A COMPARATIVE ANALYSIS TO ASSESS THE LUMBAR CURVE VARIATIONS AFTER POSTPARTUM PERIOD IN FEMALES WITH AND WITHOUT EPIDURAL ANESTHESIA

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ABSTRACT

The intervertebral discs and lumbar vertebral bodies wedged together and results in lumbar lordosis ,which is the inward (ventral) curve of the lumbar spine. The lordosis angle increases with dorsal wedging of the vertebral bodies and discs (anterior section longer than posterior), while the lordosis angle is decreased by increased ventral wedging of these structures (anterior section shorter than posterior).Increased low back pain will occur from an excessive rise or reduction in the lumbar lordosis angle, which will put too much strain on the intervertebral joints or discs. The use of local anesthetics during surgery is referred to as epidural anesthesia. Numerous investigations have shown that, in addition to relieving pain, spinal anesthesia and analgesia also lower perioperative physiologic responses. In 22% of all caesarean procedures, epidural anesthesia is used.

Objective: To assess the lumbar curve variation after postpartum period in females with or without epidural anesthesia.

Methodology: We took the data of 424 postpartum females after the written consent. On probability convenient sampling technique is used for the selection of data. First of all, we took the demographic data (age, gender, height, weight, occupation, BMI). Then using a measuring tape, we measured the height and then with the use of weight scale, we measured the weight .After that, we checked the lumbar curve variations (hypo lordosis , hyper lordosis) with the help of inclinometer Normal lumbar curve ranges between 30-40 degree. Increase in lumbar curve more than 40 degree considered as hyper lordosis. Decrease in lumbar curve less than 40 degree considered as hypo lordosis.

Results: Total 424 females after postpartum period were selected. Average age was 204(88.30) and 121(62.70),average BMI was obese class1 94(40.70) and normal was 84(43.50) and average lumbar curve variation hyper lordosis was 99(42.90) and 96(49.70) in both with epidural anesthesia and without epidural anesthesia groups respectively.

Conclusion: Lumber curve variations in females after postpartum period was varying in both groups (Group A=with epidural anesthesia vs Group B=without epidural anesthesia) but this variation was not observed statistically significant.

Indexed terms_ Epidural anesthesia, Inclinometer, postpartum.

I. Introduction

The spinal rope is the piece of the focal sensory system that controls the willful muscles of the appendages and trunk, and which gets tangible data from these locales. It likewise controls a large portion of the viscera and veins of the chest, midsection, furthermore, pelvis. The rope is depicted as being comprised of a progression of segmental parts, however in the grown-up the string is really a ceaseless chamber of focal sensory tissue. The still up in the air by the example of development of spinal nerves; the nerve rootlets emerging from the line are packaged together with the goal that one sets of spinal nerves rises out of each section. The spinal line and its meninges (dura mater, arachnoid, and pia mater) exist in the vertebral channel. The spinal rope is round and hollow, yet marginally leveled dorsoventrally.

The spinal white matter possesses a large portion of the cross-sectional region of the cervical augmentation, while the spinal line dark matter is extraordinarily broadened in the areas where the nerves of the appendages (the brachial and lumbosacral plexuses) emerge. The human spinal rope has 12 thoracic sections, 5 lumbar fragments, 5 sacral portions, and 1 coccygeal fragment, making a sum of 31 sections. Sets of spinal nerves emerge from the spinal line and leave the vertebral segment through the intervertebral foramina. The focal trench of the spinal line is a remainder of the embryological ventricular framework and is present all through the entire length of the spinal line. The spinal line is provided by a single ventral spinal conduit and two dorsal spinal corridors.[1]

The cervical spine's scope of movement is around 80° to 90° of flexion, 70° of expansion, 20° to 45° of parallel flexion, and up to 90° of turn to the two sides. The movements performed at the level of cervical spine are complex.[2–]The extensive spinal channels leading to and from the brain and spinal cord, as well as the spinal propriospinal pathways, make up the spinal cord's white matter. [3].The curve of the cervical spine has important clinical implications. The cervical lordosis affects the efficiency of a number of processes, such as chewing, breathing, vocalization, eye movement, and gaze, as well as the body's ability to absorb stress when walking and running. In contrast to the rest of the spine, the cervical spine distributes the compressive stress differently; the anterior column absorbs 36% of it, while the posterior facet joints absorb 64% of it.[4]

