bjlm
Brazilian Journal of Lifestyle Medicine
Revista Brasileira de Medicina do Estilo
ISSN 2965-6141

Clinical Assessment and Diagnosis in Lifestyle Medicine

Poor lifestyle syndrome: a new syndromic diagnosis?

Estilo de vida ruim: um novo diagnóstico sindrômico?

Estilo de vida no saludable: ¿un nuevo diagnóstico sindrómico?

Bruno Albuquerque Colontoni[1]; Eduarda Araujo Baras[2]; Nancy Huang[3]; Marcelo Rezende Young Blood[4]

DOI: https://doi.org/10.61661/BJLM.2025.v4.161

ABSTRACT

Introduction: The rise of Noncommunicable Chronic Diseases (NCDs) is closely linked to unhealthy lifestyle habits, reflecting significant sociocultural changes in recent decades. The lack of diagnostic tools to anticipate risks limits effective preventive approaches.**Objective**: To propose and describe the Poor Lifestyle Syndrome as a new syndromic diagnosis based on the analysis of the six pillars of Lifestyle Medicine (LM). **Results**: The Poor Lifestyle Syndrome is defined by insufficiency in at least three of the six LM pillars. The use of simple and validated questionnaires allows healthcare professionals to identify patients at high risk for NCDs even before clinical or laboratory manifestations. **Conclusion**: Recognizing a poor lifestyle as a syndromic diagnosis enhances clinical communication, promotes early interventions, and strengthens preventive health strategies. This concept broadens professional practice, enabling action before the onset of diseases and contributing to the reduction of morbidity and mortality associated with NCDs.

Keywords: life style; diagnosis; syndrome; noncommunicable diseases; surveys and questionnaires.

Authors' affiliation: 1 Grupo Multiprofissional de Reabilitação Intensiva, Médico, Brasil; 2 Universidade Nove de Julho, Brasil; 3 Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, Pesquisadora de pós-doutoramento, Brasil; 4 Universidade Estadual de Ponta Grossa, Chefe do Serviço de Neurologia, Brasil.

Editor-in-Chief responsible for the article: Nancy Huang
Corresponding author:
Eduarda Araujo Baras
E-mail:
eduardaaraujo_baras@hotmail.com
Conflict of interest:
Declare that there is no
Source of funding:
Declare that there is no
CEP Opinion: not applicable
Received: May 29, 2025
Accepted: Sep. 04, 2025
Available online: Sep. 19, 2025

RESUMO

Introdução: O crescimento das Doenças Crônicas Não Transmissíveis (DCNT) está diretamente associado à adoção de estilos de vida não saudáveis, refletindo mudanças socioculturais das últimas décadas. A ausência de ferramentas diagnósticas que antecipem esses riscos dificulta uma abordagem preventiva eficaz. **Objetivo**: Propor e descrever a Síndrome do Estilo de Vida Ruim como um novo diagnóstico sindrômico, baseado na análise dos seis pilares da Medicina do Estilo de Vida (MEV). **Resultados**: A Síndrome do Estilo de Vida Ruim é definida pela insuficiência em pelo menos três dos seis pilares da MEV. A aplicação de questionários simples e validados permite que o profissional identifique pacientes em alto risco para DCNT, mesmo antes da manifestação clínica ou laboratorial das doenças. **Conclusão**: Reconhecer o estilo de vida ruim como um diagnóstico sindrômico facilita a comunicação clínica, promove intervenções precoces e fortalece estratégias de prevenção em saúde. Este conceito amplia a atuação dos profissionais, tornando possível atuar antes do surgimento das doenças, contribuindo para a redução da morbimortalidade associada às DCNT.

Palavras-chave: estilo de vida; diagnóstico, síndrome; doenças não transmissíveis; inquéritos e questionários.

