom

The values for PCS and MCS were (single = 119.92, double = 116.67, multiple = 145.13, k= 3.09, p = 0.21) and (single = 123.90, double = 104.15, multiple = 133.46, k = 3.43 and p = 0.18 (Table 3). There was no significant difference in Qol scores across the individuals with different numbers of pathologies with the exception of social function domain. Therefore, the null hypothesis was accepted across all the Qol domains with exception of the social function domain, which showed significant difference with least and highest scores, respectively (k= 10.48. p = 0.01) (Table 3).

The Mann-Whitney test mean values for some of the Qol domains across cervical and lumbar spine pathologies were; PF: (cervical = 120.21, lumbar = 122.28, U = 6753.00 and p = 0.82), RP: (cervical = 126.20, lumbar = 118.67, U = 6442.50 and p = 0.39), VT: (cervical = 117.92, lumbar = 123.66, U = 6545.00 and p = 0.54) and MH: (cervical = 123.38, lumbar = 120.36, U = 6699.00 and p = 0.74). The PCS and MCS were (cervical= 125.46, lumbar = 119.11, U = 6510.00and p = 0.49) and (cervical = 128.46, lumbar = 117.31, U = 6237.00 and p = 0.23) There was no significant difference in quality of life scores between individuals with lumbar and cervical pathologies (p>0.05), therefore, we failed to reject the null hypothesis (Table 4).

The Chi-square test for cervical and lumbar spine pathologies and QoL domains were evaluated and the results showed that there were statistical significant relationships between cervical spine pathologies and QoL parameters such as Vitality ($\chi 2 = 228.663$,df =30, p= 0.044) and social function ($\chi 2 = 269.089$, df = 270, p = 0.000). The null hypothesis was rejected respectively. There were no statistical significant relationships between cervical spine pathologies and QoL parameters such as general health ($\chi 2 = 395.598$, df =480,p=0.998), bodily pain ($\chi 2 = 132.154$, df =120,p =0.211) , role function ($\chi 2 = 259.089$,df=370, p=0.954), physical function ($\chi 2$=87.578,df=280, p=0.989) , emotional function ($\chi 2$= 65.113, df =90, p = 0.978) and mental health ($\chi 2 = 386.62$, df = 420, p = 0.573), respectively. The null hypothesis was accepted, meaning that there were no statistical significant relationships between the evaluated cervical spine pathologies and the aforementioned QoL domains (Table 5).

With regards to participants with lumbar pathologies, the Chi-square test ($\chi 2$) revealed that there were statistical significant relationships between the evaluated lumbar spine pathologies and the QoL parameters; general health ($\chi 2 = 308.916$, df =60, p =0.000) , Vitality ($\chi 2 = 325.230$, df = 75 , P = 0.000) , bodily pain ($\chi 2 = 154.393$,df =18 , p = 0.000), social function ($\chi 2 = 285.276$, df = 30 ,p =0.000) , physical health ($\chi 2 = 143.322$, df =15 , p = 0.000) and role emotion ($\chi 2 = 307.416$, df = 65 , p= 0.075), respectively. The null hypothesis was rejected across all the aforementioned QoL domains. The lumbar spine pathology showed no statistical significance with mental health domain of QoL. The null hypothesis was accepted (Table 6).

Discussion

Majority of the participants with either cervical or lumbar spine pathologies in this study were males. Male preponderance noted in this study, is in agreement with the findings of the studies conducted by Maaji *et al* [5], Olarinye-Akorede[6], Laxton and Perrin[9], Velstral *et al* [11], Harkema *et al*[12], Rose-Bist *et al*[13], McColpin[14], Mustapha *et al* [22], Dallbayrak *et al* [26], which also reported male preponderance. The male preponderance noted in this study could be attributed to the fact that males account for greater numbers of the workforce in our societies and are commonly exposed to spinal pathologies predisposing factors such as strenuous job. Contrary to the finding of this study, Endo *et al* [15], Nikjooy *et al* [16], Shalaby *et al* [17] and Babinska *et al* [18], Miyagishima *et al* [27], reported high female preponderance. The differences identified in the finding of this study and that of the previous researchers, could be attributed to the different sample sizes studied, the nature and purposes of the various studies.