Age causes a reduction in the cervical spine's range of motion, but it also affects how the spine is aligned.[5]Following trauma, kyphotic angulation and a straightening or reversal of cervical lordosis are frequently observed.[6] The "Cinderella" region of the spine has been the thoracic spine for a very long time.[7]At the T2, T5, and T10 levels, the posterior subarachnoid space is deeper. T5 revealed the wider distance.[8] Between 20 and 40°, the thoracic spine's convex curvature known as kyphosis is regarded as "normal." Hyper kyphosis is the term used to describe the curve when it is more than 40°. In addition to having a lower quality of life, this comes with an increased chance of falling and developing pulmonary dysfunction. Even though people's kyphosis frequently surpasses 40°, this is the generally regarded cutoff and criterion for normality.[9]Elderly people frequently have hyper kyphosis, or exaggerated thoracic kyphosis. This age-related increase in thoracic kyphosis has been linked to vertebral fractures, intervertebral disc degeneration, loss of spinal muscle strength, intervertebral ligament degeneration, and intervertebral ligament degeneration.[10]Technological improvements may cause more thoracic kyphosis as a result of prolonged sitting and physical inactivity.[11]

The intervertebral discs and lumbar vertebral bodies wedged together to generate the lumbar lordosis, which is the inward (ventral) curve of the lumbar spine. The lordosis angle increases with greater dorsal wedging of the vertebral bodies and discs (anterior part longer than posterior), whereas more ventral wedging of these structures (anterior part shorter than posterior) decreases the lordosis angle. The total of the body and disc wedge angles creates the lumbar lordosis. The lordotic angle may alter when the vertebral bodies are compressed or when the intervertebral discs are lost. "Flat-back syndrome" caused by instrumented spinal fusion can also result in lordosis loss.[12]Studies have shown that the lumbar lordosis angle and back muscular strength play crucial roles in preserving the lumbar spine's stability. Increased low back pain will occur from an excessively high or low lumbar lordosis angle, which will put an excessive amount of strain on the intervertebral joints or discs.[13]

Local anesthetics can be delivered epidurally to generate anesthesia without the requirement for mechanical ventilation or respiratory support. However, epidural anesthesia also affects sympathetic innervation and motor function, which affect lung function. These effects—a reduction in vital capacity (VC) and forced expiratory volume in one second (FEV1.0)—are minor under lumbar and low thoracic epidural anesthesia. Epidural administration of local anesthetics not only provides better anesthesia and analgesia when compared to anesthesia and analgesia without epidural anesthesia, but it also improves postoperative outcome and reduces postoperative pulmonary issues.[14]

Epidural anesthesia is the name for the local anesthetics used during surgery. Numerous studies have demonstrated that spinal anesthesia and analgesia not only reduce pain but also the perioperative physiologic responses.[15].22% of all caesarean sections used an epidural anaesthetic.[16]Continuous lumbar epidural anesthesia can be advantageous for the mother with pregnancy-induced hypertension as well as the foetus.[17].A numbing substance is injected into the epidural region of the spine during epidural anesthesia. Benefits include avoiding general anesthesia and allowing patients to have surgery while still conscious. It has become very popular for obstetric treatments and birthing. Up to 3.6% of individuals receiving epidural anesthesia are thought to have inadvertent Dural punctures.[18]

II. MATERIAL AND METHODS

Comparative analytical cross-sectional study. Gynecology wards, Pediatrics wards in hospitals of Gujranwala. The study was conducted for 4 months from 1st August 2022 to 30th November 2022. Sample of 242 was calculated.

Inclusion Criteria:

- Postpartum females
- Females with c-sec delivery and vaginal delivery
- Mothers in between time duration after postpartum to 1st birthday of baby

Exclusion Criteria:

- Pregnant females
- Patient refusal
- Females with any recent injury(past 3 months)
- Females with any kind of spinal injury(falls, motor vehicle accidents, stab wounds)
- Infections that form an abscess on the spinal cord
- Females with polio infection.

Measuring tape, Weight machine, Inclinometer and Questionnaire used as data collecting tools.

All ethical consideration were kept in mind. **T**he data of 424 postpartum females after the written consent.

On probability convenient sampling technique is used for selection of data. First of all, demographic data(age, gender, height, weight, occupation, BMI). Then using a measuring tape, we measured the height and then with the use of weight scale, we measured the weight .After that, we checked the lumbar curve variations (hypo lordosis , hyper lordosis) with the help of inclinometer Normal lumbar curve ranges between 30-40 degree. Increase in lumbar curve more than 40 degree considered as hyper lordosis. Decrease in lumbar curve less than 40 degree considered as hypo lordosis. The Statistical Package for Social Sciences (SPSS) software version 24.0, IBM Corp. Released 2016 was used for data entry and analysis. Mean and standard deviation were determined for quantitative data for descriptive analysis, whereas frequency and percentages were employed for qualitative variables. Chi-square test was used to determine if the inferential statistics were significant. The 95% confidence interval was used to determine all findings, and a significant value was defined as one with a p-value of ≤ 0.05.

