

Original Research Article

Impact of work and working conditions on chronic low back pain among fisher women: a cross sectional study in Trivandrum

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ABSTRACT

Background: This study aimed to estimate the prevalence of chronic low back pain, its severity and associated factors among fisherwomen.

Methods: Cross-sectional survey conducted among 336 fisherwomen aged 18-49 years from 7 fishing villages in Trivandrum. The prevalence of chronic low back pain estimated using Nordic body map. Pain severity was assessed using the pain numeric rating scale.

Results: Prevalence of chronic low back pain was 45%. High BMI, UTI history, stress-induced headaches, falls, physical abuse, water-collection frequency, work-experience, and standing duration were associated with chronic low back pain. The pain severity prevalence was 23.8% mild, 51.65% moderate and 24.5% severe. Income, continuous-standing, improper-seating, and stipulated rest-time were associated with severity of chronic low back pain. Standing continuously and improper seating were predictors of pain severity.

Conclusions: Low back pain is common among fisherwomen contributed by work-related behavior. Posture correction measures such as educating the fisherwomen on appropriate posture and need for relaxation will improve their health conditions. Improved working environments which include proper resting place, designated space for vending with proper seating arrangement with chairs and with back support will improve the LBP status of fisherwomen.

Keywords: Fisherwomen, Low back pain, Occupational health, Work environment

INTRODUCTION

Globally, Low back pain (LBP) is the most common musculoskeletal problem among all age groups in men and women and prevalent in different occupations.¹⁻³ According to WHO, LBP accounts for 37% of risk factors that are associated with their occupations.⁴ Multiple medical conditions, lifestyle factors such as obesity, smoking, lack of exercise, increasing age, psychological factors, and mechanical stresses are considered as risk

factors for LBP.^{5,6} Additionally, the physiological risk factors contribute to the higher prevalence of LBP among women.⁷⁻⁹ Ignoring Chronic Low Back Pain (CLBP) can result in disability or other serious medical conditions.¹⁰ A systematic review reported the prevalence of back pain among the elderly ranged from 13% to 51%.¹¹ A global review of the prevalence of LBP in the adult general population reported the point prevalence as approximately 12%, with a one-month prevalence of 23%, and a lifetime prevalence of 40%.⁵ The relationship between occupational risk factors and LBP is not a simple

problem to study because exposure is difficult and at times impossible to quantify.¹⁰ The sitting behavior, task, seat height and inclination, backrest position, shape and inclination, and other supports all influence seated posture. The increased spinal load due to static sitting, loads generated on the spine due to bending and lifting activities are risk factors for LBP.¹² Many occupations including handloom, agriculture, brickfield, fishing and fish processing and others which have occupational exposures such as lifting, particularly in awkward postures; heavy lifting; repetitive lifting, fixed postures and long periods of sitting leads to low back pain.^{3,13-16}

The fisherwomen had to adopt all these faulty postures as part of their work. Women who are actively engaged either in door-to-door marketing or in fish markets or roadsides, engaged in fish processing- dry fish making, fish slicing, grading, packing are called fisherwomen.^{17,18} In India, among 1.5 million people working in the post-harvest sector, women make about 48% of the entire labor force.¹⁵ These fisherwomen are responsible for household management and financial management in a fishermen's family along with fishing activities.¹⁹ They have become prominent entrepreneurs in the fish processing industry in various nations because of the need for manual dexterity in selling and processing seafood, which includes activities such as sorting, grading, peeling, gutting, slicing, and so on.²⁰ Previous studies found that women fish vendors have to juggle physically demanding tasks both at domestic and work front and these contributed to LBP.^{19,21} Kerala has a 590 km long coastal area spread out among 222 fishing villages.²² total population of fishing villages in Trivandrum Corporation is 73,874.²³ Studies on CLBP among fisherwomen are scarce in general and the same for Trivandrum. Thus the objective of this paper was to estimate the prevalence of CLBP and its severity among fisherwomen and also to study the factors associated with them.