RESUMEN

Introducción: El aumento de las Enfermedades Crónicas No Transmisibles (ECNT) está estrechamente relacionado con hábitos de vida poco saludables, reflejo de cambios socioculturales recientes. La ausencia de herramientas diagnósticas que anticipen estos riesgos limita la eficacia de los enfoques preventivos. **Objetivo**: Proponer y describir el Síndrome de Estilo de Vida Pobre como un nuevo diagnóstico sindrómico, basado en el análisis de los seis pilares de la Medicina del Estilo de Vida (MEV). **Resultados**: El Síndrome de Estilo de Vida Pobre se define por la insuficiencia en al menos tres de los seis pilares de la MEV. La aplicación de cuestionarios simples y validados permite identificar pacientes con alto riesgo de ECNT, incluso antes de la aparición de manifestaciones clínicas o de laboratorio. **Conclusión**: Reconocer un estilo de vida pobre como diagnóstico sindrómico mejora la comunicación clínica, favorece intervenciones tempranas y fortalece las estrategias de prevención en salud. Este concepto amplía el campo de acción profesional, permitiendo intervenir antes del inicio de las enfermedades y contribuyendo a la reducción de la morbimortalidad asociada a las ECNT.

Palabras clave: estilo de vida; diagnóstico; síndrome; enfermedades no transmisibles; encuestas y cuestionarios.

How to cite: Colontoni BA, Baras EA, Huang N, Blood MRY. Poor lifestyle syndrome: a new syndromic diagnosis? Braz J lifestyle Med. 2024;3:1-14. https://doi.org/10.61661/BJLM.2025.v4.161

Introduction

Since the 20th century, humanity has faced challenges brought by technological advancement, economic restructuring, and the creation of a social matrix that transformed the patterns of illness and mortality. Despite the hurdles posed by the COVID-19 pandemic, the success of vaccination strategies has demonstrated our ability to overcome infectious diseases more effectively than Noncommunicable Chronic Diseases (NCDs).

In 1946, the World Health Organization (WHO) defined health as a state of complete well-being and not merely the absence of disease [1]. Accordingly, the evolving epidemiological profile of populations indicates that a poor lifestyle serves as the pathophysiological foundation for most high-morbidity and high-mortality conditions worldwide namely, NCDs [2].

Among the most complex modern diseases, obesity is a prominent example with strong behavioral and lifestyle associations. The social revolution following the events of World War II led to a steady increase in average body weight and a rise in metabolic disorders beginning in the 1960s. Nevertheless, obesity was only recognized as a disease in 1985, and to this day, in the 21st century, it is rarely documented as a diagnosis in medical records [3].

Other lifestyle-related conditions, such as fibromyalgia and chronic pain, also face resistance from healthcare professionals regarding their diagnosis and management especially due to the multifactorial nature of these diseases, which often leads to diagnostic neglect [4-6].

Egger suggests that if meta-inflammation underpins nearly all chronic diseases, then it is essential to understand the anthropogenic drivers of illness. These include poor diet, physical inactivity, substance abuse, loneliness, and mental health disorders related to stress, as well as broader political and economic factors [7].

Understanding the immediate (proximal) causes, the underlying (medial) factors, and the distal determinants allows clinicians to assess patients beyond pathophysiology and recognize how environmental interactions contribute to disease onset.

Drawing on the principles of Lifestyle Medicine (LM) and the organization of life around its six pillars nutrition, physical activity, stress management, sleep, avoidance of risky substances (tobacco and alcohol), and healthy relationships it is plausible to propose that a poor lifestyle constitutes an early clinical syndrome that precedes formal diagnoses. Such a lifestyle pattern can be identified during clinical encounters, even before laboratory or imaging abnormalities arise.

Simply observing unhealthy lifestyle patterns over time without clear diagnostic framing has not been sufficient to prompt effective preventive health strategies.

The ongoing need to develop tools for cardiovascular risk stratification in asymptomatic populations illustrates the limitations of modern science in effectively predicting cardiovascular risk.

