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Clinical approach to chronic low back pain among medical specialists

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ABSTRACT

Introduction: Low back pain is a common reason for disability in patients younger than 45 years old who visit physicians. Although there are many attitudes toward treating back pain, there is no commonly accepted approach. This study compared various attitudes toward the examination, diagnosis, and treatment of chronic low back pain among neurologists, neurosurgeons, and orthopedic surgeons.

Methods: In this cross-sectional study, a checklist including four main aspects of history taking, clinical and para-clinical tests, and treatment of chronic low back pain was designed to be completed by 45 specialists (orthopedic surgeons, neurosurgeons, and neurologists).

Results: Straight Leg Raising (SLR) was the most frequent test during the examination process. The high priorities among the para-clinics were MRI, lumbosacral graph, EMG-NCV, serology lab test, and CT scan, respectively. A significant difference was found in requesting lumbosacral graph among specialties. Moreover, the priorities for nonsurgical treatment were NSAIDs, nonpharmaceutical treatment, muscle relaxants, gabapentin, and corticosteroids, respectively.

Conclusion: History taking, physical examination, diagnostic approaches, and treatments were significantly different among the different specialties. The results revealed the need for consensus on common and well-established guidelines for a clinical approach to chronic low back pain.

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Introduction

Low back pain is the leading cause of disability among individuals under the age of 45, the second most common reason for seeking medical attention, and the third most frequent cause of surgery [1]. Approximately 84% of adults experience low back pain throughout their lifetime [2]. While some patients achieve partial relief within a month and can resume their daily activities, others continue to suffer from pain for more than a year, leading to significant limitations in daily functioning [3, 4]. The prevalence of chronic low back pain is about 4.2% among individuals aged 24 to 39 years, rising to 19.6% among those aged 20 to 59 years. Furthermore, the prevalence steadily increases from the third decade of life onward[5].

Low back pain is classified into three categories based on its duration: acute (lasting less than 4 weeks), subacute (lasting 4-12 weeks), and chronic (lasting more than 12 weeks) [6]. When underlying causes such as infection, fracture, and tumor are excluded, chronic low back pain is defined as pain persisting for over three months [7].

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Treatment of low back pain imposes an enormous financial burden on healthcare systems, given the costs associated with its methods of treatment. Other considerations, ranging from work absenteeism to the lowered quality of life, add to the economic impact a person with the condition suffers [8, 9]. Despite the crucial need for proper management, there is still no consensus on the most effective treatment for low back pain due to the range of available methods [10]. Patients with chronic low back pain are often referred by family physicians to specialists such as orthopedic surgeons, neurosurgeons, or neurologists. Sometimes, this referral process can be confusing for both patients and the referring physicians. Additionally, differences in diagnostic and treatment approaches among specialties due to the lack of specific guidelines, exacerbate this challenge. Therefore, unified protocols for diagnosing and treating chronic low back pain are urgently needed. This can help reduce costs and eliminate confusion within the healthcare system. Given the importance of this issue, further studies are needed to explore specialists' approaches and evaluate the long-term effectiveness of each proposed method. These findings can support better decision-making in managing this condition. The current study was done to define the diversity or uniformity among medical specialists from various fields on the approach to low back pain.

Materials and methods

Study design

This cross-sectional field study was conducted in specialist outpatient clinics in Mashhad, Iran between June 2017 and July 2022. A researcher-made checklist, specifically developed for this study including the information on patient history, physical examinations, para-clinical assessments, and non-surgical treatments of patients with low back pain (See Additional file 1). Two medical specialists from orthopedic surgery, neurosurgery, and neurology departments evaluated, corrected, and confirmed the checklist. Then, three groups of clinical specialists- orthopedic surgeons, neurosurgeons, and neurologists- completed the checklist.

A total of 45 doctors participated in the study and were assigned to three groups of 15 physicians from each specialty. Approximately half of the participants were university faculty members, while the remainder were practicing experts from private centers. This research was approved by the organizational ethics committee of the faculty of medicine at Mashhad University of Medical Sciences under the code IR.MUMS.fm.REC.1396.02

Statistics

Data analysis was conducted using SPSS version 16. Quantitative data were summarized as means and standard deviations (SD), while categorical data were presented using tables. Given the absence of similar prior studies, this pilot study employed a convenience sample of 15 physicians per group, for 45 participants. After analyzing all the data, $p < .05$ was considered statistically significant.