METHODS

This was a cross sectional study conducted during January to September 2022. The coastal areas of Trivandrum Corporation in Kerala consisted of 16 fishing villages. From the 16 villages 7 were selected randomly. For the selected seven villages, a list of fisherwomen was generated. The elderly women were excluded from the list, because age and postmenopausal status are the most common risk factors for osteoporosis.^{5,24} among the selected women cross-sectional surveys were conducted among fisherwomen aged 18-49 years and in total 336 were included. The coastal population of Thiruvananthapuram Corporation was calculated as 70,000 and also 28 percent of them are fisher folk which can be around 20,000.^{22,23} considering fisher women comprise 50% of fisher folk population, the finite population correction for sample size calculation was made with 10000.

With the anticipated LBP prevalence of 42% with the anticipated LBP prevalence of 42%, and an absolute precision of 5%, a design effect of 1, the sample size at a 95% confidence interval was estimated to be 361.⁶ it was rounded to 360. But, only 336 women in the selected age group were found to be engaged in fishing related activities. The tool consisted of basic socio demographic details along with medical history, anthropometry, work related information such as work experience, duration of work per day, days of work in a week, walking distance with fish loaded baskets, average weight of fish load carried, type of seating utensils while vending at markets or roadsides, back support during vending or fish drying activities, and designated stipulated time for rest during the work.

The tool also included the Nordic Body Map to identify the region of pain. Nordic body map is a simple ergonomic measuring tool which is in the form of a simple image that helps in identifying the region of musculoskeletal disorders. Through the Nordic body map, the muscles that experience pain can be identified by the participants by marking the respective body part.²⁵ Interviews continued for those who marked pain in their lower back region. Certain questions were used to assess whether the LBP is chronic or not. Those who were found to have chronic low back pain were administered Pain Numeric Rating Scale (PNRS) which is a practical index in assessing pain severity.²⁶ It is an 11-point scale (0–10) for rating the pain intensity. As there is a day to day fluctuation in chronic low back pain an average number on a scale from 0-10 (11-point scale) for current pain, best, worst and usual pain in last week was marked according to the participant's response.²⁶ The average rating of PNRS from zero to four considered mild pain, five to six considered moderate, and seven to ten considered as severe.²⁷ The anthropometric measurements were assessed using a common measuring tape for height and Seka 813 machine for weight respectively by the first author who is trained in measurements for chronic diseases.

Ethical approval was given by the Institutional Ethics Committee (IEC) of Sree Chitra Tirunal Institute for Medical Sciences and Technology (Ref no: SCT/IEC/1829/JANUARY/2022). SPSS version 20 was used for data cleaning and data analysis. Pearson Chi-square for bivariate analysis and Fisher exact test for bivariate analysis for those variables which had cells less than five and binary logistic regression for multivariate for analyzing chronic low back pain and associated factors. The same method was followed for analyzing Pain severity.

RESULTS

The mean age of the fisherwomen was 43 years (± 5.66) and the median monthly family income was Rs.12000 with an inter quartile range of 8000. Only 58% of participants owned houses and 17% lived with relatives

or camps. All women were married, and nearly 1/4th were widows. The mean work experience of fisherwomen was 10.83 years (1-42 years). Fisherwomen community mostly doesn't have drinking water at their homes. They collect water from public taps and other external sources like neighborhoods, water supplies through lorry, water cans, and others. Among the fisherwomen in our study, 23% had to walk to fetch drinking water. Based on BMI calculation, only 30% have a BMI between 18.5 to 24.9 which is considered as healthy weight.

The prevalence of musculoskeletal pain (MSP) in any joints is found to be 278 (82.7%) and LBP based on the Nordic body map was found to be 183 (54.5%). Chronic LBP was assessed using two methods and those satisfied with either one was classified as chronic LBP (CLBP). Initially with two questions on LBP duration and frequency was administered.²⁸ If the participant is experiencing pain for greater than three months or at least half the days in the past six months or the occurrence of a minimum of 25 episodes of LBP in the last one year were classified as having CLBP.²⁸⁻³⁰ From that 32 (9.5%) reported having acute and 151 (44.94%) were CLBP. Using the PNRS, it determined that 36 (23.8%) had mild, 78 (51.65%) moderate, and 37 (24.5%) severe CLBP. For further analysis, moderate and severe have been merged into one category.

