

# RISK FACTORS ASSOCIATED WITH LOW BACK PAIN IN MARINES TREATED BY THE OUTPATIENT CLINIC OF THE CENTRO MÉDICO NAVAL

FACTORES DE RIESGO ASOCIADOS A LA LUMBALGIA EN MARINOS ATENDIDOS POR CONSULTORIO EXTERNO DEL CENTRO MÉDICO NAVAL

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## ABSTRACT

**Objective:** To determine the risk factors associated with low back pain in Naval personnel attended by an outpatient of the hospital Naval Medical Center in Lima in 2017. **Methods:** Cases and controls study that included 66 cases and 132 controls, obtaining the information from medical records of the personnel of the Peruvian Navy in activity attended by an outpatient of physical medicine and rehabilitation through a validated data collection form. For the calculation of the chi-square and the p-value; logistic regression was used to estimate the Odds Ratio (OR) and CI 95%. **Results:** Of the total population, the male sex was 90.4%, the median age was 26 years (IR: 36-77). The presence of low back pain was associated in the multivariate analysis with overweight / obesity (OR = 2.24; 95% CI:1.16-4.28) and dyslipidemia, (OR = 2.00; 95% CI:1.47-5.66). **Conclusion:** The presence of low back pain in naval personnel is associated with overweight / obesity and dyslipidemia.

**Key words:** Low Back Pain; Risk factors; Naval personnel; Health behavior (source: MeSH NLM).

## RESUMEN

**Objetivo:** Determinar los factores de riesgo asociados a la lumbalgia en marinos atendidos por consultorio externo del hospital Centro Médico Naval en Lima del año 2017. **Métodos:** Estudio observacional, analítico, retrospectivo, de casos y controles que incluye a 66 casos y 132 controles, obteniendo información de las historias clínicas del personal en actividad de la Marina de Guerra del Perú, atendidos por consultorio externo de medicina física y rehabilitación del hospital Centro Médico Naval a través de una ficha de recolección de datos validada. Se calculó la prueba de chi cuadrado y el valor de p; para la estimación de los Odds Ratio (OR) se utilizó la regresión logística. **Resultados:** Del total de la población, el sexo varón fue de 90,4 %, la mediana de la edad fue de 26 años (RI: 36-77). La presencia de lumbalgia se asoció en el análisis multivariado a: sobrepeso / obesidad (OR =2,24; IC 95%: 1,16 – 4,28) y dislipidemia, (OR =2,89; IC 95%:1,47 – 5,66). **Conclusión:** La lumbalgia en el personal naval está asociada a la presencia de sobrepeso / obesidad y dislipidemia.

**Palabras clave:** Dolor de la región lumbar; Factores de riesgo; Personal naval; Conductas relacionadas con la salud (fuente: DeCS BIREME).

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## INTRODUCTION

Low back pain is one of the most common conditions in musculoskeletal pathologies, affecting the lower back area, and can occur at any age, gender, and social stratum. Generally, it has a benign course and its interest is focused on its high frequency, social, labor and economic repercussions<sup>(1)</sup>. It is characterized by pain that presents itself in an acute form and over time can become chronic, it can also generate some degree of functional limitation and even lead to the impossibility of making any movement<sup>(2)</sup>. Pain in the lower back is one of the most common reasons of medical consultation and medical rest worldwide. It is said that low back pain affects eight out of ten people and, according to studies, it can hurt people's quality of life, affecting their work activities and even their daily activities<sup>(3)</sup>.

Low back pain has a high prevalence because it affects a large number of people around the world. 80% of the population will suffer from low back pain at least once in their lifetime<sup>(1)</sup>, and even more, people who use their musculoskeletal system to carry out physical activities such as marines who are constantly subjected to high physical loads due to the high demand for training they exercise. In addition to certain risk factors that amplify the possibility of suffering from this condition. The low back pain is one of the musculoskeletal disorders that causes the greatest disability in the Armed Forces<sup>(4)</sup>. For this reason, documenting the variable behavior such as age, gender, military service time, overweight or obesity and dyslipidemia, leads us to awaken interest to investigate this problem<sup>(5)</sup>.

The idea of investigating low back pain and its risk factors will allow us to transmit a knowledge base on this subject, identifying the factors that increase the risk of suffering it, as has been explained above. This study aims to identify the risk factors of low back pain in marines attended by the outpatient clinic of Naval Medical Center Lima in 2017.

## METHODS

An analytical, observational and retrospective case-control study was conducted. The sample consisted of 66 medical records of marines attended by an external Physical Medicine and Rehabilitation clinic with a diagnosis of low back pain (66 cases) and 132 medical records of marines attended by an external Physical Medicine and Rehabilitation clinic who were randomly selected without a diagnosis of low back pain (132 controls), belonging to the Naval Medical Center of patients over the age of 18 and under the age of 70. Incomplete medical records were excluded.

The data collection from medical records was carried out in the Medical Records office of the Naval Medical Center, exhaustively and meticulously, removing incomplete information for various reasons.