Results

In this study, 45 clinicians (15 orthopedic surgeons, 15 neurologists, and 15 neurosurgeons) evaluated approaches to the examination, diagnosis, and treatment of chronic low back pain based on a checklist that included patient history, physical examination, requested paraclinical assessments, and treatment methods.

Patient History

Table *1* presents the frequency of responses regarding the necessity of specific patient history elements as reported by specialists. Among all questions, the most frequently asked was about the location of symptoms (100%), while psychological status and mental illnesses were the least frequently examined (48.9%). In addition, there was no significant difference between specialties in the type of questions asked during patient interviews (P value > 0.05).

Table 1. Frequency of Common Medical Questions in Specialist Interviews

Checklist questions/tips reviewed by physicians		Orthopedic surgeons	Neurologists	Neurosurgeons	Total	P- value
Chief complaint	Always	15 (100)	14 (93)	15 (100)	44 (98)	
	Sometimes	0	1 (7)	٠	1 (2)	0.99
	Never	٠	0	٠	0	
Severity of symptoms	Always	14 (93)	14 (93)	15 (100)	43 (95.6)	
	Sometimes	1 (7)	1 (7)	٠	2 (4.4)	0.99
	Never	0	0	0	0	
paresthesia	Always	12 (80)	13 (87)	15 (100)	40 (88.9)	
	Sometimes	2 (13)	2 (13)	٠	4 (8.9)	0.45
	Never	1 (7)	0	0	1 (2.2)	
Psychological status and mental illnesses	Always	5 (33)	10 (67)	7 (47)	22 (48.9)	
	Sometimes	9 (60)	5 (33)	8 (53)	22 (48.9)	0.28
	Never	1 (7)	0	٠	1 (2.2)	

When the main problem started	Always	14 (93)	14 (93)	15 (100)	43 (95.6)	
	Sometimes	1 (7)	1 (7)	۰	2 (4.4)	0.99
	Never	۰	۰	۰	0	
Location of symptoms	Always	15 (100)	15 (100)	15 (100)	45 (100)	
	Sometimes	۰	۰	۰	۰	-
	Never	۰	۰	۰	۰	
Occupation of the patient	Always	11 (73)	11 (73)	9 (60)	31 (68.9)	
	Sometimes	4 (27)	4 (27)	6 (40)	14 (31.1)	۰/۷۸
	Never	۰	۰	۰	۰	
Associated symptoms	Always	8 (53)	13 (87)	9 (60)	30 (66.7)	
	Sometimes	7 (47)	2 (13)	6 (40)	15 (33.3)	0.12
	Never	۰	۰	۰	۰	

Physical Examination

The necessity of specific physical examination based on the patient's main complaint is summarized in Table *2*. Across specialists, the Straight Leg Raise (SLR) test and gait analysis were the most consistently performed tests. Significant differences were observed in performing tests such as plantar flexion (P= 0.03), patellar reflex (P= 0.02), and the Babinski reflex (P= 0.049). Neurologists were the most likely to assess plantar flexion and patellar reflex, while neurosurgeons were less consistent in these tests. Moreover, no significant differences were found for SLR, toe extension/flexion, knee and hip range of motion, dorsiflexion, and gait analysis (P>0.05)

Table 2. Frequency distribution of the necessity of physical examinations according to the physicians under study