Activities associated with occupation were long-distance walking, weight-carrying, continuous standing or sitting, frequent bending forwards and work without rest. The activities engaged were house to house marketing (48%), market fish selling (28%), road-side fish selling (22%),

fish curing, fish processing, factory works, fish cutting, and engaged in marketing the fishes online by using 'WhatsApp'. The mean fishing job time was 7.17 hours (± 2.91). Nearly half (48%) of them carried a heavy load of fish and walked daily. The average fish-load weight was 18 kgs (1-60). Mean distance walked was 5 kilometers (2-12). Only 12% had back-support for sitting at work.

Determinants of CLBP

Pearson Chi-square test was performed to find the associated factors with CLBP, the variables included were age, marital status, family type, education status, drinking water source, whether the respondent collects water herself, frequency of water collection, distance walked to collect water, the volume of water collected, monthly family income, house ownership type, health insurance status, BMI category, menopause status, the status of gynecological illness, status of varicose vein, headache, history of fall, work experience, previous job if any, nature of jobs, whether standing for a longer duration, whether sitting continuously for longer duration, quantity of head load carried, whether walking with head load, distance walked with load, bending while work, use of back support, number of days worked in a week, type of chair or utensils used for sitting during work, having a stipulated time for rest during at work. The variables that were having a p value of 0.05 and below were considered to be statistically significant (Table 1).

Table 1: Factors associated with status of CLBP (Pearson chi-square test).

Variable	Category	n=336	CLBP N (%)	No CLBP N (%)	P value
Per capita income	3500 and below	196	98 (50)	98 (50)	0.027
	More than 3500	140	53 (37.9)	87 (62.14)	
BMI	<25 kg/m ²	111	39 (35.1)	72 (64.9)	0.012
	≥ 25 kg/m ²	225	112 (49.8)	113 (50.2)	
UTI in last six months	Yes	47	30 (63.8)	17 (36.2)	0.006
	No	289	121 (41.9)	168 (58.1)	
Frequent headache	Yes	49	33 (67.35)	16 (32.65)	0.001
	No	287	118 (41.11)	169 (58.88)	
History of fall	Yes	204	105 (51.5)	99 (48.5)	0.003
	No	132	46 (34.8)	86 (65.2)	
BMI	<25 kg/m ²	111	39 (35.1)	72 (64.9)	0.12
	≥ 25 kg/m ²	225	112 (49.8)	113 (50.2)	
UTI in last six months	Yes	47	30 (63.8)	17 (36.2)	0.006
	No	289	121 (41.9)	168 (58.1)	
Frequent headache	Yes	49	33 (67.35)	16 (32.65)	0.001
	No	287	118 (41.11)	169 (58.8)	
History of fall	Yes	204	105 (51.5)	99 (48.5)	0.003
	No	132	46 (34.8)	86 (65.2)	
Physical abuse from partner	Yes	161	86 (53.4)	75 (46.58)	0.003
	No	175	65 (37.1)	110 (62.9)	
Water collection frequency (n=76)	2 times or less	34	10 (29.41)	24 (70.58)	0.044

Continued.