The dependent variable was the diagnosis of low back pain which is in the clinical history. The independent variables were age, length of service, gender, nutritional status and the presence or absence of dyslipidemia.

The data were collected through a data collection sheet and then transcribed into a computer database in Excel 2010 to do this research study.

The chi-square test, with confidence intervals, and the p-value were used for statistical analysis. Logistic regression was used to estimate ORs. Relative and absolute frequency distributions were also presented. Data processing was performed with SPSS 24 and Excel 2010 software.

## RESULTS

Of the total population, there were 66 cases and 132 controls, the most common gender was male with 179 individuals representing 90.4%, the median age was 26 years (36-77 years), 99 patients attended were overweight and 32.8% presented dyslipidemia. All this can be seen in table 1.

**Table 1.** General characteristics of the marines attended at the Naval Medical Center.

	Frequency (Percentage)
<b>Gender</b>	
Male	179 (90.4)
Female	19 (9.6)
<b>overweight or obesity</b>	
Yes	99 (50.0)
No	99 (50.0)
<b>Obesity</b>	
Yes	26 (13.1)
No	172 (86.8)
<b>Dyslipidemia</b>	
Yes	65 (32.8)
No	133 (67.1)
Age	44 (36 – 57)*
Length of time	26 (18 – 37)*
BMI	24.95 (23.8 – 27.4)*

\*Median and interquartile range.

In the bivariate analysis of factors associated with low back pain, a statistically significant association was found between the variables of overweight,

dyslipidemia, age and time of service. The p-values and their ORs can be seen in table 2.

**Table 2.** Bivariate analysis of factors associated with low back pain in marines attended at the Naval Medical Centre.

	Low Back Pain		P-value (Prueba de U de Mann-Whitney)	OR (IC 95%)
	Yes 66 (33,3 %)	No 132 (66,6 %)		
<b>Gender</b>				
Male	57 (31.8%)	122 (68.1%)	0.172	0.51 (0.19 - 1.34)
Female	9 (47.3%)	10 (52.6%)		
<b>overweight or obesity</b>				
Yes	40 (40.4%)	59 (59.6%)	0.035	1.90 (1.04 – 3.47)
No	26 (26.2%)	73 (73.7%)		
<b>Obesity</b>				
Yes	10 (38.4%)	16 (61.5%)	0.552	1.29 (0.55 – 3.03)
No	56 (32.56%)	116 (67.4%)		
<b>Dyslipidemia</b>				
Yes	30 (46.1%)	35 (53.8%)	0.007	2.30 (1.24 – 4.29)
No	36 (27.0%)	97 (72.9%)		
Age	43 (35 – 50)*	45 (37 – 59)*	0.029**	0.97 (0.94 – 0.99)
Service Time	24 (16 – 32)*	28 (19 – 40)*	0.013**	0.97 (0.94 – 0.99)
BMI	26.05 (23.7 – 28.1)*	24.7 (23.9 – 27.2)*	0.071**	1.10 (1.02 – 1.20)

\*Median and interquartile range.

\*\*Mann-Whitney U-test.

The variables that were associated in the bivariate analysis were introduced in the multivariate model, using

logistic regression. The ORs adjusted to their respective 95% confidence intervals can be seen in table 3.

**Table 3.** Multivariate analysis of factors associated with low back pain in seafarers attended at the Naval Medical Center.

Variable	P Value	Adjusted OR	CI 95%
Age	0.326	1.05	0.94 – 1.16
Service time	0.073	0.91	0.81 – 1.00
Overweight or obesity	0.015	2.24	1.16 – 4.28
Dyslipidemia	0.002	2.89	1.47 – 5.66

## DISCUSSION

Low back pain is a very common musculoskeletal condition worldwide<sup>(6)</sup>. Although it is a benign pathology that in most cases remits spontaneously, there is a group in which it can persist over time<sup>(3)</sup>, becoming chronic or affecting the quality of life of those who suffer it and their job performance<sup>(7)</sup>. There are risk factors that favor the presence of low back pain, some of which are influenced by ergonomics, among other factors; however, there are few national and international studies on low back pain and the risk factors associated with it in the military population, which is also prone to this condition because of the type of work they do during their military career<sup>(4)</sup>.

It is important to recognize the risk factors that increase the likelihood of suffering from low back pain, especially the most common ones, such as age, gender, and overweight or obesity. In the Naval Medical Center, these factors were evaluated in the period from January to December 2017, as well as other factors such as time of military service and dyslipidemia, a variable in which association has been found as a risk factor for low back pain in some studies.

