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SPINE20 recommendations 2023: One Earth, one family, one future WITHOUT spine DISABILITY

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ABSTRACT

Introduction: The purpose is to report on the fourth set of recommendations developed by SPINE20 to advocate for evidence-based spine care globally under the theme of "One Earth, One Family, One Future WITHOUT Spine DISABILITY".

Research question: Not applicable.

Material and methods: Recommendations were developed and refined through two modified Delphi processes with international, multi-professional panels.

Results: Seven recommendations were delivered to the G20 countries calling them to:

- establish, prioritize and implement accessible National Spine Care Programs to improve spine care and health outcomes.
- eliminate structural barriers to accessing timely rehabilitation for spinal disorders to reduce poverty.
- implement cost-effective, evidence-based practice for digital transformation in spine care, to deliver self-management and prevention, evaluate practice and measure outcomes.
- monitor and reduce safety lapses in primary care including missed diagnoses of serious spine pathologies and risk factors for spinal disability and chronicity.
- develop, implement and evaluate standardization processes for spine care delivery systems tailored to individual and population health needs.
- ensure accessible and affordable quality care to persons with spine disorders, injuries and related disabilities throughout the lifespan.
- promote and facilitate healthy lifestyle choices (including physical activity, nutrition, smoking cessation) to improve spine wellness and health.

Discussion and conclusion: SPINE20 proposes that focusing on the recommendations would facilitate equitable access to health systems, affordable spine care delivered by a competent healthcare workforce, and education of persons with spine disorders, which will contribute to reducing spine disability, associated poverty, and increase productivity of the G20 nations.

1. Introduction

Spine disorders including low back pain, are a leading cause of disability in most countries (Collaborators GBDLBP, 2023). The need to optimize health systems and address the profound and increasing burden of disability associated with spine disorders is well described, yet few policy changes have been achieved. Therefore, there is a need for an advocacy strategy to promote political engagement and facilitate the design of initiatives to reduce the enormous societal burden associated with spine disorders (AlEissa et al., 2021; Roosa et al., 2020).

As the 2030 Agenda for Sustainable Development reaches its midpoint, world leaders prepare for a comprehensive review of the progress made on achieving the 17 Sustainable Development Goals (SDGs) proposed by the United Nations (UN) (UN, 2023 SDG Summit, 2023). However, the unforeseen interlinked crisis that the world is currently undergoing, threatens to delay the milestones determined under SDGs, marking a relapse from the progress made in previous decades. Addressing spine disorders and disabilities aligns with multiple SDGs, including the promotion of good health and well-being, quality education, decent work and economic growth, reduced inequalities, sustainable cities and communities, as well as peace, justice, and strong institutions. The present era of SDGs provides a platform to raise awareness and prioritize the need to improve spine care, given the significant impact on individuals, health services, society, and the global economy.

In 2019, SPINE20, an evidence-based advocacy group dedicated to raising global awareness about spine disorders, was established through the collaboration of four prominent spine care and non-governmental professional organizations: EUROSPINE, the North American Spine Society, the German Spine Society, and the Saudi Spine Society. Currently, 32 national and international societies support the activities of SPINE20 (Table 1). Since its formation, SPINE20 has convened annual meetings with leading international experts to develop evidence-based policy recommendations for G20 governments that can contribute to the progress of achieving the SDGs (Darwono et al., 2022). The primary focus of the initial recommendations made by SPINE20 in 2020 centered on raising awareness of the substantial impact of spinal disorders worldwide (AlEissa et al., 2021). In 2021 and 2022, SPINE20 developed the second and third sets of recommendations to emphasize the importance of several aspects of spine care such as "access to care", "economy", and "rehabilitation" (Darwono et al., 2022; Costanzo et al., 2022). These recommendations sought to actively engage experts, organizations, and governing bodies in identifying strategies to alleviate the burden of spine disorders. In 2023, SPINE20 emphasized that "Implementation and outcomes" were key themes. It is imperative to establish global measures to monitor progress and establish benchmarks for improving spine care within governmental frameworks. The purpose of this paper is to report the fourth series of recommendations developed by the SPINE20 advocacy group with the overarching theme of "**One Earth, One Family, One Future WITHOUT Spine DISABILITY.**"

2. Methods to develop recommendations 2023

2.1. Authors

Members from the SPINE20 'Scientific task force' and

Table 1
Societies participating in SPINE20 (August 2023).