The majority of the participants were in the 4th-5th decades of age with cervical spine pathologies commonly found within the age group of 20-39 years while those with lumbar spine pathologies were highest within the age group of 40-59 years with overall mean age of 52.16±13.2 years (mean ± standard deviation). The mean age of the total participants obtain in this study is similar to the mean ages obtained in previous studies conducted by Laxton and Perrin [9] in Canada and Olarinye-Akorede[6] in Zaria Northern Nigeria, which reported participants with a mean age of 52.4±15.3 years and 52.7±11.31 years, respectively. The preponderance of the 2nd -5th decade ages noted in this study could be ascribed to the fact that people in these age range are the most active parts of every society and usually involved in

strenuous jobs and social activities that often predispose them to spinal pathologies. The findings of this study with respect to the common age group or mean age affected by spinal pathologies is inconsistent with the findings of the studies conducted by Maaji *et al*[5], Fei *et al*[8], Endo *et al* [15], Babinska *et al* [18], Mustapha *et al* [22], Miyagishima *et al* [27], Becerranfontal *et al* [28], which reported a different mean age from that of this study. The discrepancies in these findings could be ascribed to the different sample sizes studied in our various studies.

The majority of the participants with single spinal pathologies had spondylosis as the most common spinal pathology. This finding is in agreement with the findings of the studies conducted by Laxton and Perrin[9] in Canada, Mustapha *et al* [22] in Maiduguri, Nigeria and Adekanmi *et al*[29], which also reported spondylosis as the most common pathology in their studies. The differences in the absolute values of our findings could be attributed to the differences in our various sample sizes. Spondylosis as the most common pathology in this study is contrary to the findings of studies conducted by Maaji *et al* [5] in Sokoto Northern Nigeria and Karki *et al*[10] in Kathmandu Nepal. The discrepancies in our findings could be attributed to the different sample sizes studied and the geographical variations of the various studies.

In this study, the quality of life associated with cervical and lumbar spine pathologies of patients presented for MRI in Rivers State Nigeria was assessed and the results revealed that all the quality of life scores (domains, component and total) were all poor with none (except the role limitation due to emotional problems of those with cervical pathology) reaching the 50% mark. Participants with Lumbar spine pathologies had a poor quality of life in all subscales of the QOL domains when compared with those that had cervical spine pathologies this could be attributed to the fact that more patients with lumbar spine pathologies were included in this study and could be responsible for the variations observed in the QOL presented by the participants. This finding is in consonance with the findings of previous studies carried out by Becerra-fontal *et al* [28]. In the study conducted by Becerra-fontal *et al*[28], they noted that patients with lumbar spine pathologies had a poor quality of life ($p < 0.05$) in all subscales, both for raw and adjusted values, with exception of the general health and mental health measurements. They also reported that patients with lumbar pathology had worse scores of QoL on social function (SF) scales ($p < 0.001$) and role physical (RP) ($p < 0.05$). In addition, Beccerra-fontal *et al* [28] observed worse scores on vitality, physical function (PF), social function (SF) and role physical (RP) with patients that had lumbar radiculopathy in comparison with patients with Claudication ($p < 0.05$). Singh *et al* [30] documented that generic assessment scales such as the SF-12 and SF-36 give more comprehensive measure of health related quality of life, especially when evaluating physical, social, and mental health in diseases states.

The result of this study revealed that there was no significant difference in quality of life scores among individuals with different number of pathologies except in the social functioning domain where those with single and multiple pathologies had significantly least and highest scores, respectively ($k=10.48$; $p=0.01$). This implies that the Qol of individuals does not necessarily depend on the number of pathologies affecting the spinal code. Also there was no significant difference in quality of life scores between individuals with lumbar and cervical pathologies ($p>0.05$). Nevertheless, those

individuals with lumbar spine pathologies were affected across all the domains of Qol when compared with those with cervical spine pathologies. This finding could be attributed to the numbers of the different spines studied.

Cervical spinal pathology showed statistical significant relationships between quality of life domains such as vitality and social function. This means that cervical spine pathology affects the vitality and social function components of the QoL of the participants in this study. There were no statistical significant relationship between cervical spine pathology and quality of life domains such as general health, pain, role function, physical function. This implies that the patients had cervical pathology, which does not impact on the aforementioned QoL statistically. Among patients with lumbar spine pathologies, out of the eight domains of QoL, seven (general health, vitality, bodily pains, social function, role function, physical health and role emotion) showed statistically significant relationships with lumbar spine pathology. This implies that patients with lumbar spine pathologies usually presents with poor quality of life especially when compared to patients with the cervical spine pathologies. The null hypothesis was rejected because there were significant relationships between the lumbar pathology and the aforementioned quality of life domains. Despite the different nature of our studies, the finding of this study is in harmony with the findings of the studies conducted by Becerra-fontal *et al* [28], Otani *et al*[33] and Motter *et al* [34], which also reported negative impact of spinal pathologies on the individuals 'quality of life. According to the findings of Motter *et al* [34] patients with lumbar spine pathologies usually present with poor quality of life outcome. This is contrary to the report of the epidemiological studies, which shows that elderly patients with clinical complaints of vertebral pathology are considered at risk for pain and permanent disability[31,32, 34].