Physical examination		Orthopedic surgeons	Neurologists	neurosurgeons	Total	P-value
Gait Analysis	Always	11 (73)	11 (73)	9 (60)	31 (69)	
	sometimes	3 (20)	4 (27)	4 (27)	11 (24)	0.77
	Never	1 (7)	0	2 (13)	3 (7)	
Straight Leg Rise test (SLR)	Always	12 (80)	10 (66)	9 (60)	31 (69)	
	sometimes	3 (20)	4 (27)	6 (40)	13 (29)	0.51
	Never	۰	1 (7)	۰	1 (2)	
Hip Range of Motion	Always	8 (53)	7 (47)	5 (33)	20 (44)	
	sometimes	7 (47)	7 (47)	7 (47)	21 (47)	0.43
	Never	0	1 (6.7)	3 (20)	4 (9)	
Knee Range of Motion	Always	7 (47)	3 (20)	4 (27)	14 (31)	
	Sometimes	6 (40)	10 (67)	7 (47)	23 (51)	0.46
	Never	2 (13)	2 (13)	4 (27)	8 (18)	
Patellar Reflex	Always	4 (27)	12 (80)	8 (53)	24 (53)	
	sometimes	8 (53)	3 (20)	3 (20)	14 (31)	0.02*
	Never	3 (20)	0	4 (27)	7 (16)	
Plantar Flexion	Always	11 (73)	12 (80)	5 (33)	28 (62)	
	sometimes	4 (27)	3 (20)	9 (60)	16 (36)	0.03*
	Never	0	0	1 (7)	1 (2)	
Dorsiflexion	Always	9 (60)	9 (60)	9 (60)	27 (60)	1
	sometimes	6 (40)	6 (40)	6 (40)	18 (40)	
	Never	۰	0	۰	۰	
Toe Flexion	Always	7 (47)	4 (27)	6 (40)	17 (38)	
	sometimes	6 (40)	9 (60)	6 (40)	21 (47)	0.79
	Never	2 (13)	2 (13)	3 (20)	7 (15)	
Toe Extension	Always	11 (73)	7 (47)	9 (60)	27 (60)	
	sometimes	3 (20)	7 (47)	6 (40)	16 (36)	۰/۴۰
	Never	1 (7)	1 (7)	۰	2 (4)	
Babinski Reflex	Always	2 (13)	7 (47)	5 (33)	14 (31)	
	Sometimes	7 (47)	8 (53)	6 (40)	21 (47)	0.05*
	Never	6 (40)	0	4 (27)	10 (22)	

Paraclinical Assessments

The use of paraclinical tests among specialists, including MRI, CT scan, EMG/NCV (electromyography/nerve conduct velocity), radiography, and serology tests is displayed in Table 3. MRI was the most commonly requested first-priority test (60%). No specialists prioritized CT scans or serological tests. In addition, remarkable differences were found in the prioritization of radiography requests (P<0.01). Neurologists were less likely to prioritize radiographs compared to orthopedic surgeons and neurosurgeons. More information is provided in Table 3 and Figure 1.

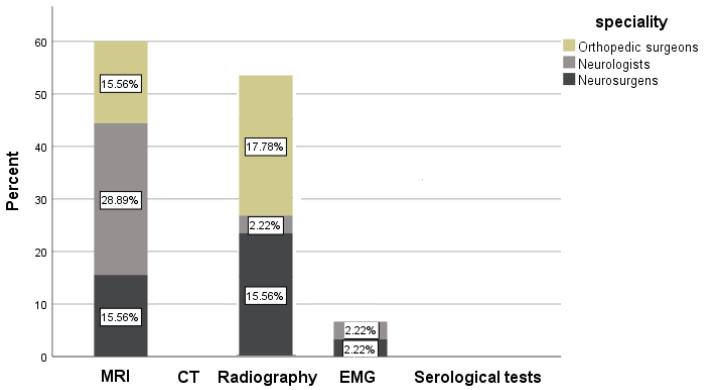

Figure 1. Frequency of first paraclinical priority among specialists

Table 3. Frequency distribution of the priority of requesting paraclinical procedures according to the physicians under study