Society	Nations
Australian Physiotherapy Association	Australia
Brazilian Spine Society (BSS)	Brazil
World Federation of Chiropractic	Canada
German Spine Society (DWG)	Germany
NSPINE	Germany
Hellenic Spine Society	Greece
Association of Spine Surgeons of India (ASSI)	India
The Spinal Cord Injury Association	India
The Association of People with Disability (APD)	India
Indian Head Injury Foundation	India
THE SPINAL FOUNDATION	India
INDIAN ASSOCIATION OF PHYSICAL MEDICINE AND REHABILITATION	India
Spinal Cord Society	India
Spine Society Delhi Chapter	India
Nina Foundation	India
THE ABILITY PEOPLE	India
Society of Indian Physiotherapists	India
CHANDIGARH SPINAL REHAB-An Initiative of Sai Aasra Paraplegic Rehab Centre	India
AMAR SEVA SANGAM	India
Indonesia Spine Society	Indonesia
The Indonesian Association of Physical Medicine and Rehabilitation	Indonesia
Italian Spine Society (SICV&GIS)	Italy
Japanese Society for Spine Surgery and Related Research (JSSR)	Japan
Japanese Association for Patients with Spinal Ligament Ossification	Japan
Asociacion Mexicana de Cirujanos de Columna (AMCICO)	Mexico
Society of Spine Surgeons of Pakistan	Pakistan
Saudi Spine Society (SSS)	Saudi Arabia
Saudi Association of Neurological Surgery	Saudi Arabia
North America Spine Society (NASS)	United States
World Spine Care	United States
SOCIEDAD IBEROLATINOAMERICANA DE COLUMNA (SILACO)	Uruguay
EUROSPINE	Various[a]

[a] : Canada, France, Germany, Netherlands, Switzerland and UK.

'Recommendation and Publication taskforce' representing 15 countries co-developed recommendations. Both taskforces included multidisciplinary panels including surgeons, rehabilitation clinicians, researchers, epidemiologists, primary care physicians, allied health professionals, education professionals, patient advocacy group and strategic health leaders.

2.2. Domains

All recommendations were based on the specific domains that SPINE20 considered as critical for global improvement in spine health, which were also informed by the latest available evidence, India G20 primer, SDGs, and Rehabilitation 2030 call for action (Rehabilitation, 2030, 2018). Specifically, the SPINE20 recommendations were based on domains that were designed to include the themes selected by consensus process in previous years (AlEissa et al., 2021; Darwono et al., 2022; Costanzo et al., 2022). All domains were reviewed and updated between January 7th and 23rd, 2023 by the SPINE20 scientific task force composed of international, multi-professional members. In 2023, six new domains were identified and developed by the panel.

2.3. Selection of domains

SPINE20 held an online Delphi consensus meeting on January 30th, 2023, to select the domains (Barrett and Heale, 2020). Two facilitators (KT from Japan and PC from Canada) facilitated the meeting, and 29 scientific taskforce members participated in the consensus survey. The Delphi process aimed to select six of the 12 domains using an on-line voting software (Forms, Microsoft, Redmond, WA). For the first round of voting, participants scored each domain from 1 to 10 with 1 the lowest and 10 the highest score. The top 10 domains with the highest mean scores were brought to the next round, where participants were asked to agree or disagree with each specific domain. The first six domains reaching consensus were selected, (defined as agreement of ≥75%, over a maximum of four rounds).

The key domains selected for the SPINE20 2023 recommendations were.

- Spinal disability and poverty (94.1% agreement in 1st vote),
- Healthy spine and Lifestyle for Environment (LiFE) (88.2% agreement in 1st vote),
- Digital spine care (76.4% agreement in 1st vote),
- Economy of spine care (76.4% agreement in 1st vote),
- Patient safety (87.5% agreement in 3rd vote),
- Social determinants (81.3% agreement in 4th vote).

Each year, SPINE20 adopts one additional domain proposed by the host of the SPINE20 annual meeting. This year the host, the Association of Spine Surgeons of India, proposed a domain focused on "Implementation" (Appendix 1).

2.4. Development of recommendations

Each domain elected three writers who were assigned by the SPINE20 scientific task force to draft the recommendations. The recommendations were drafted by.