Conclusion

This study revealed that more males were commonly affected with cervical and lumbar spine pathologies than their female counterparts. It also showed that cervical spine pathologies are more common among patients in 3rd and 4th decades while lumbar spine pathologies are more prevalent among patients in their 5th and 6th decades of life. Spondylotic changes were the commonest disease entity in the both spinal regions. Despite the fact that there was no significant difference in the quality of life scores among patients with cervical and lumbar spine pathologies, participants with lumbar spine pathologies had a poor quality of life in all subscales of the QoL domains when compared to the cervical spine and there was significant negative impact of the pathologies on the patients' QoL, which MRI practitioners can explore for the protocol decision-making process to optimize patient's healthcare. Therefore, MRI practitioners should always bring QoL to the forefront in their protocol decision-making process.

Conflict of interest: None declared among the authors

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Appendix: Figures 1 and 2

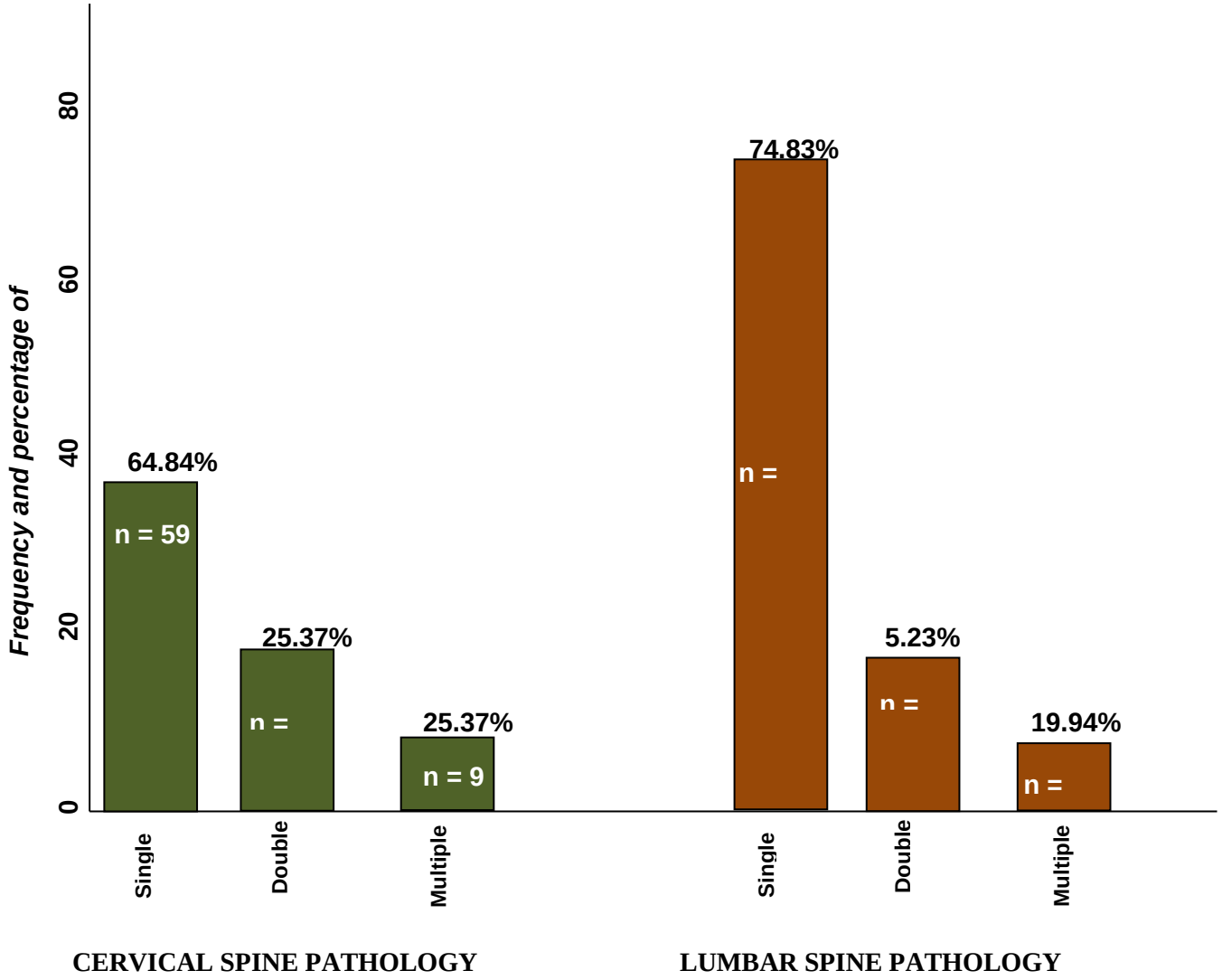

Figure 1 Frequency and Percentage of the Spinal Pathology Categories

Figure 2: Lumbar Spondylosis with Anterior Slip of L4 on L5 Vertebra (Grade 1)(Arrow)