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Original Article/Research

Evaluating sustainability awareness and practices in podiatry clinics in Spain: A path toward a healthy and sustainable future[1,2,3]

Esther Chicharro-Luna [a], Gabriel Gijón-Nogueron [b], Angela M.F. Evans [c,*], Alfonso Martínez-Nova [d]

[a] Department Behavioral Sciences and Health, Nursing Area, Faculty of Medicine University Miguel Hernández, Spain
[b] Department of Nursing and Podiatry, Faculty of Health Sciences, IBIMA, University of Málaga, Spain
[c] Discipline of Podiatry, School of Allied Health, Human Services and Sport, La Trobe University, Victoria 3086, Australia
[d] Department of Nursing, University of Extremadura, Plasencia, Spain

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ABSTRACT

Background: Sustainability in healthcare is crucial due to the sector's significant contribution to global greenhouse gas emissions. Medical practices must address environmental impact while maintaining high-quality care and equitable access. In podiatry, sustainable practices can reduce the environmental footprint of clinics and improve long-term healthcare outcomes by promoting prevention and resource efficiency.
Study design: Cross sectional study.
Method: We conducted an online survey with 357 practicing podiatrists, all registered with the General Council of Podiatrists of Spain and with at least one year of professional experience. The survey contained 26 questions focused on sustainability in healthcare, podiatry practices, and environmental impact. The questionnaire included both closed-ended questions and Likert-scale items. Responses were scored and categorized into arbitrary sustainability categories: low (<12), medium (12 to 25), and high (>25).
Results: Most respondents (82.6 %) did not regularly use public transport, and 14 % did not engage in any form of physical exercise. More than half of the sample were unaware of the United Nations Sustainable Development Goals (SDGs). Almost all (98 %) had not measured the carbon footprint of their clinics, yet 34.7 % planned to optimise energy consumption in their clinics. Overall, 41.7 % were categorized as low sustainability, 56.9 % medium, and 1.4 % met high sustainability.
Conclusions: Podiatry clinics in Spain demonstrate low sustainability actions and knowledge. Sustainable practice aligns with global environment healthcare urgency, and ensures more responsible podiatric services. This study provides the first baseline data for this issue, availing comparisons across global podiatric healthcare sectors.

Public interest summary

Sustainability is a critical aspect of healthcare, including environmental, social, and governance dimensions (ESG). Global consciousness of the climate crisis has grown. This study assessed the significance of sustainability in podiatry clinics in Spain, emphasizing its importance for patient care, reduced environmental damage, and responsible consumption.

In total, 357 practicing podiatrists in Spain completed an online survey addressing sustainability in healthcare.

The main findings were:

- > 50 % were unaware of the United Nations Sustainable Development Goals (SDGs)
- > 85 % did not use public transport
- 98 % had never measured the carbon footprint of their clinics
- 35 % planned to optimize energy consumption in clinics.
- 40 % rated low sustainability, 56 % rated medium sustainability, 1.4 % rated high sustainability.

[1] **Running title**: Awareness of green podiatry practice in Spain [2] **Ethical approval**: approved by Ethics Committee of Miguel Hernández University of Elche (Spain). (Code: DCC.ECL.02.23PROV). [3] **Patient Consent**: Not required.

* Corresponding author at: Discipline of Podiatry, School of Allied Health, Human Services and Sport, La Trobe University, Victoria 3086, Australia.
E-mail address: Angela.Evans@latrobe.edu.au (A.M.F. Evans).

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Podiatry clinics in Spain show low sustainability and need to be more environmentally knowledgeable and responsible. Education and initiatives to promote sustainable practice, and more sustainable lifestyles, are needed.

Introduction

In a world characterized by population growth, and an environment which is demonstrably threatened by climate change, healthcare is facing increasing pressure to maintain service quality, ensure equitable access, and minimize environmental impact. In this context, sustainability emerges as a fundamental aspect across all facets of society, including healthcare. In podiatry clinics, sustainability not only pertains to adopting environmentally positive practices, but also encompasses the economic and social aspects, which are crucial for the well-being of current and future generations [1].