Variable	Category	n=336	CLBP N (%)	No CLBP N (%)	P value
Work experience	More than 2 times	42	22 (52.38)	20 (47.62)	0.005
	8 year or less	175	66 (37.7)	109 (62.3)	
Previous job	More than 8 year	161	85 (52.8)	76 (47.2)	0.093
	No job	221	94 (42.5)	127 (57.5)	
	Domestic help	91	49 (53.8)	42 (46.15)	
Fishing job time	Other jobs	24	8 (33.3)	16 (66.6)	0.096
	6 hour and above	236	113 (47.9)	123 (52.2)	
	Less than 6 hour	100	38 (38)	62 (62)	
Market based marketing	Yes	93	39 (41.9)	54 (58)	0.493
	No	243	112 (46.1)	131 (53.9)	
Fish cutting alone	Yes	5	0 (0)	5 (100)	0.067 (f)
	No	331	151 (45.62)	180 (54.4)	
Time for house to house marketing	4 hour or less than 4 hour	103	45 (43.7)	58 (56.31)	0.069
	Greater than 4 hour	58	34 (58.6)	24 (41.38)	
Continuous walking with weight	Yes	160	78 (48.8)	82 (51.25)	0.181
	No	176	73 (41.5)	103 (58.5)	
Prolonged sitting	Yes	198	92 (46.5)	106 (53.5)	0.501
	No	138	59 (42.8)	79 (57.25)	
Prolonged standing	Yes	69	22 (31.9)	47 (68.12)	0.014
	No	267	129 (48.3)	138 (51.7)	
Taking weight more than 15 minutes	Yes	164	79 (48.2)	85 (51.83)	0.245
	No	172	72 (41.9)	100 (58.14)	
Walking with weight	≥5 km	84	41 (48.8)	43 (51.2)	0.877
	<5 km	84	40 (47.6)	44 (52.4)	
Working days per week	≤3 days	28	18 (64.3)	10 (35.71)	0.089
	4 or 5 days	83	34 (41)	49 (59)	
	≥5 days or above	225	99 (44)	126 (56)	

f: Fisher's exact test.

Table 2: Factors associated with pain severity.

Variable	Category	N	Pain severity (%)		P value
			Moderate/severe	Mild	
Income	<Rs.12000	81	68 (84)	13 (16)	0.016*
	>Rs.12000	70	47 (67.1)	23 (32.9)	
Work experience	8 year or less	66	19 (28.8)	47 (71.2)	0.209
	More than 8 year	85	17 (20)	68 (80)	
Back support	Yes	17	6 (35.3)	11 (64.7)	0.240 (f)
	No	134	30 (22.4)	104 (77.6)	
headache	Yes	33	5 (15.2)	28 (84.8)	0.185
	No	118	31 (26.3)	87 (73.7)	
Continuous standing for longer duration as part of job	Yes	22	12 (54.5)	10 (45.5)	0.010*
	No	129	103 (79.8)	26 (20.2)	
Keep stipulated time for rest while work	Yes	106	73 (68.9)	33 (31.1)	0.001**
	No	45	42 (93.3)	3 (6.7)	
Seating equipment	Proper	23	13 (56.5)	10 (43.4)	0.038*
	Non proper	66	52 (78.78)	14 (21.2)	

* p value <0.05, ** p value <0.005, f: Fisher's exact test.

The pain severity is classified to mild and moderate/severe. In such a way moderate/severe pain category can be considered as a higher degree case and mild pain category can be considered as lesser degree. All

the factors checked in association for CLBP also included to check association with pain severity. The Pearson chi square test has performed with these and the results are given in Table 2.

Even though logistic regression for CLBP hasn't shown any significant association, it found significant associations were found with pain severity (Table 3). Based on the Chi square analysis four factors that were found to be significantly associated with the pain severity were included in the regression model. Binary Logistic Regression analysis was done using the Enter method, only two variables were significantly associated with the pain severity, while allotted stipulated time for rest was

found to be closer to significance and monthly income was not significantly associated. Based on the regression model, fisherwomen who were not standing continuously for long while working had 8.12 times more risk of having moderate to severe low back pain compared to fisherwomen who stood for long. Those who are not using proper seating during work have a 4.5 times risk of having moderate to severe low back pain compared to those who use proper seats.

Table 3: Logistic regression for pain severity and associated factors.

Variable	Category	CLBP severity (moderate-severe/ mild)			
		Unadjusted Odd's ratio		Adjusted Odd's ratio	
		OR (95% CI)	P value	OR (95% CI)	P value
Allotted stipulated time for rest during work	Yes	1	0.004	1	0.050
	No	6.33 (1.83-21.9)		5.34 (1-28.54)	
Continuous standing for longer duration as part of job	Yes	1	0.013	1	0.006
	No	3.30 (1.29-8.48)		8.12 (1.82-36.26)	
Seating equipment	Proper	1	0.042	1	0.013
	Non proper	2.56 (1.18-5.56)		4.49 (1.37 -14.71)	

*Model summary log likelihood - 83.301a, Cox & Snell R Square - 0.205, Nagelkerke R Square - 0.298

^aEstimation terminated at iteration number 5 because parameter estimates changed by less than 0.001.