In 2023, the American Heart Association introduced the PREVENT score, the most advanced cardiovascular risk calculator to date, incorporating social determinants of health, kidney function, and obesity [8,9]. However, many social components are still framed primarily around poverty, rather than more nuanced psychosocial aspects such as chronic stress, loneliness, or mental health factors [10-12].

Functional capacity and physical inactivity are also not included in cardiovascular risk scores, despite robust evidence linking these variables to prognosis and disease progression [13].

Given these limitations in current risk assessment and prevention strategies, we propose a new diagnosis: Poor Lifestyle Syndrome. It is based on an analysis of the six LM pillars and aims to communicate to patients that even in the absence of disease, there exists a behavioral and physiological substrate likely to culminate in NCDs.

Disease or Syndrome?

Science began defining the concept of disease in the 14th century, when it was considered "a condition of the body or of an organ or part of the body resulting from a specific structural lesion [14]." Over the centuries, there has been no consensus on a universal definition of disease, but the currently accepted concept is that it is the sum of abnormal phenomena in a living organism with a group of common characteristics that may be pathophysiological, etiological, or in the manifestation of symptoms [15].

Within this taxonomic heterogeneity, we can group phenomena and classify them by syndromic descriptions (e.g., sarcoidosis), anatomical morbidity (cancers), pathophysiological (asthma), or etiological (tuberculosis) [16].

Classically, a syndrome is defined as a set of signs and symptoms with an unknown etiology or multiple common origins. A classic example of a syndrome with multiple similar causes is heart failure, which has dozens of possible etiologies, accompanied by different developments and treatment options, and a similar clinical picture.

Based on the understanding of the importance of the pillars of SEM in building clinical reasoning, we define Poor Lifestyle Syndrome as a clinical entity manifested by the insufficiency of three or more of these pillars, objectively measured using recognized tools.

In this syndrome, the goal is to detect a state with a high probability of NCD occurrence, as these criteria are already associated with the onset of such morbidities.

The following paragraphs will define and explain the concepts of Poor Lifestyle Syndrome, helping readers understand the importance and relevance of this new diagnosis in clinical practice. To facilitate its incorporation and application to each patient, assessments and questionnaires will be proposed for each of the pillars of the SEM, based on and validated by current guidelines. The goal of these tools is to enable healthcare professionals to identify and diagnose a poor lifestyle in their patients in an effective, validated, and easily applicable manner.

How to Outline a New Syndrome: Phenotypic Spectrum, Natural History, and Acquisition or Recurrence

Given the robust body of evidence developed within the field of Lifestyle Medicine (LM), it is appropriate to consider that an objective assessment of a patient's lifestyle, and the recognition of a poor lifestyle as a syndromic diagnosis, may serve as a valuable tool particularly for identifying asymptomatic individuals. It acts as an early marker for multiple diseases that could be triggered if the maladaptive lifestyle pattern persists.

By identifying and classifying patients with Poor Lifestyle Syndrome, healthcare professionals can provide anticipatory guidance, initiate early interventions, and potentially prevent the clinical manifestation of chronic diseases. This approach shifts the clinical focus from reactive treatment to proactive health preservation, aligned with the principles of predictive, preventive, and personalized medicine.

The recognition of lifestyle and environmental factors as primary determinants of chronic diseases has led to the need for classifying such conditions within this etiological spectrum. A broad range of diseases are now

known to be significantly influenced by behavioral and environmental variables. Table 1 shows chronic diseases determined by lifestyle and environmental conditions.

Table 1. Chronic diseases determined by lifestyle and environmental conditions

Chronic diseases determined by lifestyle and environmental conditions
Cardiovascular and cerebrovascular disease
Neoplasms with lifestyle-related components
Endocrine diseases
Gastrointestinal diseases
Chronic kidney disease
Diseases related to mental health
Musculoskeletal diseases
Respiratory diseases
Reproductive system diseases
Dermatological diseases
Neurodegenerative diseases

Source: Prepared by the author.