· Implementation of recommendation: HC (India), SK (Japan), AB (Canada)
· Spinal disability and poverty: PC (Canada), CR (Italy), RM (India)
· Healthy spine and LiFE: BD (Indonesia), DL (USA), RH (Indonesia)
· Digital spine care: GC (Italy), LR (UK), HA (Saudi Arabia)
· Economy of spine care: SA (Saudi Arabia), FK (Germany), CM (Brazil)
· Patient safety: CT (Brazil), MA (Germany), BG (India)
· Social determinants: WS (USA), SB (India), SW (India)

Writers co-developed the recommendations with multi-professional experts supported by the scientific literature. Each group of writers provided a problem statement and proposed solution based on the latest available evidence related to the assigned domain. Each group of writers submitted 2–3 candidate recommendations for each domain. The candidate recommendations were discussed and refined at the Scientific taskforce through weekly online meetings between February 6th and June 5th, 2023.

2.5. Selection of recommendations

An online consensus meeting was held on June 12th, 2023, using the real-time modified Delphi method to select the final recommendations. Two facilitators (KT from Japan and PP from Portugal) facilitated the meeting, and 49 international, multidisciplinary experts from 29 countries participated in the meeting. Recommendations were selected using an online voting software (Forms, Microsoft, Redmond, WA). A week prior to the Delphi consensus meeting, participants scored each recommendation (from 1 to 10) to provide an initial prioritization by the group. Recommendations reaching a level of agreement ≥75% were kept and the next round of voting was carried out, with a maximum of 4 rounds of voting per recommendation. Recommendations that did not reach the 75% level of agreement after 4 rounds were rejected. All candidates of recommendation statements and the voting results are shown in Appendix 2 and 3.

2.6. Publication of recommendations

Recommendation statements and supporting rationales were published on the SPINE20 website (https://spine20.org) 7 days before the SPINE20 summit which took place on August 10th-11th, 2023, in New Delhi, India. Public comments were invited via website and if needed, the recommendations were modified accordingly. The recommendations were discussed at the SPINE20 Summit 2023, allowing Summit participants to debate the recommendations and suggest modifications. As a result, all recommendation statements obtained conditional approvals from summit participants. Following meticulous scrutiny by Recommendation and Publication taskforce members based on the comments, the final recommendations were released.

Recommendations and rationale SPINE20 2023

Domain: Implementation of recommendations.

SPINE20 calls on the G20 countries to establish, prioritize, and implement accessible National Spine Care Programs to improve spine care and health outcomes

Relevance to SDGs: SDG3 - Good Health and Well-being, SDG4 - Quality education, SDG6 - Clean water and sanitation, SDG8 - Decent work and economic growth, SDG10 - Reduced inequalities, SDG11 - Sustainable cities and communities, SDG17 - Partnerships for the goals.

Background:

Spinal disorders affect over one billion people worldwide and remain a leading cause of global disability since 1990 (Cieza et al., 2021; World Health Organizationa). The best available evidence on the management of spine disorders is not well integrated in health policy in most countries (Buchbinder et al., 2018; Bickenbach et al., 2013; Briggs et al., 2021, 2023; Speerin et al., 2020).

Problem:

While high quality, evidence-based guidelines on the management of spine disorders are available (Package of interventions for rehabilitation, 2023), many people with spine symptoms continue to be neglected and/or receive unnecessary and potentially harmful investigations, treatments, or experimental procedures, together resulting in wasted resources.

Potential solutions:

SPINE20 calls on the G20 countries to establish, prioritize, and implement accessible National Spine Care Programs to improve spine care and health outcomes. SDGs 4, 6, 8, 9, 10, 11, 17 and ensure the inclusion and optimal development of persons with disabilities. '*Leaving no one Behind*' is the overarching SDG philosophy and explicitly states '*include disability*' and '*persons with disabilities*' in relation to education, growth and employment, inequality, accessibility of human settlements, as well as data collection and the monitoring of the SDGs (Bickenbach et al., 2013). Robust health policies, prevention strategies, and National Spine Care Programs designed to support the implementation and evaluation of SPINE20 recommendations can help countries achieve the SDGs and enhance equitable access to high-value spine care. The proposed solution entails establishing comprehensive National Spine Care Programs to promote the delivery of safe, effective, culturally relevant evidence-based non-surgical care, encompassing rehabilitation and spinal cord injury management, as well as emergent and surgical care when required (Buchbinder et al., 2018; Briggs et al., 2021, 2023; Speerin et al., 2020).