III. RESULTS

Out of 424 participants,22-31 age group individual was 204(88.30) with epidural anesthesia which is higher than other 2 categories and 121(62.70) was without epidural anesthesia which is higher than other 2 categories. By comparing both groups 204(88.30%)individuals with epidural anesthesia have higher n% than individuals without epidural anesthesia...According to health status with BMW, Obese class 1 was 94(40.70) with epidural anesthesia which is higher than other 2 categories, Normal was 84(43.50) without epidural anesthesia which is higher than other categories. According to lumbar curve variations, hyper lordosis was 99(42.90) with epidural anesthesia which is higher than other 2 categories and 96(49.70) was without epidural anesthesia which is higher than other 2 categories.

This table shows the mean ±S.D. Mean age and S.D of individuals with epidural anesthesia was 27.43±3.60 and individuals without epidural anesthesia was 28.27±4.76. Mean BMI and S.D of individuals with epidural anesthesia was 28.55±5.21 and individuals with non-epidural anesthesia was 25.60±4.61.Mean and S.D of LBP with epidural anesthesia was 1.58±0.50 and mean and S.D of individuals with non-epidural anesthesia was 1.56±0.50.Mean and S.D of number of C-sections with epidural anesthesia was 1.50±0.74 and with non-epidural anesthesia was 0.10±0.31.Mean and S.D of premature birth with epidural anesthesia was 1.70±0.46 and without epidural anesthesia was 1.78±0.41.Mean and S.D of any miscarriage with epidural anesthesia was 1.77±0.42 and without epidural anesthesia was 1.69±0.46.Mean and S.D of complications during pregnancy with epidural anesthesia was 1.54±0.50 and without epidural anesthesia was 1.68±0.47. Mean and S.D of obstetric complications with epidural anesthesia was 1.72±0.77 and without epidural anesthesia was 1.81±0.39.Mean and S. of sleep disturbance with epidural anesthesia was 1.65±0.48 and without epidural anesthesia was 1.67±0.47.Mean and S.D of age of marriage with epidural anesthesia was 21.72±3.91 and without epidural anesthesia was 20.69±3.75.Mean and S.D of number of child with epidural anesthesia was 2.15±1.34 and without epidural anesthesia was 2.81±1.82.Mean and S.D of weight of baby at birth with epidural anesthesia was 3.19±0.75 and without epidural anesthesia was 3.31±0.56.Mean and S.D of lumbar curve variations in individuals with epidural anesthesia was 41.88±10.67 and without epidural anesthesia was 43.82±10.60.

Table 1 shows the p value of different variables' value ≤ 0.05 was considered statistically significant. BMI was significant ($p = 0.001$).Complications during pregnancy was significant (0.002).Number of children was significant(0.001).No. of C-Sections was significant(0.001).

Table 1: Descriptive analysis of participants

Table 2: Between Group analysis

Table 2 demonstrates that the p value of different variables. p value ≤ 0.05 was considered statistically significant. BMI was significant (p = 0.001).Complications during pregnancy was significant (0.002).Number of children was significant(0.001).No. of C-Sections was significant(0.001).

	t	do	P-value	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Age of participant (years)	-2.02	351.87	0.044*	-.841	-1.66	-0.02
Body Mass Index(Kg/m^2)	6.19	420.58	<0.001*	2.952	2.01	3.89
Premature Birth	-2.01	419.77	0.045*	-.085	-0.17	0.00
	1.98	390.94	0.048*	.086	0.00	0.17
Complications during pregnancy	-3.13	416.88	0.002*	-.147	-0.24	-0.05
Obstetric Complications	-1.73	351.03	0.085	-.100	-0.21	0.01
Lower back pain after C-section	0.33	422.00	0.738	.016	-0.08	0.11
Sleep disturbance	-0.43	422.00	0.667	-.020	-0.11	0.07
Age of marriage (years)	2.76	422.00	0.006*	1.034	0.30	1.77
Number of children	-4.18	345.70	<0.001*	-.661	-0.97	-0.35
Weight of baby at birth (Kg)	-1.92	417.45	0.056	-.122	-0.25	0.00
No. of C-Sections	26.11	317.73	<0.001*	1.394	1.29	1.50
Lumber Curve Variation (angle in degree)	-1.87	422.00	0.062*	-1.941	-3.98	0.10

IV. DISCUSSION

Poor posture may be detected using a variety of techniques and is characterized by a change in body form without any subjective complaints, such as discomfort. Usually, these problems worsen if they are not treated.(1) The goal of the current study was to close the knowledge gap about postural deviations. 424 women in Wazirabad's general population between the ages of 18 and 49 were included in this study. The average female age was 33.41±9.31.There were 59 pupils assessed, both males and females. 79.7% of people had poor posture.(2) According to our study's prevalence of postural dysfunction, 65.57% of female had poor posture. Because we only look at

