

# Hamstring Muscle Tightness and Chronic Low Back Pain an Analytical Study on General Population

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## ABSTRACT

**Background:** The low back is a common disorder prevalent in general population having an association with hamstring tightness which needs to be addressed while its prevention or management strategies. The objective was to find if there is any link between CLBP severity and hamstring muscle tightness.

**Methods:** A cross-sectional analytical study was carried out on 160 patients with persistent LBP, fulfilling the criteria of the study. After ethical approval, data was gathered from Ayesha Sadiqa Hospital Lahore. The low back pain disability index was measured using Oswestry Disability Index and Hamstring tightness was evaluated using clinical Active knee extension test. The data were analysed using SPSS V.23 and Chi square was used to determine association between outcomes.

**Result:** There were 160 participants, among them 114 (71.25%) experiencing hamstring tightness and 46 (28.75%) not having hamstring tightness. Females had a greater prevalence than males. The findings suggest that hamstring tightness affected 61% patients with moderate impairment. There was an association of hamstring tightness with disability Index among the participants at p Value <.01.

**Conclusion:** In subjects with back pain, hamstring tightness has an association with activities of daily life other than sexual preferences, community interactions, and journey. The chronic low back pain has direct association with hamstring muscle tightness in our target population.

**Keywords:** Association, Chronic Low Back Pain, Hamstring Muscle, Tightness

## INTRODUCTION

The muscular tension above the inferior glutei folds and below the regional coastal border is referred as LBP (Low back Pain), while CLBP lasts longer than 12 weeks.<sup>1</sup> Low back pain may be classified into three categories severe, moderate, and dull according to a recent cohort.<sup>2</sup> The incidence of LB is lower in males than in females, but the prevalence of "incapacitating LBP" is substantially higher in males than among the females.<sup>3</sup> Knee pain is also responsible for 71.2% of CLBP cases, with the most prevalent symptoms being decreased physical function and psychological distress.<sup>4</sup> It is estimated that more than 70% of young individuals would have LBP at least once in their lives. Many people suffer from terrible back pain at some point in their lives due to any reason that can be a direct or an indirect source. A large number of people suffer from back discomfort that is not well defined and this is the reason that leads to poor management. This eventually leads to impairment, i.e. being bedridden or having a reduction of the activities of daily livings.<sup>5</sup> The rising number of occurrences with back pain debility is a point of consideration.<sup>6</sup> The Chronic LBP was thought to be caused by the lack of hamstring flexibility during the movements of hip and knee, and considered linked to reduced flexibility in hamstring flexibility in several studies.<sup>7</sup> A reported significant difference in hamstring muscle length between those with CLBP and people who have no or irregular low back pain.<sup>8</sup> There is evident association between prior periods of chronic LBP and SLR (straight leg raising) measures in teenage boys, but not in adolescent females.<sup>9</sup> According to another study, those with or without LBP had the same straight-leg raising measures. The reason can be, hamstring tightness that leads reduction in normal extensibility that can result in low back pain but as indirect source. The other reason stated is that, due to lumbar pelvic rhythm changes that are associated with sagittal spine curvatures during the flexion of trunk can be causative factor. This compromised forward bending due to hamstrings shortness ultimately lead to an increase in the risk of mechanical stress on the involved lumbar spinal level.<sup>10</sup>

CLBP is a common reason for individuals who used to miss their workdays, they are also afraid that doing any exercise or job may trigger their back pain, therefore they used to prefer leaves rather than job work. Furthermore, individuals avoid exercise and

other leisure activities due to fear of developing back discomfort. Shortening of the hamstring muscle is caused by inactivity, avoidance of exercise or limited activities. This study has focused that the target population has not been studied about the low back pain and its relation with hamstring tightness, which can affect their daily activities. The basic aim is to find an association between hamstring muscle tightness and chronic low back pain in the general population of Faisalabad. The findings will work better for the clinicians and physical therapists to associate the clinical signs with hamstring muscles while management of low back pain and its associated factors.