Domain: Spinal disability and poverty.

SPINE20 calls on the G20 countries to eliminate structural barriers to accessing timely rehabilitation for spinal disorders to reduce poverty

Relevance to SDGs: SDG1 - No Poverty, SDG3 - Good Health and Well-being.

Background:

Persons with disability are more likely to live in poverty and experience barriers to accessing rehabilitation than people without disability (Landry et al., 2008; Deslauriers et al., 2017; World report on disability 2011, 2011). This is particularly relevant to individuals who experience disability because of spinal disorders (Cieza et al., 2021; Feldman and Nahin, 2022). However, in most countries, insufficient rehabilitation services are available to persons with spinal disorders. In fact, spinal disorders such as low back pain are a leading reason for unmet rehabilitation needs in G20 nations (Cieza et al., 2021).

Problem:

People who live in poverty face structural barriers in accessing adequate spine rehabilitation (Cieza et al., 2021). These barriers include stigmatization, marginalization, social isolation, absence of adequate transportation, financial constraints, lack of a trained workforce, lack of political prioritization for rehabilitation, and the absence of integration of rehabilitation in universal health systems (Magnusson et al., 2022; Esson et al., 2020). Additionally, few public health and healthcare policies are in place to remove these barriers. This is a significant global health problem because the burden of disability related to spinal disorders is increasing rapidly, especially in low- and middle-income countries (Collaborators GBDLBP, 2023). Therefore, it is imperative to invest in health systems integrated within universal coverage and supported through sustainable funding from government and non-government resources.

Potential solutions:

SPINE20 calls on the G20 countries to eliminate structural barriers to accessing timely rehabilitation for spinal disorders to reduce poverty. The World Health Organization's (WHO) *Rehabilitation 2030 Call for Action* offers practical solutions to this problem through the conduct of 10 activities (Rehabilitation, 2018, 2030). The implementation of these activities is described in detail in *Rehabilitation in Health Systems: Guide for Action* (Rehabilitation in health systems, 2019).

Domain: Healthy spine and LiFE.

SPINE20 calls on the G20 countries to promote and facilitate healthy lifestyle choices (including physical activity, nutrition, smoking cessation) to improve spine wellness and health

Relevance to SDGs: SDG3 - Good Health and Well-being, SDG13 - Climate action.

Background:

The Lifestyle for Environment (LiFE) initiative, which was launched by Indian Prime Minister Narendra Modi in 2023, aims to encourage the adoption of sustainable lifestyles and tackle internationally the challenges of environmental degradation and climate change. (https://www.g20.org/content/dam/gtwenty/gtwenty_new/document/G20%20University%20Connent-Primer.pdf) If only 13% of the global population adopted sustainable lifestyle behavior changes, such as healthy eating habits, being physically active, and smoking cessation, carbon emissions would be reduced by 20%. (ScienceDaily)

Problem:

The link between poor lifestyle choices, climate change, and spine health is indirect but significant. Poor lifestyle choices, such as physical inactivity, excessive consumption of food and unhealthy diet, or smoking, can contribute to climate change, which in turn, can have various consequences affecting spinal health through physical injuries, air quality, disease transmission, nutrition, mental health, displacement, and economic challenges. In 2015, excess body weight was estimated to affect 2 billion people worldwide, and accounted for approximately 4 million deaths and 120 million disability-adjusted life-years (Collaborators GBDEMRO, 2018). Overeating and food wastage are common denominators in people who are obese. By eating smaller food portions and finishing the food on your plate, one can avoid 74 kg of food waste per year while reducing the weight and decreasing the load on the spine (United Nations enviromentalprogramme, 2021). Furthermore, the WHO reported that the industry's carbon footprint from production, processing, and transporting tobacco is equivalent to one-fifth of the CO_2 produced by the commercial airline industry each year, further

contributing to global warming. (World Health Organization) Studies show a link between cigarette smoking and back pain (Dai et al., 2021). Smoking also increases the risk for osteoporosis which can lead to disabling back pain from vertebral fractures (Nishino et al., 2021). In summary, obesity and smoking are some of the major factors adversely affecting both spine health and world climate change. Exploring this synergistic relationship and understanding what changes need to be made, are key to protecting both the environment and spine wellness and health.