In our study, a significant and inverse association was obtained between age and low back pain, being the young adult population the most affected. This result agrees with several studies carried out in military populations; such as the one described in Honduras, where the most frequent age group was from 31 to 45 years old<sup>(8)</sup>, in Ecuador, where the most frequent age group was from 30 to 39 years old, with 49%<sup>(9)</sup>, and in the United States, where it was found that the incidence ratio for the age group over 40 years old in comparison with the group from 20 to 29 years old was 1.28 (95% CI: 1.27-1.29)<sup>(10)</sup>. As for the studies that

were carried out in the Peruvian military population, we have Bernedo Llerena A, who specified that in his study population, the average age was 34,2 years<sup>(11)</sup>, the study of Tejada EJ, where it was found that the frequent age range where low back pain occurred was between 40 and 49 years (39,45%)<sup>(12)</sup>, the study of Cáceres Álvarez ME, where it was found that ages ranging from 41 to 60 represented 42.31%<sup>(13)</sup>, and finally the study of Ramírez Köhler S, where it was specified that the average age of patients with low back pain was  $41.4 \pm 4.45$ <sup>(14)</sup>.

On the other hand, there are studies in which young age predominates in the military with low back pain, like the study carried out in Ecuador, where the most frequent age range was from 23 to 27 years because young people are subjected to more demanding training<sup>(15)</sup> and the study of Rodríguez Vargas DM carried out in Arequipa where it was found that the most frequent age range was between 18 and 20 years, with 88%<sup>(16)</sup>.

As the gender factor, it was obtained in the bivariate analysis a predominance in the male gender, but not in the multivariate, unlike the results of other studies where the male gender predominated, as in the studies of Macias DD with 90.4%<sup>(9)</sup>, Pinto Romero MR et al. with 60.1%<sup>(8)</sup> and many other authors<sup>(11-15)</sup>. This may be because these studies were carried out in a military population where the prevalence of males was higher than the prevalence of females. In our study, there was no association between low back pain and gender as the results were not significant. This contrasts with what was found in an American study where it can be observed that women in comparison with men had a significantly higher incidence rate for low back pain, of 1.45 (95% CI: 1.44-1.46)<sup>(10)</sup>.

Concerning the variable military service time, it did not prove to be statistically significant, therefore no association was found between military service time and the presence of low back pain. This contrasts with the study carried out in Arequipa, where it was evident that the highest percentage of patients with low back pain (43%) were between 6 and 12 months in military service, 31% had less than 6 months and 26% had more than 12 months in military service<sup>(16)</sup>. Another cross-sectional study was carried out in Canada, it was found that older police officers had a higher prevalence of chronic low back pain (adjusted OR, 1.06; 95% CI, 1.01-1.12)<sup>(17)</sup>.

Regarding overweight or obesity, our study found that most patients with low back pain had a body mass index (BMI) above the parameters of normality, so it was statistically significant. This means that the BMI is associated with the presence of low back pain, so people who have a BMI higher than the normal range have a greater risk of suffering from it. This is comparable to the research of Ramírez Köhler S, who through a transversal study, found that 54.3% of patients with low back pain were overweight and so it was considered a risk factor for the development of low back pain<sup>(14)</sup>. Likewise, in the study by Bernedo Llerena A, it was described that 35.97% of military personnel were overweight and 7.19% were obese<sup>(11)</sup>. On the other hand, Shiri R. et al. performed a meta-analysis of 33 studies where it was demonstrated that the obesity condition increased the risk of suffering from low back pain in 12 months (OR: 1.53; 95% CI 1.22-1.92)<sup>(18)</sup>.

Finally, as the dyslipidemia variable, our study found that 36 of the patients did not present it and 30 patients did. When analyzing this frequency statistically, it was found that dyslipidemia is a highly significant risk factor and is associated with low back pain, so anyone with a lipid disorder has a greater risk of suffering from low back pain. This result is compatible with a study carried out in Finland, as the results were positive after an analysis of triglycerides and serum cholesterol in patients with localized or diffuse chronic low back pain<sup>(19)</sup>. Years earlier, this finding was also referred to in a prospective study in the United States, in which they document a positive association between the concentration of triglycerides and low back pain referred by retired patients who have worked as office workers<sup>(20)</sup>.

A study was carried out in Mexico, in which it was found that the absence of dyslipidemia had a protective effect (OR 0.26, 95% CI: 0.12 to 0.56) as the absence of

dyslipidemia reduced the risk by up to 74% according to the OR expressed by the logistic model; in other words, the presence of any type of dyslipidemia would be a risk factor for chronic low back pain<sup>(18)</sup>.

If it is accepted that there is an association between dyslipidemia and low back pain, it could be sustained pathophysiologically through the development of atheromatosis in the lumbar arteries. This effect would be given by the reduction of the blood supply to the lumbar region which would induce degeneration of the vertebral discs, giving changes in their anatomy<sup>(19)</sup>, in other words, atherosclerosis of the lumbar vessels has been suggested as a mechanism that leads to lumbar pain<sup>(18)</sup>. Finally, this reinforces the existing association between obesity, not only as a risk factor mechanism but as an art of a metabolic syndrome capable of damaging the histology of the arteries preventing a correct function, in this case, of the lumbar arteries<sup>(20)</sup>.

The limitations of the present study lie in its design of cases and controls as low back pain is a relatively common disease but of slow appearance, so it would be advisable to carry out subsequent cohort studies to determine the risk factors in the military population.

## CONCLUSION

In conclusion, low back pain in the military personnel of the Central Military Hospital is associated with age, gender, nutritional status, and dyslipidemia.

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