Para-clinics		Orthopedic surgeons	Neurologists	Neurosurgeons	Total	P-value
MRI	Priority	7 (47)	13 (87)	7 (47)	27 (60)	0.07
	Second priority	5 (33)	0	6 (60)	11 (24)	
	Third priority onwards	3 (20)	2 (13)	2 (13)	7 (16)	
CT scan	Priority	0	0	0	0	0.06
	Second priority	1 (7)	2 (13)	0	3 (7)	
	Third priority onwards	12 (80)	5 (33)	11 (73)	28 (62)	
Radiography	Priority	8 (53)	1 (7)	7 (47)	16 (36)	<0.01
	Second priority	3 (20)	0	7 (47)	10 (22)	
	Third priority onwards	3 (20)	9 (60)	0	12 (27)	
EMG/NCV	Priority	0	1 (7)	1 (7)	2 (4)	0.06
	Second priority	4 (27)	9 (60)	1 (7)	14 (31)	
	Third priority onwards	10 (67)	5 (33)	12 (80)	27 (60)	
Serological tests	priority	0	0	0	0	0.06
	Second priority	2 (13)	5 (33)	1 (7)	8 (18)	
	Third priority onwards	13 (87)	8 (53)	14 (93)	35 (79)	

Non-Surgical Treatments

According to the analysis of the treatments observed in this study, as presented in **Error! Not a valid bookmark self-reference.**, nonsteroidal of anti-inflammatory drugs (NSAIDs) were the predominant first-line treatment (75%), followed by non-drug treatments such as physiotherapy and water therapy (20%). Notably, anti-inflammatory drugs such as corticosteroids were rarely request used as first-line treatments. Furthermore, no significant treatment priorities were found among specialists (P>0.05).

Table 4. Frequency distribution of non-surgical treatment priority requests according to the physicians under study

Treatments		Orthopedic surgeons	Neurologists	neurosurgeons	Total	P-value
NSAIDs	priority	13 (87)	11 (73)	10 (67)	34 (75)	0.38
	Second priority	2 (13)	1 (7)	3 (20)	6 (13)	
	Third priority onwards	0	3 (20)	2 (13)	5 (11)	
Corticosteroids	priority	0	0	0	0	0.26
	Second priority	1 (7)	2 (13)	0	3 (6)	
	Third priority onwards	10 (67)	9 (60)	14 (93)	33 (73)	
Muscle relaxants	priority	0	1 (7)	3 (20)	4 (8)	0.89
	Second priority	7 (47)	1 (7)	4 (27)	12 (26)	
	Third priority onwards	7 (47)	11 (73)	8 (53)	26 (57)	
Gabapentin	priority	0	1 (7)	0	1 (2)	0.64
	Second priority	2 (13)	2 (13)	2 (13)	6 (13)	
	Third priority onwards	11 (73)	12 (80)	12 80)	35 (77)	
Nondrug treatments	priority	2 (13)	3 (20)	4 (27)	9 (20)	0.97
	Second priority	3 (20)	9 (60)	5 (33)	17 (38)	
	Third priority onwards	10 (67)	3 (20)	6 (40)	19 (42)	

Discussion

This study aimed to assess the degree of diversity versus uniformity in how medical specialists approach the diagnosis and treatment of chronic low back pain (CLBP). Our findings revealed substantial variations across different specialties, reinforcing the need for standardized clinical protocols.

The key findings of the current study are:

Patient History: While symptom location was universally assessed (100%), mental health evaluation was inconsistently performed (48.9%), despite recommendations from the College of Medicine and the American Pain Association (2007) to consider underlying psychological disorders in medical history. This omission may be due to time constraints and high patient loads, but given the impact of psychosomatic conditions, a more integrated approach is necessary [11].

Physical Examination: Specialists exhibited significant variability in performing key diagnostic tests, including plantar flexion ($P = 0.03$), patellar reflex ($P = 0.02$), and Babinski reflex ($P = 0.049$), with neurologists being the most thorough. The Straight Leg Raise (SLR) test—a reliable method for detecting disc herniation—was most frequently performed by orthopedic surgeons, whereas neurosurgeons had the lowest rate of use, highlighting differences in practice patterns [١٢].

Paraclinical Assessments: MRI was the most frequently requested first-line diagnostic test (60%), while radiography usage varied significantly among specialists ($P < 0.01$), with neurologists deprioritizing radiographs compared to orthopedic surgeons and neurosurgeons. Guidelines generally recommend imaging only for patients over 50 years old or those with suspected systemic disease [13].