Classification of Poor Lifestyle Syndrome Based on the Pillars of Lifestyle Medicine

The challenge of proposing a new pathological entity lies in establishing specific and objective diagnostic criteria. Over the decades, the diagnostic criteria for diseases and syndromes have been modified in response to emerging scientific findings.

Even syndromes such as metabolic syndrome have multiple classification systems endorsed by different medical societies [17]. Just like obesity and metabolic syndrome, the initial challenge is to demonstrate robust evidence that supports acceptance by the scientific community, and to define diagnostic criteria based on established data.

The International Association for the Study of Pain (IASP) successfully advocated for the inclusion of chronic pain in the ICD-11 as a syndrome, defined by its biological, psychological, and social determinants [18].

Broadly defining the syndrome using general criteria does not invalidate the detailed approaches of LM, in which each pillar can be assessed using more comprehensive tools. However, for clinical diagnosis purposes, an excess of detailed questions and questionnaires may hinder practical application by healthcare providers.

The International Board of Lifestyle Medicine (IBLM), together with the American College of Lifestyle Medicine and affiliated organizations, provides validated and objective assessment tools. The compilation of these tools forms the basis for clinical reasoning that supports the proposal of this new syndromic diagnosis [19].

Such criteria must be concise, validated, and effective to ensure clinical utility. Therefore, we propose the following questionnaires to assess each LM pillar:

Physical Activity

Among all LM pillars, physical activity is the only one formally validated and classified as a vital sign. It is sufficiently concise to assess whether this pillar is adequate or insufficient.

In this tool, the clinician asks the patient about the average weekly duration (in minutes) of moderate or vigorous physical activity. If the patient reports less than 149 minutes per week, they are classified as physically insufficient. If they report more than 150 minutes, they are considered sufficiently active.

Although the American College of Sports Medicine provides detailed qualitative exercise recommendations by age group including balance and strength training for specific populations the "Physical Activity as a Vital Sign" (PAVS) tool is suitable for diagnostic screening purposes due to its simplicity [20]. As described in Table 2.

Table 2. Physical Activity Questionnaire

Question	Classification
"Do you engage in less than 149 minutes of physical activity per week?"	Insufficiently active
"Do you engage in more than 150 minutes of physical activity per week?"	Sufficiently active

Source: Exercise is Medicine. [20].

Sleep

Among the many validated tools for sleep assessment, the Single-Item Sleep Quality Scale (Table 3) offers a simplified approach [21]. It asks:"How would you rate the overall quality of your sleep over the past 7 days, on a scale from 1 (terrible) to 10 (excellent)?".

Table 3. Sleep Questionnaire

Question	Classification
"How would you rate your sleep quality over the past 7 days on a scale from 1 (terrible) to 10 (excellent)?"	Score lower than 7: insufficiently adequate sleep
	Score higher than 7: sufficiently adequate sleep

Source: Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. [23].

If the patient reports a score lower than 7, their sleep is considered insufficiently adequate.

Other scales such as the STOP-BANG or the Pittsburgh Sleep Quality Index (PSQI) [22,23] are excellent tools for further investigation and planning interventions. However, due to their complexity, they are not practical as diagnostic criteria for a syndrome.

Social Relationships

This pillar is more complex due to the common reluctance of clinicians to explore social connection themes during consultations.

Among the validated tools available, it is important to consider three core dimensions of social relationships: 1. The existence or frequency of social interactions 2. The structure of these relationships 3. Their functionality and perceived support

The Loma Linda Social Relationship Questionnaire [24] (Table 4) is one of the most suitable instruments for diagnostic purposes, rather than simply evaluating general social support [22].