DISCUSSION

The CLBP prevalence among fisherwomen is 45%, which is higher than the studies conducted among coastal women which is 42% prevalence and female fish processing factory workers which is 33%.^{6,15} However, the LBP prevalence was higher among female brickfield workers (70%) and agricultural workers (81%).^{3,13} It shows that low back pain in any profession that demands physical labor needs immediate attention. In the present population half of fisherwomen with CLBP reported moderate pain severity and 1/4th each was with mild and severe pain, and it is in confirmation by the rural Puducherry study (as both studies have same prevalence).⁶

The fisherwomen in our study have an average work experience of 10 years. The direct association between CLBP with work experience is similar to the findings of study conducted in fish cutting units of Karnataka.³¹ Thus, work experience has a significant impact on LBP. The previous studies found that the Fisherwomen in India work for 6 hours and it is similar in the present study which found average daily fishing work as 7 hours.³² In a study conducted among agriculture workers, the average working time was 10-14 hours and had a prevalence of LBP as 81% confirms the actual prevalence of LBP is directly proportional to the number of working hours.³ It depicts that more working hours can cause more LBP. The repetitiveness of work-door-to-door vending, prolonged sitting, and lifting heavy loads positively contributed to LBP. Fetching water was another factor that caused low back pain, emphasizing the provision of drinking water conditions to address the LBP among fisherwomen. The present study found people who had

BMI above 25 were having more LBP and women with a lesser income had more pain severity. This finding is in confirmation by the National Health Survey of Iran.³³ Statistically, the higher BMI status, which is obesity, is considered to be one of the causes for LBP.^{5,12}

Psychosocial stress, falls, and physical abuse contributed to LBP are reported in several studies and the present study findings are in agreement with that.^{12,34} The intimate partner violence, occurrence of fall with head loads while house to house fish marketing and having frequent headaches for which the psychological stress is a major reason are found to be major problems in the present fisherwomen community. Addressing these factors along with work related factors are needful in raising better quality of life for fisherwomen. The fisherwomen who have allotted designated stipulated time for rest experienced milder LBP than those who did not allocate. It shows the importance of a better work environment for fisherwomen. A cross-sectional study conducted among fish processing workers in the western province of India found standing for a longer duration causes a higher prevalence of LBP.¹⁵ The present study's finding is contrary to the above as the present study had women who were either standing or sitting position while engaging in fishing activities. The women who sell fish in standing positions can move around, change their posture, and take a break for stretching can promote their spinal flexibility as compared to those fisherwomen who continuously adapt to other positions like sitting for marketing/bending for dry fish making activities. The present study found proper seating equipment reduces pain severity. Sitting on chairs or selling fish on Auto-rickshaw can help to provide adequate lumbar support and make it easier to stand, stretch and walk. Thus, the

proper seating has a very relevance in reducing pain severity.

The pain was measured using a standard PNRS scale in this study. The assessment of pain score was only based on the respondents self-reporting. Also, the recall period for the pain frequency was 1 year. This might have some bias on the measurement.

CONCLUSION

The LBP is found to be a generic problem among the fisherwomen that needs immediate attention. About half of the fisherwomen experience LBP while majority of them reported to have moderate to severe LBP. Factors such as the duration of work, sitting posture, and lifting load were contributing to LBP. The other factors such as obesity also cause LBP. The work-related behavior such as rest, back support is also playing an important role in LBP. Construction of designated space for vending with proper seating arrangement with chairs with back support will improve the LBP status of fisherwomen. In addition a proper resting place will reduce the LBP among fisherwomen. Educating the fisherwomen on relaxation, on appropriate posture will improve their health conditions.

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