Treatment Strategies: NSAIDs were the predominant first-line treatment (75%), followed by non-drug interventions such as physiotherapy and water therapy (20%). Corticosteroids were rarely prioritized, in line with conservative treatment recommendations [14][14, 15]. However, our findings suggest a lower preference for nonpharmacological treatments, likely due to longer recovery times and higher costs, limiting patient acceptance [16, 17].

Our results contrast with those of Rodoni P-Y et al. (2018), where physiotherapy was the most frequently prescribed treatment (99.2%), followed by NSAIDs (97.4%) and acetaminophen (94.4%). Complementary therapies such as yoga (69.3%) and massage therapy (63.9%) were more widely adopted, particularly by female physicians for younger patients (<56 years old) [18].

A 2017 systematic review by Machado et al. found that while NSAIDs provide short-term relief for CLBP, their long-term effectiveness is limited due to side effects, reinforcing the importance of nonpharmacological interventions, including basic physiotherapy [19].

International guidelines increasingly recommend nonpharmacological approaches as first-line treatments, shifting NSAIDs and opioids to secondary options when conservative measures fail [20, 21]. However, patient preferences—driven by cost concerns and expectations for rapid symptom relief—may hinder broader adoption of non-drug therapies.

Scientific communities emphasize the need to expand research in CLBP management, focusing on primary prevention strategies, timely musculoskeletal disorder diagnosis, optimized cost-effectiveness of diagnostics and treatments, multidisciplinary treatment approaches, incorporating both pharmacological and interventional methods [22].

While our study provides valuable insights, a few limitations should be acknowledged:

Incomplete medical records led to the exclusion of certain patients, potentially affecting data accuracy. Small sample size may limit the generalizability of findings. Comparability with previous studies is challenging due to the scarcity of research on specialist practice patterns in CLBP management.

Conclusion

This study underscores the significant variability in clinical approaches to chronic low back pain (CLBP) across medical specialties, reinforcing the need for unified guidelines to optimize patient management. Our findings revealed major inconsistencies in patient history evaluation, physical examinations, and diagnostic priorities. Despite established recommendations emphasizing the inclusion of mental health assessments, psychological status was frequently overlooked, suggesting a gap between guidelines and clinical practice.

Similarly, differences in physical examination techniques and paraclinical assessments highlight the absence of a standardized diagnostic framework. While MRI remains the preferred imaging modality, variations in radiography use further illustrate specialist-dependent decision-making, rather than evidence-based protocols. Treatment priorities also reflected a strong reliance on pharmacological interventions, particularly NSAIDs, while nonpharmacological therapies were underutilized, potentially due to patient preferences, cost concerns, and longer recovery timelines.

These discrepancies align with previous reports that stress the importance of comprehensive, multidisciplinary approaches, emphasizing early

diagnosis, conservative management, and cost-effective interventions. To bridge these gaps, future clinical frameworks should prioritize standardized protocols, enhance physician awareness, and promote patient education on nonpharmacological treatment benefits.

Ultimately, expanding research in CLBP management—particularly in primary prevention strategies, optimizing diagnostics, and refining therapeutic guidelines—will be instrumental in reducing inconsistencies, improving patient care, and ensuring evidence-based decision-making across medical specialties.

Abbreviations

SLR Straight Leg Rise
EMG/NCV Electromyography/Nerve conduct velocity
MRI Magnetic Resonance Imaging
CT scan computed tomography scan
NSAIDs *Non-steroidal anti-inflammatory drugs*

Authors' Contribution

Study concept and design: Ravanshad S. Acquisition of the data: Hajmolarezaee NZ. Statistical analysis: Mehrad-Majd H, Moradi A, and Taherynejad MH. Drafting of the manuscript: Taherynejad MH, Ravanshad Y, Rostami A, Farsi s, Study supervision: Ravanshad S.

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Data Reproducibility

The data are available on reasonable request from the corresponding author.

Declarations

Ethics approval and consent to participate

This study was approved and reviewed by the organizational ethics committee of the faculty of medicine at Mashhad University of Medical Sciences under the code IR.MUMS.fm.REC.1396.02. Informed consent was obtained from all participants. All methods were carried out in accordance with relevant guidelines and regulations. Moreover, the protocol of this study complied with the ethical consideration outlined in 1964 Helsinki Declaration and its later amendments.