Table 4. Social Relationships Questionnaire

Question	Classification
"I have people who care about what happens to me" Rate on a scale from 1 (strongly disagree) to 5 (strongly agree).	Score lower than 4: insufficient social connections
"I have people who accept me at my worst and my best" Rate on a scale from 1 (strongly disagree) to 5 (strongly agree).	Score lower than 4: insufficient social connections
"I have people I trust at home or at work with whom I can talk about my problems" Rate on a scale from 1 (strongly disagree) to 5 (strongly agree).	Score lower than 4: insufficient social connections
"I receive help when I am sick" Rate on a scale from 1 (strongly disagree) to 5 (strongly agree).	Score lower than 4: insufficient social connections

Source: American College of Lifestyle Medicine. [24].

It includes four statements rated on a scale from 1 (strongly disagree) to 5 (strongly agree):

1. I have people who care about what happens to me.

2. I have people who accept me at my worst and best.

3. I have someone at home or at work I can talk to about my problems.

4. I receive help when I am sick.

If the response to any of these items is less than 4, the social connections pillar should be considered insufficient. Just as with sleep, further detailed investigation will be required during the treatment phase.

Use of Toxic Substances

Given the variety and complexity of potentially harmful substances, it is essential to use a simple yet validated tool for screening. The NIDA Quick Screen, developed by the National Institute on Drug Abuse (Table 5), is a validated questionnaire that enables initial assessment of the most prevalent substances of abuse including alcohol, tobacco, illicit drugs, and medications used for non-medical purposes [25].

Table 5. Toxic Substances Use Questionnaire

Question	Classification
"In the past year, how often have you used tobacco?" ● Daily (or almost daily) ● Weekly ● Monthly ● Occasionally ● Never	The patient is considered sufficient in this pillar if they answer "never" to all questions. For any other answer, they should be considered insufficient in this pillar.
"In the past year, how often have you used medications without a clinical indication?" ● Daily (or almost daily) ● Weekly ● Monthly ● Occasionally ● Never	The patient is considered sufficient in this pillar if they answer "never" to all questions. For any other answer, they should be considered insufficient in this pillar.
"In the past year, how often have you used illicit drugs?" ● Daily (or almost daily) ● Weekly ● Monthly ● Occasionally ● Never	The patient is considered sufficient in this pillar if they answer "never" to all questions. For any other answer, they should be considered insufficient in this pillar.
"In the past year, how often have you engaged in binge drinking (men > 5 drinks/day, women > 4 drinks/day)?" ● Daily (or almost daily) ● Weekly ● Monthly ● Occasionally ● Never	The patient is considered sufficient in this pillar if they answer "never" to all questions. For any other answer, they should be considered insufficient in this pillar.

Source: National Institute on Drug Abuse. [25].

The core question is: "In the past year, how often have you used the following substances: daily (or almost daily), weekly, monthly, occasionally, or never?"

Abusive alcohol use is defined as five or more drinks in a single day for men, and four or more for women.

A patient is considered sufficient in this pillar only if they answer "never" to all items. Any other response classifies them as insufficient and warrants further evaluation and appropriate treatment.

Stress

The stress pillar encompasses mental health screening. It can be assessed in two main ways [26]: 1. Time-based approach – Analogous to the physical activity metric, it quantifies the time spent weekly on stress management activities. 2. Validated scale approach – The Satisfaction with Life Scale (SWLS), particularly its abbreviated version, is commonly used.

In this tool, the patient rates agreement (on a scale from 1 = strongly disagree to 7 = strongly agree) with the following statements:

a) "In many ways, my life is close to my ideal."

b) "I am satisfied with my life."

Although these responses can be influenced by social determinants not directly related to individual mental health or stress management, this can be seen as an advantage in identifying broader risk factors.

If the patient scores less than 5 on either item, the stress management pillar is considered insufficient and further evaluation is recommended. As per Table 6.