Variables	Responses	With Epidural Anesthesia	Without Epidural Anesthesia
		n(%)	
Age Groups of participants in Years	12-21	4(1.70)	6(3.10)
	22-31	204(88.30)	121(62.70)
	32-41	23(10.00)	66(34.20)
Health status with BMI (Kg/m^2)	Underweight (<18.5)	3(1.3)	5(2.60)
	Normal(18.5-24.9)	74(32.00)	84(43.50)
	Overweight(25-29.9)	54(23.40)	71(36.80)
	Obese Class 1 (30-34.9)	94(40.70)	28(14.50)
	Obese Class 2 (35-39.9)	4(1.70)	5(2.60)
	Obese Class 3 (>39.9)	2(0.90)	0(0)
Lumbar Curve Variations (Degree)	Hypo lordosis(<30)	45(19.50)	21(10.90)
	Normal(30-40)	87(37.70)	76(39.40)
	Hyper lordosis(>40)	99(42.90)	96(49.70)
Total		231(100)	193(100)

females in this study, but the prior study looked at both genders, this finding is different. Research on 2007 was done. This study's objective was to determine the prevalence and key contributing variables of bad posture among Czech schoolchildren. 3600 kids from both sexes were involved in this cross-sectional research. 38.3% of kids had a diagnosis of poor posture, with males being more likely to have one. Between 7 and 11-year-old children, bad posture was observed to occur at considerably different rates. Children in this research were far less likely to have bad posture than adult females, contrary to our previous results that gender was a major predictor. Males were also more likely to have poor posture than females.(3)

In order to ascertain the incidence of neck discomfort among university academic staff and potential risk factors, research was conducted in 2002. All of the academic staff members who work full-time received self-administered surveys. Gender and neck discomfort were shown to be significantly associated (p = 0.02). Neck discomfort was more common in female academic staff (62%), compared to male personnel (38%).(4) This was consistent with our study's findings, which showed that women had worse posture on average. This research was conducted in 2015. This study sought to determine the prevalence of postural deviation in children as well as the risk factors that affect these deviations in children. The most frequent risk factors of postural deviation in youngsters were found to be television and video entertainment, along with weight growth.(5) This study directly contradicted our conclusions. Poor posture and television or video entertainment were not significantly correlated in our study.

In order to identify the risk factors for the emergence of postural abnormalities in school-aged children, a study was conducted in 2013. The research was carried out using a diagnostic survey. 380 youngsters between the ages of 14 were included in the research, comprising 175 females and 205 boys. They were chosen at random from Czech Republic and eastern Poland schools. The conclusion was that there was a connection between the child's inactivity and the emergence of postural abnormalities. In line with earlier research, our findings showed that a sedentary lifestyle ($p<0.001$) and a lack of physical activity ($p<0.001$) were significant risk factors for poor posture.(6)

In order to ascertain the prevalence of postural dysfunction among female college students, a study was conducted in 2017. 804 female participants in this study were frontally and sagittal photographed. It's likely that the irregularities were brought on by extended sitting and a lack of flexibility. Lack of physical exercise and postural irregularity are linked among female college students.(1) We discovered that our results were consistent with other research and that physical inactivity ($p<0.001$) was a substantial risk factor that had a high connection with postural dysfunction. In 2008, research was carried out. This study sought to ascertain how muscular weakening affected postural instability and falling. The conclusion showed that postural instability was significantly increased by muscular weakening.(7) According to our research, women who had weaker muscles ($p<0.001$) were more likely to have postural problems which is consistent with our findings. In 2011, research was conducted to identify the prevalence and risk factors for CANS (Complaints of arms, neck and shoulders). Using the validated Maastricht Upper Extremity Questionnaire, information on the prevalence and risk factors of CANS was gathered. The associations and correlations between risk variables and symptoms were examined using a binary logistic regression analysis.(8) This investigation confirms our results that bad posture is substantially correlated with poor sitting posture ($p<0.001$). Women who participated in competitive sports showed a high link with postural dysfunction in our study. In female athletes who participated in competitive sports, postural dysfunction was two times more likely to develop. 20% of children in a prior study who did not report participating in sports had a much greater likelihood of having bad posture than those who did.(3) This study was in stark contrast since it found no connection between playing competitive sports and having bad posture.

RECOMMENDATIONS

By controlling risk factors, we can decrease the risk of lumbar curve variations.

Future studies use another sampling technique to get more accurate results.

Although current study was conducted in a single district so, it is recommended that future studies collect data from different districts or at provisional level.

LIMITATIONS

The single study setting was the limitation of study .Data was collected from one district only. Current study includes not only Non probability convenient sampling technique.

V. CONCLUSION

Lumber curve variations in females after postpartum period was varying in both groups (Group A=with epidural anesthesia vs Group B=without epidural anesthesia) but this variation was not observed statistically significant.

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None.

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