Potential solutions:

SPINE20 calls on the G20 countries to promote and facilitate healthy lifestyle choices (including physical activity, nutrition, smoking cessation) to improve spine wellness and health. Addressing both individual lifestyle choices and taking collective action to mitigate climate change can help safeguard spine health and overall well-being. Walking or cycling to work or school can have a positive effect on the environment and on spine health. Reducing carbon dioxide emissions through a reduction in driving and an increase in active transportation would exceed the reduction in greenhouse-gas emissions that could be expected from the increased use of lower emission motor vehicles (Howden -Chapman and MDKCSRCP, 2018). Exercise also helps to reduce the physiological toxins produced through muscle contraction and relaxation, which, if left to accumulate, can cause back muscle stiffness and decreased flexibility (Hayden et al., 2021). Changes to our fundamental values, philosophies, and principles need to be implemented to live a healthy life, and promote spine health while curbing greenhouse emissions, that is in accordance with the concept of the LiFE initiative.

Domain: Digital spine care.

SPINE20 calls on G20 countries to implement cost-effective, evidence-based practice for digital transformation in spine care, to deliver self-management and prevention, evaluate practice and measure outcomes

Relevance to SDGs: SDG3 - Good Health and Well-being, SDG10 - Reduced inequalities.

Background:

Digitization has revolutionized the field of spine health, offering improvements and efficiencies in diagnostics, treatment, evaluation, and delivery of spine care. For example, the integration of artificial intelligence (AI) with imaging technologies enhances image definition and unveils intricate structure and details, although further exploration is warranted (Naik et al., 2022). Wearable devices and mobile applications that facilitate symptom monitoring, record-keeping, and access to self-management support, can benefit patients experiencing spinal symptoms (Cargnin et al., 2023; Didyk et al., 2022).

Telehealth including remote rehabilitation programs, has the potential to enhance access to spine specialists, reducing the need for patients to physically travel for consultations visits, (Haldeman et al., 2021; Touchett et al., 2022) although some aspects of clinical testing may not be possible. Digitization also facilitates the evaluation of clinical practice through the extensive use of internationally shared digital registries of surgical records. These registries enhance the selection of appropriate, safe, and cost-effective surgical procedures (Zehnder et al., 2021). Moreover, digitization plays a vital role in clinical training. For instance, virtual reality can be employed to facilitate the dissemination of advanced evidence-based knowledge via the internet, bridging the gap between international centers of excellence and hospitals in low-income countries (Correale et al., 2022).

Problem:

Spinal disability including low back pain is a highly prevalent and burdensome global health condition, affecting up to one billion individuals worldwide, with a lifetime prevalence of up to 84% (Collaborators GBDLBP, 2023; Nicholl et al., 2017; Walker, 2000; Hurwitz et al., 2018). The digitization of spine care has been shown to offer substantial improvements and efficiencies across many aspects (Senbekov et al., 2020). Although the evidence is growing in favor of digital

spine health, there is relatively little evidence evaluating the outcomes and cost-effectiveness of these interventions worldwide, and limited recommendations currently exist in treatment guidelines promoting or supporting digital spine health (Chronic pain; Foster et al., 2018; Ng et al., 2021; Lin et al., 2020).

Potential solutions:

SPINE20 calls on G20 countries to implement cost-effective, evidence-based practice for digital transformation in spine care, to deliver self-management and prevention, evaluate practice and measure outcomes. The primary objective of this transformative approach is to prioritize patient empowerment and preventative care. To achieve these goals, it is crucial for decision-makers to prioritize research funding, invest in capacity-building initiatives, and establish the necessary infrastructure to support the digital transformation of spine health.

Domains: Economy.

SPINE20 calls on G20 countries to develop, implement and evaluate standardization processes for spine care delivery systems tailored to individual and population health needs

Relevance to United Nations SDGs: SDG3 - Good Health and Well-being, SDG10 - Reduced Inequalities.