Healthcare systems consume vast resources and are responsible for at least 5 % of global greenhouse gas emissions [2]. Planetary warming results in climate change, manifesting as extreme weather events, with protracted droughts, floods, wild fires and storms [3]. There is both irony and responsibility for healthcare as a sector. Purposed to heal and enhance health, its very practice also harms health, via greenhouse gas emissions.

Energy-efficient technologies, reduction and proper management of medical waste, implementation of restrained water consumption, are key elements that contribute to both environmental sustainability and the long-term economic viability of healthcare [4].

The literature regarding sustainability in healthcare services identifies various barriers and facilitators to its implementation. In dental practices, barriers include: a lack of professional and public awareness, carbon emissions from transport, and challenges associated with the management and recycling of biomedical waste, particularly single-use plastics [5]. Further, the absence of education about sustainable practices related to dental materials further complicate the situation. Common facilitators include: effective leadership, training, and organisational support; whilst inadequate staffing remains a significant barrier [6,7].

In the broader healthcare context, several approaches to sustainability have been implemented. For instance, efforts in hospitals to reduce energy consumption through the use of energy-efficient lighting and heating, ventilation, and air conditioning systems (HVAC) have been highlighted as effective strategies [8]. Additionally, initiatives to reduce single-use plastics and improve waste segregation in clinical settings, such as the implementation of biodegradable materials and reusable medical supplies, have shown promising results in minimizing environmental impact [9–11]. Telemedicine is another example that has gained traction as a sustainable alternative, reducing the need for patient travel and, consequently, lowering carbon emissions [12,13]. Moreover, several studies have emphasized the importance of sustainable procurement practices, such as selecting suppliers with low carbon footprints and environmentally friendly packaging, reducing transportation needs for healthcare professionals and patients [14,15], and minimizing low-value imaging in radiology [16], as key strategies for reducing the overall ecological footprint of healthcare institutions.

Sustainability in podiatry, and other allied health areas, is intertwined with patient education and disease prevention [17,18]. Podiatrists must be educated to provide and empower their patients with knowledge for healthy lifestyles, including basic nutrition, and physical activity [19,20]. Healthcare needs to reduce the burden of chronic, and often avoidable, non-communicable diseases, and better promote public health. By doing so, the need for complex and costly podiatric interventions (e.g., diabetic foot ulcer infections, amputations) can be averted.

Sustainability in medical clinics advocates for equitable access to healthcare. Inequitably distributed healthcare resources remain a problem globally [21]. More sustainable approaches can better share resources, enabling poorer nations access to quality healthcare, promoting social justice [22].

As with all areas of healthcare, sustainability in podiatry may incorporate technological innovation [23], for more efficient and 'greener' consultations, reducing the carbon footprint [24]. Electronic patient records, telemedicine consulting [24–27], and online diagnostic and treatment techniques, can enhance the quality, access, and sustainability of healthcare.

Green podiatry is essential, and the education and knowledge of clinicians, researchers, and academics will underpin sustainable podiatric care in the 21st century [28–30].

The objective of this study is to assess the level of sustainable podiatry practice and knowledge in Spain. A known baseline will direct the need for recommendations to achieve the United Nations (UN) 2030 agenda: equality among people, planet protection, and prosperity assurance [31].

Method

Study design

Descriptive observational study designed following The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [32]. Participants were recruited from May to July 2023.

Ethical statement

The study was approved by Ethics Committee of Miguel Hernández University of Elche (Spain). (Code: DCC.ECL.02.23PROV). All participants were informed of the study's objectives. Data were collected anonymously, and ethical principles proposed in the Helsinki Declaration were followed [33].

Participants

In 2023 there were 10,247 practicing podiatrists in Spain. Hence, the required sample size for the study, with a confidence level of 95 %, and a margin of error of 5, is calculated as 352 participants.