## MATERIAL AND METHODS

A cross-sectional design was adopted, and purposeful sampling was used to recruit participants from the population. The study was started after ethical approval from the Ayesha Sadiqa Hospital Lahore. A total of 160 people were included in the study. The sample comprised 160 participants from Faisalabad. Those subjects who had a history of low back pain more than 03 months, both gender, between the ages of 30-55 years, non-pregnant ladies having chronic low back pain. The participants over 55 years, any systemic disorders diagnosed, recent undergone surgery in last 06 months, congenital deformity, psychological issues and females with pregnancy or any history of recent fall were excluded. They signed the consent form that they are agreed to participate in the study. Individuals who did not meet the inclusive criteria were excluded from the study. Each of the individuals in the study goes through a screening procedure to find the most variables and factors that might influence the study's outcomes. All of the participants were asked to fill out a questionnaire. They were guided about the responses so that they can understand them. All scientific and medical terms were well explained. The Active Knee Extension test was used for hamstring flexibility assessment, which has good interrater reliability Of 0.87 for dominant knee, test-retest reliability was 0.78-97 for one rater and it has an agreement was 93% within 10 degrees of AKE assessments.<sup>11</sup> LBP was assessed using the ODI, we have categorized participants as; mild disability (0% to 20%) moderate disability (21% to 40%) severe disability ( 41% to 60%) partial disability (61%- 80%, and complete disability ( 80% to 100%

effected). <sup>12</sup>All the data was handled confidentiality and entered in SPSS V.23 Pearson chi-square test was used to find the association between outcomes of interest.

**RESULTS**

There were 160 participants included where 111 (69%) females and 49 (31%) men. In this study, 114 (71%) of the 160 participants reported hamstring stiffness, whereas 46 (29%) did not felt it. (Table .No.1)

Table 1: Demographic Details

	Category	Frequency (%age)
Gender	Male	49(31%)
	Females	111 (69%)
Marital status	Married	67 (41.87%)
	Un-Married	93 (58.12%)
Body Mass Index	Normal	23 (14.75%)
	Over weight	84 (52.5%)
	Obese	53(33.12%)
Socioeconomic Status	Upper	04 (2.5%)
	Middle	106 (66.25%)
	Lower	50(31.25%)
AKE test (Active Knee Extension)	Positive	114 (71%)
	Negative	46(29%)

In current study the participants had 149 (71%) were having Tightness on AKE test, where 92(80.70%) were females 22 (19.29%) were males. The 28.75%participants had mild, 38.21% had moderate and 21.87% had severe, while only 10% had disability according to Oswestry disability outcome measures. (Table No.2)

Table 2: Disability Index across Gender

Gender	Disability Index				
	0%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Female	20	48	29	12	2
Male	26	13	6	4	0
Sum (Frequency and %age)	46 (28.75%)	61(38.21%)	35 (21.87%)	16 (10%)	29(1.5%)

Mild disability (0% to 20%) moderate disability (21% to 40%) severe disability ( 41% to 60%) partial disability (61%- 80%, and complete disability ( 80% to 100% effected).

The p values for hamstring tightness and ADLs such as pain level, strolling, sitting position, standing position, napping, and self-care are less than the selected alpha (=0.05), indicated association of hamstring tightness with routine activities but travelling , social life and sexual life was not effected due to hamstring tightness (Table 3)

Table 3: Descriptive statistics for ODQ

Sub-Section	Mean	SD	P-Value
Pain Intensity	2.41	1.20	0.014
Walking	2.84	1.08	.0003
Lifting	3.43	1.54	0.007
Sitting	3.21	1.21	0.002
Personal Care	2.56	1.21	0.002
Standing	3.12	1.21	0.001
Travelling	2.79	1.19	0.096
Sleeping	1.68	.89	0.001
Social Life	2.69	1.29	0.055
Sex Life	3.25	2.42	0.056