Background:

Standardization has been defined as "the process of developing, agreeing upon and implementing uniform technical specifications, criteria, methods, processes, designs, or practices that can increase compatibility, interoperability, safety, repeatability and quality." (Mannion and Exworthy, 2017) Standardization, especially in healthcare, helps to decrease variation, minimize the risk of errors, and increase patient safety (Collden et al., 2021). However, standardization has its natural limitations, in particular, due to its inability to account for unforeseen elements in different clinical situations. Where deviations from guidelines for specific cases may be necessary and beneficial, customization and personalization could provide a framework to address gaps in knowledge. Customization is the tailoring of standardized treatment and diagnosis to the psychological, social, and cultural dimensions of the patients, while personalization in medicine means the adaptation of treatment to the biological dimensions of the patient's genomic variation (Exworthy, 2015; Elwyn et al., 2010). Determining the optimal point along the continuum between these standardization and customization approaches for any given processes of delivering spine care requires careful consideration and should be a paramount goal of organizational leadership, standards developers, and regulators (Sinsky et al., 2021).

Problem:

There is inherent complexity in spine care practice, due to the wide spectrum of spine disorders, diversity of treatment options, and the multiple professional backgrounds involved, in addition to many other contextual factors.

Potential solutions:

SPINE20 calls on G20 countries to develop, implement and evaluate standardization processes for spine care delivery systems tailored to individual and population health needs. Strategies are evolving with a goal of maximizing value for patients by achieving the best outcomes at the lowest cost, while reducing inequalities. This is more likely to be achieved with standardized approaches that are then tailored to the individual patient context, to optimize treatment and outcomes.

Domain: Patient safety.

SPINE20 calls on the G20 countries to monitor and reduce safety lapses in primary care including missed diagnoses of serious spine pathologies and risk factors for spinal disability and chronicity

Relevance to United Nations SDGs: SDG3 - Good Health and Well-being, SDG10 - Reduced inequalities.

Background:

About half of the global burden of patient harms occurs in the primary and ambulatory care settings, with direct costs related to safety lapses accounting for up to 2.5% of the total health expenditure. (OECD)

The broader economic impact of delayed or wrong diagnosis, and delayed treatment for chronic illness could approach 0.5% of GDP, which represents approximately 5% of health expenditures (Auraaen, 2018). In primary care management of back pain, the safety culture may be defined by all actions that might mitigate the risk of transition to chronic pain and persistence of untreated chronic pain, as well as early detection of yellow flags (psychological, emotional, social factors, and risk factors of chronicization) and red flags (indicative of serious spine pathology, such as neurologic impairment, tumor, and infection). Few low- and middle-income countries have adopted evidence-based guidelines on the management of spinal disorders in primary care.

Problem:

Recognizing patient safety lapses, such as appreciating the risk of acute to chronic pain trajectory, and the undetected presence of red and yellow flags in the primary care setting, can be a cost-effective opportunity to help mitigate the enormous economic and public health burden back pain represents worldwide. However, in most middle and low-income countries, health authorities are not sufficiently committed to mitigating the impacts of back pain on its economy and health services.

Potential solutions:

SPINE20 calls on the G20 countries to monitor and reduce safety lapses in primary care including missed diagnoses of serious spine pathologies and risk factors for spinal disability and chronicity. To achieve the SDG-3 and 10, it is key to achieve full and reliable safety coverage for patients with back pain in primary care to develop and train healthcare teams to deliver appropriate content, foster self-care, and critical reasoning, and to educate patients about coping with back pain. This coverage will mitigate the enormous economic, financial, and public health burden and the cost of unnecessary and harmful treatments (surgery included), misleading beliefs, unnecessary referrals and diagnostic imaging.

Domain: Social Determinants.

SPINE20 calls on G20 countries to ensure accessible and affordable quality care to persons with spine disorders, injuries, and related disabilities throughout the lifespan

Relevance to United Nations SDGs: SDG3 - Good Health and Well-being, SDG10 - Reduced inequalities.

Background:

Health inequities cause unnecessary suffering and result from adverse social conditions and failing public policies. They are problematic for all countries and reflect not only differences in income and wealth, but also differences in opportunity, based on factors such as ethnicity and racism, class, gender, education, disability, sexual orientation, and geographical location. These differences have profound consequences and represent the impact of what we know as 'social determinants of health (SDH)'. (World Helth Organization) The SDH, the non-medical factors that influence health, can have a major impact on people's health, well-being, and quality of life. The SDH include: i) safe housing, transportation, and neighborhoods; ii) racism, discrimination, and violence; iii) education, job opportunities, and income; iv) access to nutritious foods and physical activity opportunities; v) polluted air and water; and vi) language and literacy skills. (World Helth Organization)

Problem:

Significant relationships between the SDH and spinal disorders were identified with the strongest evidence for associations related to educational attainment and socioeconomic status (Karran et al., 2020). Recognition of the contribution of SDH to disparities in spinal disorders is warranted by G20 countries, although this has the potential to usefully inform strategies to reduce burden.