The study sample consisted of 357 podiatrists, registered by the General Council of Podiatrists of Spain. Podiatrists who met the inclusion criteria were selected:

a) practicing with at least one year of professional experience,
b) agreeing to participate in the study.

Recruitment of participants was initiated by an email message from the General Council of Podiatrists to all registered podiatrists in Spain. The email explained the study and invited participation. Participants completed an online survey. The survey emphasised the need to assess the level of sustainability in podiatry clinics in Spain as a basis for implementing future actions. The survey was accessible for 2 months.

Procedure

Sociodemographic variables (age, sex, geographical location of practice), anthropometric variables (weight, height, Body Mass Index - BMI), and basic knowledge of the United Nations (UN) Sustainable Development Goals (SDGs) were collected for each participant.

A questionnaire, designed to assess the sustainability of participants' clinics, consisted of 26 items, and was completed by each participant. Responses were graded: 0 = no, never; 1 = yes, occasionally, or sometimes; 2 = yes, always. The sum of all items availed a total score 37. Arbitrary, not technically scaled, scores ranged from:

- low sustainability – total score <12
- medium sustainability – total score 12 to 25

- high sustainability – total score >25.

Questions included compliance with nine clinically relevant UN SDGs of the 2030 Agenda [34]:

- SDG 1 (1 question): No Poverty. Collaboration with any association to provide consultations or podiatric materials to people with low resources or at risk of exclusion.
- SDG 3 (1 question): Good Health and Well-being. Collaboration with institutions, associations, or companies to develop activities that promote foot health and well-being of the population.
- SDG 6 (1 question): Clean Water and Sanitation. Use of water-saving measures in the clinic.
- SDG 7 (6 questions): Affordable and Clean Energy. Inquire about the presence of a specific strategic plan to optimise energy consumption in the clinic; improvement of enclosures or replacement of more efficient devices for better energy efficiency; use of renewable energy sources; and proper use of climate control in the clinic.
- SDG 11 (3 questions): Sustainable Cities and Communities. Access to the clinic through more sustainable transportation by providing necessary information to patients.
- SDG 12 (7 questions): Responsible Consumption and Production. Minimisation and separation of waste in the clinic; engagement in circular economy activities; elimination of paper for clinic marketing or use of sustainable office and furniture.
- SDG 13 (3 questions): Climate Action. Measurement of the clinic's carbon footprint; receipt of environmental management awards or certifications.
- SDG 16 (3 questions): Peace, Justice, and Strong Institutions. Procurement of materials from distributors with Corporate Social Responsibility; transparency through a communication channel for patient complaints or suggestions.
- SDG 17 (1 question): Partnerships to Achieve the Goals. Collaboration with institutions or companies to develop activities that promote sustainability.

The survey questionnaire is attached as Appendix 1.

Statistical analysis

All statistical analyses were performed using SPSS v. 24.0 (SPSS Inc., Chicago, IL, USA). Quantitative variables that passed the normality test were presented as means and standard deviations. Categorical variables were presented as frequencies, cross-tabulations, and descriptive analyses.

The Kolmogorov-Smirnov test was used to assess normality, considering a normal distribution with a p-value >0.05. A Student *t*-test was used to compare means for variables with a normal distribution, and the Mann-Whitney U test (a non-parametric test) was employed when the variables did not follow a normal distribution. Bivariate correlation tests were used to assess the relationship between sustainability scores and quantitative variables.

Results

The results are presented in two parts: sociodemographic participant data; survey responses from participants.

Socio-demographic results

The sample consisted of 357 podiatrists (221 females, 131 males), with a mean age of 39.7 ± 9.6 years, and professional experience of 12.8 ± 9.1 years. The mean body mass index was 24.6 ± 4.2 kg/m^2 (16.3 - 45.9) (Table 1).