Table 6. Stress Questionnaire

Question	Classification
"In many ways, my life is close to my ideal." Rate on a scale of 1 (lowest) to 7 (highest).	Score < 5 → Insufficient in this pillar
"I am satisfied with my life." Rate on a scale of 1 (lowest) to 7 (highest).	Score < 5 → Insufficient in this pillar

Source: Spitzer RL, Kroenke K, Williams JB, Löwe B. [26].

Nutrition

The nutritional pillar presents a particular challenge, as randomized clinical trials are limited in their ability to precisely quantify nutrient intake and establish exact diagnostic cutoffs.

In this context, the nutrition questions from the Lifestyle Short Form (Table 7) offer a practical and effective screening method. Two central items are assessed [27]:

Table 7. Nutrition Questionnaire

Question	Classification
"In the past two weeks, how often did you eat fast food, sugary drinks (e.g., soda, sports drinks, juice), or packaged foods (e.g., chips, candy, cookies, crackers)?" (a) Not at all (b) Several days (c) More than half the days (d) Almost every day (2)	Answer letter "a": sufficient patient in this pillar Answer letters "b" and/or "c" and/or "d": insufficient patient in this pillar
"On a typical day, how many servings of whole fruits and vegetables do you eat (a serving is about a handful and does not include fruit juice)?" (a) Less than 2 servings (b) 2–3 servings (c) 4–5 servings (d) More than 5 servings	Resposta letra "a": paciente suficiente nesse pilar Resposta letras "b" e/ou "c" e/ou "d": paciente insuficiente neste pilar

Source: Loma Linda University Health. [27].

1 - Frequency of unhealthy food consumption: "In the past two weeks, how often have you consumed fast food, sugary drinks (e.g., soda, sports drinks, juice), or packaged snacks (e.g., chips, candy, cookies)?"

(a) Not at all;

(b) Several days;

(c) More than half the days;

(d) Almost every day.

2. Daily intake of whole fruits and vegetables: "On a typical day, how many servings of whole fruits and vegetables do you consume (a serving is about a handful and does not include fruit juice)?"

(a) Fewer than 2 servings;

(b) 2–3 servings;

(c) 4–5 servings;

(d) More than 5 servings.

If the patient selects any option other than (a) in either question, they are considered insufficient in this pillar. Table 8 presents the criteria for diagnosing Poor Lifestyle Syndrome.

Table 8. Criteria for diagnosing Poor Lifestyle Syndrome

Pilar	Tool	Insufficient	Sufficient	Note
Physical Activity	Physical Activity as a Vital Sign (PAVS)	< 149 minutes per week	> 150 minutes per week	Diagnosis is confirmed if patient is insufficient in 3 or more pillars
Sleep	Single-item Sleep Quality Scale (1-10)	< 7	≥ 7	
Social Relationships	Loma Linda Social Relationship	Any response < 4	> 4	
Toxic Substances	NIDA Quick Screen	Any response other than "Never"	"Never" to all	
Stress	Satisfaction with Life Scale (SWLS) (1-7)	< 5 on either item	≥5	
Nutrition	Lifestyle Short Form	Any answer beyond item (a)	Item (a) on both	

Source: Prepared by the author.

Although there is a validated Brazilian tool that provides more detailed analysis of dietary intake, its complexity may hinder its use for rapid diagnostic screening [28].

Conclusion

Analogous to other clinical syndromes such as metabolic syndrome we may understand the presence of lifestyle-related elements during patient history-taking as semiological signs. These do not necessarily produce symptoms at the time of consultation, but they are scientifically validated predictors of Noncommunicable Chronic Diseases (NCDs), making them highly relevant for clinical reasoning and daily medical practice.

In this context, recognizing a Poor Lifestyle as a syndromic diagnosis is conceptually sound. Similar paradigms have proven successful in the cases of obesity, metabolic syndrome, and chronic pain syndromes.

Therefore, the implementation of structured screening systems for poor lifestyle, using targeted questions to detect insufficiencies in self-care or health behavior, aims to consolidate multiple dimensions into a single result. This enables the clinician to effectively alert the patient, initiate timely lifestyle interventions, and conduct deeper investigations using Lifestyle Medicine tools.