Potential solutions:

SPINE20 calls on G20 countries to ensure accessible and affordable quality care to persons with spine disorders, injuries, and related disabilities throughout the lifespan. Social determinants and social justice must consider spine health across all age groups, genders, strata of society, and types and degrees of severity of spine-related disorders (congenital or acquired, painful or not) (Karran et al., 2020). To address the SDH and social justice, national policy and programs should encompass all the important clinical spine health services, including prevention (at multiple levels), early diagnosis (clinical, supported by appropriate investigations where required), and comprehensive patient-centered care across all levels of care, namely acute care, rehabilitation, medical, surgical, primary, secondary, tertiary and palliative care.

3. Conclusions

SPINE 20 is an international advocacy coalition that was created to bring global attention to the burden of disability caused by spinal disorders. Our advocacy efforts focus on developing public policy recommendations to improve the health, welfare, and wellness of all who experience spinal pain and disability. We propose that focusing on facilitating access to health systems that prioritize high value care delivered by a competent healthcare workforce will contribute to reducing disability and improve the productivity of the G20 nations. In addition, it is our proposition that the alignment of SPINE 20 recommendations will make a valuable contribution to the advancement of the SDGs.

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No funds were obtained.

Availability of data and material

The datasets generated during the current study are available from the corresponding author on reasonable request.

Code availability

Not applicable.

Ethics committee approval

Not applicable to the current policy paper.

Author contributions

HC, KT, HA, and MN managed in developing the paper all steps. SA, SK, AB, PC, CR, RM, BD, DL, RH, GC, LR, YA, FK, CM, CT, MA, BG, WS, SB, and SW led the drafting of this paper in collaboration with the other authors and were part of the team that coordinated the production of papers. TRB, MC, JF, MI, KK, NK, KM, EJM, PP, APS closely revised many sections. Thereafter all authors contributed to all sections of the paper and edited it for key intellectual content. All other authors have read and provided substantive intellectual comments to the draft and have approved the final version of the paper.

Consent to participate

All authors have read and approved the final version of the paper.

Consent for publication

All authors give our consent for the publication of identifiable details to be published in the Brain and Spine Journal.

Declaration of competing interest

Nothing to disclose.

Appendix 1. Domain proposed in SPINE20 2023

Proposed domains	Primary scoring	Results of consensus meeting
Healthy spine and LiFE	8.33	88.2% agreement in 1st voting
Spinal disability and poverty	8.30	94.1% agreement in 1st voting
Digital spine care	8.00	76.4% agreement in 1st voting
Prevention	7.63	
Economy of spine care	7.56	76.4% agreement in 1st voting
Social perspective	7.33	
Patient safety	7.26	87.5% agreement in 3rd voting
Social determinants	7.15	81.3% agreement in 4th voting
Access to care	7.04	
Spine emergency	6.93	
Value-based care	6.48	
Rehabilitation	6.44	
Diversity	6.41	
Implementation	6.30	
Research	6.30	
Pediatric spine	6.11	
Future of spine care	5.96	
Capacity building	5.81	