Declaration of Helsinki. Consent for publication

Not applicable.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships.

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References

1. Hides JA, Richardson CA, Jull GA. Multifidus muscle recovery is not automatic after resolution of acute, first-episode low back pain. Spine (Phila Pa 1976). 1996 Dec 1;21(23):2763-9. doi: 10.1097/00007632-199612010-00011. PMID: 8979323.
2. Deyo RA, Tsui-Wu YJ. Descriptive epidemiology of low-back pain and its related medical care in the United States. Spine (Phila Pa 1976). 1987 Apr;12(3):264-8. doi: 10.1097/00007632-198704000-00013. PMID: 2954221.
3. Pengel LH, Herbert RD, Maher CG, Refshauge KM. Acute low back pain: systematic review of its prognosis. BMJ. 2003 Aug 9;327(7410):323. doi: 10.1136/bmj.327.7410.323. PMID: 12907487; PMCID: PMC169642.
4. Von Korff M, Saunders K. The course of back pain in primary care. Spine (Phila Pa 1976). 1996 Dec 15;21(24):2833-7; discussion 2838-9. doi: 10.1097/00007632-199612150-00004. PMID: 9112707.
5. Meucci RD, Fassa AG, Faria NM. Prevalence of chronic low back pain: systematic review. Rev Saude Publica. 2015;49:1. doi: 10.1590/S0034-8910.2015049005874. Epub 2015 Oct 20. PMID: 26487293; PMCID: PMC4603263.
6. Chou R. In the clinic. Low back pain. Ann Intern Med. 2014 Jun 3;160(11):ITC6-1. doi: 10.7326/0003-4819-160-11-201406030-01006. PMID: 25009837.
7. Bogduk N. Management of chronic low back pain. Med J Aust. 2004 Jan 19;180(2):79-83. doi: 10.5694/j.1326-5377.2004.tb05805.x. PMID: 14723591.
8. Liao ZT, Pan YF, Huang JL, Huang F, Chi WJ, Zhang KX, Lin ZM, Wu YQ, He WZ, Wu J, Xie XJ, Huang JX, Wei QJ, Li TW, Wu Z, Yu BY, Gu JR. An epidemiological survey of low back pain and axial spondyloarthritis in a Chinese Han population. Scand J Rheumatol. 2009 Nov-Dec;38(6):455-9. doi: 10.3109/03009740902978085. PMID: 19922021.
9. Melloh M, Röder C, Elfering A, Theis JC, Müller U, Staub LP, Aghayev E, Zweig T, Barz T, Kohlmann T, Wieser S, Jüni P, Zwahlen M. Differences across health care systems in outcome and cost-utility of surgical and conservative treatment of chronic low back pain: a study protocol. BMC Musculoskelet Disord. 2008 Jun 6;9:81. doi: 10.1186/1471-2474-9-81. PMID: 18534034; PMCID: PMC2438357.
10. Burton AK, Balagué F, Cardon G, Eriksen HR, Henrotin Y, Lahad A, Leclerc A, Müller G, van der Beek AJ; COST B13 Working Group on Guidelines for Prevention in Low Back Pain. Chapter 2. European guidelines for prevention in low back pain : November 2004. Eur Spine J. 2006 Mar;15 Suppl 2(Suppl 2):S136-68. doi: 10.1007/s00586-006-1070-3. PMID: 16550446; PMCID: PMC3454541.
11. Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians; American College of Physicians; American Pain Society Low Back Pain Guidelines Panel. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med. 2007 Oct 2;147(7):478-91. doi: 10.7326/0003-4819-147-7-200710020-00006. Erratum in: Ann Intern Med. 2008 Feb 05;148(3):247-8. doi: 10.7326/0003-4819-148-3-200802050-00020. PMID: 17909209.
12. Müller-Schwefe G, Morlion B, Ahlbeck K, Alon E, Coaccioli S, Coluzzi F, Huygen F, Jaksch W, Kalso E, Kocot-Kępska M, Kress HG, Mangas AC, Margarit Ferri C, Mavrocordatos P, Nicolaou A, Hernández CP, Pergolizzi J, Schäfer M, Sichère P. Treatment for chronic low back pain: the focus should change to

multimodal management that reflects the underlying pain mechanisms. Curr Med Res Opin. 2017 Jul;33(7):1199-1210. doi: 10.1080/03007995.2017.1298521. Epub 2017 Mar 22. PMID: 28277866.

13. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. Ann Intern Med. 2002 Oct 1;137(7):586-97. doi: 10.7326/0003-4819-137-7-200210010-00010. PMID: 12353946.

14. Koes BW, van Tulder M, Lin CW, Macedo LG, McAuley J, Maher C. An updated overview of clinical guidelines for the management of non-specific low back pain in primary care. Eur Spine J. 2010 Dec;19(12):2075-94. doi: 10.1007/s00586-010-1502-y. Epub 2010 Jul 3. PMID: 20602122; PMCID: PMC2997201.

15. Rodondi PY, Dubois J, Bill AS, Koutaïssoff D, Ros J, Aveni E, Pasquier J, Herzig L, Decosterd I, Burnand B. Primary care physicians' attitude and reported prescribing behavior for chronic low back pain: An exploratory cross-sectional study. PLoS One. 2018 Sep 27;13(9):e0204613. doi: 10.1371/journal.pone.0204613. PMID: 30261029; PMCID: PMC6160127.

16. Qaseem A, Wilt TJ, McLean RM, Forciea MA; Clinical Guidelines Committee of the American College of Physicians; Denberg TD, Barry MJ, Boyd C, Chow RD, Fitterman N, Harris RP, Humphrey LL, Vijan S. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. Ann Intern Med. 2017 Apr 4;166(7):514-530. doi: 10.7326/M16-2367. Epub 2017 Feb 14. PMID: 28192789.

17. Machado GC, Maher CG, Ferreira PH, Pinheiro MB, Lin CW, Day RO, McLachlan AJ, Ferreira ML. Efficacy and safety of paracetamol for spinal pain and osteoarthritis: systematic review and meta-analysis of randomised placebo controlled trials. BMJ. 2015 Mar 31;350:h1225. doi: 10.1136/bmj.h1225. PMID: 25828856; PMCID: PMC4381278.

18. Rodondi PY, Dubois J, Bill AS, Koutaïssoff D, Ros J, Aveni E, Pasquier J, Herzig L, Decosterd I, Burnand B. Primary care physicians' attitude and reported prescribing behavior for chronic low back pain: An exploratory cross-sectional study. PLoS One. 2018 Sep 27;13(9):e0204613. doi: 10.1371/journal.pone.0204613. PMID: 30261029; PMCID: PMC6160127.

19. Machado GC, Maher CG, Ferreira PH, Day RO, Pinheiro MB, Ferreira ML. Non-steroidal anti-inflammatory drugs for spinal pain: a systematic review and meta-analysis. Ann Rheum Dis. 2017 Jul;76(7):1269-1278. doi: 10.1136/annrheumdis-2016-210597. Epub 2017 Feb 2. PMID: 28153830.

20. Koes BW, van Tulder M, Lin CW, Macedo LG, McAuley J, Maher C. An updated overview of clinical guidelines for the management of non-specific low back pain in primary care. Eur Spine J. 2010 Dec;19(12):2075-94. doi: 10.1007/s00586-010-1502-y. Epub 2010 Jul 3. PMID: 20602122; PMCID: PMC2997201.

21. Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians; American College of Physicians; American Pain Society Low Back Pain Guidelines Panel. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med. 2007 Oct 2;147(7):478-91. doi: 10.7326/0003-4819-147-7-200710020-00006. Erratum in: Ann Intern Med. 2008 Feb 05;148(3):247-8. doi: 10.7326/0003-4819-148-3-200802050-00020. PMID: 17909209.

22. Yelin E, Weinstein S, King T. The burden of musculoskeletal diseases in the United States. Semin Arthritis Rheum. 2016 Dec;46(3):259-260. doi: 10.1016/j.semarthrit.2016.07.013. Epub 2016 Jul 26. PMID: 27519477.