Classifying Poor Lifestyle Syndrome as a diagnosis opens new fields of research, both for the refinement of tools and for strategic decision-making in public health systems. It offers a cost-effective way to enhance prevention, screening, and early treatment of chronic diseases.

Moreover, this framework highlights the importance of incorporating lifestyle history-taking into the education of future health professionals suggesting the integration of curricular disciplines that improve communication skills and increase academic exposure to Lifestyle Medicine principles.

Authors' contribution according to Taxonomia CRediT:

Colontoni BA [1]; Baras EA [6,14]; Huang N [10]; Blood MRY [12].

References

1. GBD 2021 Forecasting Collaborators. Burden of disease scenarios for 204 countries and territories, 2022–2050: A forecast analysis for the Global Burden of Disease Study 2021. Lancet. 2024;403(10440):2204-56. doi:10.1016/S0140-6736(24)00685-8

2. Azzouzi S, Stratton C, Muñoz-Velasco LP, Wang K, Fourtasse M, Hong Bo-Young, Cooper R, Balicuddembe JK, Palomba A, Peterson M, Pandiyan U, Krassioukov A, Tripathi DR, Tuakli-Wosornu YA, Hajjioui B. The impact of the COVID-19 pandemic on healthy lifestyle behaviors and perceived mental and physical health of people living with non-communicable diseases: An international cross-sectional survey. Int J Environ Res Public Health. 2022;19(13):8023. doi:10.3390/ijerph19138023

3. Engin A. The definition and prevalence of obesity and metabolic syndrome. Adv Exp Med Biol. 2017;960:1-17. doi:10.1007/978-3-319-48382-5_1

4. Chinn S, Caldwell W, Gritsenko K. Fibromyalgia pathogenesis and treatment options update. Curr Pain Headache Rep. 2016;20(4):25. doi:10.1007/s11916-016-0556-x

5. Ostovar-Kermani T, Arnaud D, Almaguer A, Garcia I, Gonzales S, Martinez YHM, Surani S. Painful sleep: Insomnia in patients with chronic pain syndrome and its consequences. Folia Med (Plovdiv). 2020;62(4):645-54. doi:10.3897/folmed.62.e50705

6. Kissoon NR. Chronic widespread pain. Continuum (Minneap Minn). 2024;30(5):1427-46. doi:10.1212/CON.0000000000001470

7. Egger G, Dixon J. Beyond obesity and lifestyle: A review of 21st century chronic disease determinants. Biomed Res Int. 2014;2014:731685. doi:10.1155/2014/731685

8. Khan SS, Matsushita K, Sang Y, Ballew SH, Grams ME, Surapaneni A, Blaha MJ, Carson AP, Chang AR, Ciemins E, Go AS, Gutierrez OM, Hwang SJ, Jassal SK, Kovesdy CP, Lloyd-Jones DM, Shlipak MG, Palaniappan LP, Sperling L, Virani SS, Tuttle K, Neeland IJ, Chow SL, Rangaswami J, Pencina MJ, Ndumele CE, Coresh J. Development and validation of the American Heart Association Predicting Risk of Cardiovascular Disease EVENTs (PREVENTTM) equations. Circulation. 2023; 149(6):430-449. doi:10.1161/CIRCULATIONAHA.123.067626

9. Khan SS, Coresh J, Pencina MJ, Ndumele CE, Rangaswami J, Chow SL, Palaniappan LP, Sperling LS, Virani SS, Ho JE, Neeland IJ, Tuttle KR, Singh RR, Elkind MSV, Lloyd-Jones DM. Novel prediction equations for absolute risk assessment of total cardiovascular disease incorporating cardiovascular-kidney-metabolic health: A scientific statement from the American Heart Association. Circulation. 2023;148(24):1982-2004. doi:10.1161/CIR.0000000000001191

10. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. Loneliness and social isolation as risk factors for coronary heart disease and stroke: Systematic review and meta-analysis of longitudinal observational studies. Heart. 2016;102(13):1009-16. doi:10.1136/heartjnl-2015-308790

11. Kivimäki M, Kawachi I. Work stress as a risk factor for cardiovascular disease. Curr Cardiol Rep. 2015;17(9):630. doi:10.1007/s11886-015-0630-8

12. Berger M, Solelhac G, Roche F, Heinzer R. Insomnia, a new modifiable risk factor for heart failure?. Eur Heart J. 2021;42(40):4177-9. doi:10.1093/eurheartj/ehab570

13. Lechner K, Schacky C, Kenzie AL, Worm N, Nixdorff U, Lechner B, Kränkel N, Halle M, Krauss RM, Scherr J. Lifestyle factors and high-risk atherosclerosis: Pathways and mechanisms beyond traditional risk factors. Eur J Prev Cardiol. 2020;27(4):394-406. doi:10.1177/2047487319869400

14. Telles Correia D, Stoyanov D, Rocha Neto, HG. How to define today a medical disorder? Biological and psychosocial disadvantages as the paramount criteria. J Eval Clin Pract. 2022;28(6):1195-204. doi:10.1111/jep.13592

15. Jablonski S. Syndrome a changing concept. Bull Med Libr Assoc. 1992;80(4):323-7. PMID: 1422501; PMCID: PMC225693.

16. Cohen MM. Syndrome designations. Rev Genet Med. 1976;13:266-70.

17. Huang PL. A comprehensive definition for metabolic syndrome. Dis Model Mech. 2009;2(5-6):231-7. doi:10.1242/dmm.001180

18. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, Keefe FJ, Mogil JS, Ringkamp M, Sluka KA, Song XJ, Stevens B, Sullivan MD, Tutelman PR, Ushida T, Vader K. The revised International Association for the Study of Pain definition of pain: Concepts, challenges, and compromises. Pain. 2020;161(9):1976-82. doi:10.1097/j.pain.0000000000001939

19. Keyes D, Huecker M. Lifestyle Medicine: Review of Certifications and Boards. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022.

20. Exercise is Medicine. The physical activity vital sign. Exerciseismedicine.org. 2022 [cited 2025 Jun 7]. Available from: https://www.exerciseismedicine.org

21. Snyder E, Cai B, DeMuro C, Morrison MF, Ball W. A new single-item sleep quality scale: Results of psychometric evaluation in patients with chronic primary insomnia and depression. J Clin Sleep Med. 2018;14(11):1849-57. doi: 10.5664/jcsm.7478

22. Chung F, Abdullah HR, Liao P. STOP-Bang questionnaire: A practical approach to screen for obstructive sleep apnea. Chest. 2016;149(3):631-8. doi:10.1378/chest.15-0903

23. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213. doi:10.1016/0165-1781(89)90047-4

24. American College of Lifestyle Medicine, Loma Linda University. Lifestyle Assessment Long Form. [Internet]. [cited 2022 Aug 1]. Available from: https://www.lifestylemedicine.org

25. National Institute on Drug Abuse. Resource guide: Screening for drug use in general medical settings. [Internet]. 2012 [cited 2025 Feb 12]. Available from: https://www.nida.nih.gov

26. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. Arch Intern Med. 2006;166(10):1092-7. doi:10.1001/archinte.166.10.1092

27. Loma Linda University Health, The American College of Lifestyle Medicine. Lifestyle Assessment Short Form. [Internet]. 2018 [cited 2025 Jun 4]. Available from: https://www.ihacares.com

28. Louzada MLC, Souza TN, Frade EOS, Gabe KT, Patricio GA. QuestNova: innovation in the evaluation of food consumption based on industrial processing. Rev Saude Publica.