Appendix 2. All candidates of recommendation statements

Domain Subdomain	Candidate statements
Implementation	A. Since Spinal diseases problems are the commonest cause of disability in most countries across the globe and the Sustainable Development Goals have a strong emphasis on healthy lives, promotion of well-being as well as inclusion and empowerment of persons with disabilities, SPINE20 calls upon G20 countries to consider implementation of the evidence based recommendations compiled by the SPINE20 experts each year since 2020 through a Delphi consensus process by including these in their HEALTH POLICY and considering a National Spine Care program. SPINE20 experts would be happy to extend all support to all countries in this regard. B. SPINE20 calls upon G20 countries to consider implementation of the evidence-based recommendations compiled by the SPINE20 experts each year through a Delphi consensus process by including these in their HEALTH POLICY and considering a National Spine Care program, since spinal problems are the most common cause of disability in most countries. C. SPINE20 calls upon the G20 countries to establish National Spinal Care programs, and to prioritize, implement, and evaluate recently compiled SPINE20 recommendations across health systems to improve equitable spine care and health outcomes.
Spinal disability and poverty Investments in health systems	A. SPINE20 calls on the G20 nations to eliminate structural barriers to accessing to timely rehabilitation for back pain as a means to reduce poverty. B. SPINE20 calls on the G20 nations to invest in health policy and systems research to study the impact on rehabilitation for back pain on the welfare of populations.
Healthy spine and LiFE Impact	A. SPINE20 calls on the G20 to collectively work together to implement changes to reduce the carbon footprint worldwide by promoting, Wellness, Healthy lifestyles, and Physical activity, to prevent Spine Disability in One Earth, One Family, One Future B. SPINE20 calls on the G20 to encourage, promote and implement holistic action plans for healthy lifestyles that all individuals can enact worldwide to preserve our planet from further climate damage and protect the environment while decreasing spine disorders and preventing spine disability. C. SPINE20 calls on the G20 to raise awareness of how our everyday lifestyle decisions regarding wellness, physical activity, smoking and nutrition affect the worlds resources and our Spine Health.
Digital spine care Transformation	A. SPINE20 calls upon policy makers to ensure access to digital spine care through supporting infrastructure (including spine registries) and digital literacy to deliver ethical practice and monitor its impact. B. SPINE20 calls upon G20 countries to implement cost-effective, evidence-based practice for digital transformation in spine care, to deliver self-management and prevention, evaluate practice and measure outcomes. C. SPINE20 calls upon research funders to prioritize funding research to develop and evaluate digital technologies and tools, to prevent disability and optimize spine care.
Economy Standardization	A. SPINE20 calls on G20 countries to support the development, implementation, and evaluation of standardization processes for spine care delivery systems encompassing genomic, psychological, social, and cultural dimensions of population health needs. B. SPINE20 calls on G20 countries to promote the development, implementation, and evaluation of standardization processes throughout the multilayers of spine care delivery system, while allowing for the systematic customization and personalization of care to reduce knowledge gaps and address the inherent variation in genomic, psychological, social, and cultural dimensions of the population health needs
Patient safety Culture of safety	A. SPINE20 calls on the G20 to raise awareness of safety lapses in primary care including unrecognized red flags and risk of chronicization. B. SPINE20 calls on the G20 to promote education as a mean to manage safety lapses in primary care.
Social Determinants Social Justice	A. Social determinants of health like gender, race, ethnicity, education, occupation, socioeconomic status etc. influence spine health, recovery, and rehabilitation. SPINE20 calls upon G20 countries to consider making all stake holders including policy planners, healthcare providers, professionals, media, individuals and families with spine-related problems, and the society at large aware about these factors and address them as best as possible so as to decrease spine health inequities and improve comprehensive Spine Care.

(*continued*)

Domain Subdomain	Candidate statements
	B. SPINE20 calls upon G20 countries to initiate continuing education and awareness related activities and programs highlighting the importance of all important pillars of holistic and continuum of care, such as prevention, early diagnosis, treatment, and rehabilitation of spine-related conditions.
	C. SPINE20 calls upon G20 countries to ensure accessible and affordable quality care to persons with spin- related disorders, deformities, injuries etc. throughout the lifespan.

Appendix 3. All candidates of recommendation statements

Domain Subdomain	Results of pre-score	Voting results
Implementation	A:7.00, B:7.80, C:8.67	Vote1: A 7.1%, B 10.7%, C82.1%
Spinal disability and poverty	A:8.60, B:8.40	Vote1: A 78.6%, B 21.4%
Investments in health systems		
Healthy spine and LiFE	A:7.75, B:7.81, C:8.08	Vote1: A 14.3%, B 14.3%, C 71.4%
Impact		Vote2: A 6.5%, B 6.5%, C 87.1%
Digital spine care	A:7.96, B:8.63, C:7.52	Vote1: A 10.7%, B 85.7%, C 3.6%
Transformation		
Economy	A:7.81, B:7.69	Vote1: A 71.4%, B 28.6%
Standardization		Vote2: A 80.6%, B 19.4%
Patient safety	A:8.04, B:7.92	Vote1: A 75.0%, B 25.0%
Culture of safety		
Social Determinants	A:7.80, B:7.98, C:8.12	Vote1: A 17.9%, B 28.6%, C 53.6%
Social Justice		Vote2: B 22.6%, C 77.4%

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