**DISCUSSION**

CLBP has been linked to muscular stiffness in the back of the thigh in patients, according to this study. Gender has a crucial impact in the onset of low back pain. Many factors thought to be connected in inducing low back pain. One of the cause of LBP is a tightness in hamstring group of muscles. This study was carried out on 160 patients with persistent LBP, in Faisalabad to find link between

CLBP severity and hamstring muscle tightness which increases the likelihood. There is a link between hamstring tightness and % disability. We found that hamstring tightness has an association with activities of daily life other than sexual preferences, community interactions, and journey. Females are more likely than males to be disabled as a result of low back pain, and this is related to anatomical differences between males and females. Females are more likely to experience low back discomfort because their bones have a lower mineral density, which can lead to disorders.<sup>13</sup>The prevalence of LBP in females and males is equal; however, the variations in results are dependent on demographic differences in the Nordic population, as well as demographic differences in other settings and their link with pain.<sup>14</sup>Females have substantially more hamstring tightness than males. CLBP patients are more likely to have hamstring tightness. Housewives were more impacted by hamstring stiffness than other vocations, where 64 % of the women felt hamstring tightness were housewives.<sup>15</sup>

In current study 28.75%participants had mild, 38.21% had moderate and 21.87% had severe, while only 10% had disability, while more than half of the effected were females in our study. According to this study, there is a link between hamstring tightness and percentage disability.

In current study, Hamstring tightness was seen in 19.29%, 42% of the subjects with moderate disability and 26.31% of the subjects with severe disability, 12(10.52%) of the individuals with crippled had hamstring tightness. The CLBP and hamstring stiffness in teenagers are also linked, according to a study on LBP 23 % of the children and 33 % of the adolescents reported it positive In this study, there was a link between CLBP and hamstring tightness in teenagers men, but no such link was seen in adolescent females or children (boys or girls), but they had not stated wither it was associated to obesity or other factors, <sup>16</sup>but the results were in contrast to our study because our study has more effected females compared to males. The mean hamstring length was 76.51±9.80, demonstrating significant association (p=.0001) .The across gender results had shown that hamstring flexibility and mean disability was present in target population at moderate impairment level.<sup>17</sup>

The muscle tightness can be a significant, but an indicator of the undue stress that can lead to poor extensibility. In thigh muscle stretchiness with LBP, suggest that mechanical LBP and stiffness in the back of thigh muscle may be linked to each other. But dominance of leg can be an associated factor that right lower limb flexibility was greater than left lower limb flexibility (P=0.002). The lower limit of the dominant limb was more flexible than the lower limit of the non-dominant limb (P=0.013). The respondents' ODQ scores were linked to hamstring tightness in the right down leg (p=0.039) and the left down limb (p=0.048), and negative was linked to potential variance between the R and L extremities (p=0.091). <sup>18</sup> But this was beyond the discussion of the current study, but it cannot be ignored. The decreased lumbar curvature inducing tightness in the back thigh muscle can be a predictors of LBP. The LBP can be due to limited side flexion movement confined hamstring range of motion and lessened lumbar curvature. <sup>19</sup> The influence of back thigh muscle in the pelvic girdle, lumber, and trunk ROM in LBP is studied by Jadre et al. (2015).According to another research, pelvic tilt among individuals back pain had less pelvic girdle mobility and trunk flexion available Range, but greater in the lumber area during backward turns.<sup>20</sup>

This study was single centred and we have focused effected daily working activities among general population. The sample size, gender variations and demographic variations can affect the external validity that can warrant results.

**CONCLUSION**

The low back pain disability index has stated that it has direct association with Hamstring tightness (with p=0.001) depending upon the gender, where more females were involved compared to

males. But sexual, social and travelling were not associated according to the current study results.

**Disclaimer:** None to declare

**Conflict of Interest:** None to declare

**Funding Disclosure:** None to declare

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