There was participation from each of the 17 autonomous regions of Spain. Four of the regions: Andalusia (n = 85), Valencia (n = 57), Madrid (n = 52), and Galicia (n = 35), returned the highest participation rates, collectively 230/357 (64.4 %) (Table 1).

Table 1
Descriptive Analysis of Participants' Sociodemographic Variables (n = 357). The descriptive data for age, professional experience, BMI, sex distribution, geographical location of practice, private vehicle use, and physical exercise habits of the participants.

Variable	Mean ± SD	Range (years)
Age (years)	39.7 ± 9.6	22 - 72
Professional Experience (years)	12.8 ± 9.1	1 - 40
BMI	24.6 ± 4.2	
Gender %		
- Female	63.1	
- Male	36.9	
Geographical Location	%	
- Andalusia	23.8	
- Valencia	16.0	
- Madrid	14.6	
- Galicia	9.8	
- Extremadura	6.2	
- Other Regions	29.6	
Private Vehicle %		
- Fossil Fuel (petroleum/diesel)	89.6	
- Hybrid	8.9	
- Electric	1.5	
Physical Exercise %		
- None	14.0	
- 1–2 h/week	25.5	
- 3–4 h/week	26.6	
- >4 h/week	33.9	*Note: WHO advise 300 min/week*

Note: SD = Standard Deviation.
BMI: Body Mass Index.
WHO: World Health Organization.

Survey responses

Table 2 displays a summary of the main findings, regarding participant's sustainability knowledge and practices.

- SDG knowledge: 89.9 % of the respondents report not knowing or having minimal knowledge of the UN SDGs.

Table 2
Summarised survey responses to sustainable clinical podiatry practice (n = 357).

Parameter	% deficient (n)	% partial (n)	% OK (n)
SDG knowledge	52.7 (188)	37.2 (133)	10.1 (36)
Health promotion	71.1 (254)	16.8 (60) [#]	12.1 (43) [&]
Carbon–footprint assessed	98.0 (350)	1.7 (7) [^]	0.3 (1) [χ]
Energy use plan	95.0 (339)	3.9 (14) [¥]	1.1 (4) [*]
Separated waste	18.8 (67)	19.9 (71)	61.3 (219) [£]
Consumption - paper	38.7 (138)	–	61.3 (219)
Consumption - water	58.5 (209)	6.4 (23) [§]	35.1 (125)
Transport to clinic	46.8 (167)	10.9 (39) [µ]	25.2 (90)
Ethical procurement	87.4 (312) ß	10.9 (39)	1.7 (6)

[#] care for socially disadvantaged persons.
[&] Regularly through workshops or talks at educational centers and associations.
[^] annually documented clinic environmental, social, economic report.
[χ] environmental certification.
[¥] changing or improving enclosures for better insulation and substituting devices with those of greater energy efficiency.
[*] strategic plan to optimise energy consumption.
[£] always separated waste generated in the clinic (plastic, paper).
[§] having timed faucets and/or automatic sensors.
[µ] clinic workers used sustainable transportation.
[Þ]Did not consider whether the material distributor had Corporate Social Responsibility initiatives.
SDG: Sustainable Development Goals.

- Health promotion: The majority (71.1 %, $n = 254$) did not collaborate with institutions, associations, or companies to develop activities promoting foot health and population well-being, with only 9.5 % ($n = 34$) regularly engaging in workshops or lectures at educational centres, associations for individuals with diabetes, senior centres, or sports clubs. Additionally, 14 % ($n = 50$) provided consultations or podiatric materials to individuals with low resources or at risk of exclusion (individuals who do not reach 60 % of the minimum wage of Spain, even though they receive social benefits).
- Carbon footprint assessed: 98 % ($n = 350$), had never measured the carbon footprint of their clinics. Only 3.1 % ($n = 11$) possessed an environmental certification, and just 3.9 % ($n = 14$) assessed their annual clinic activity, including environmental, social, and economic aspects, despite the Ministry for Ecological Transition and Demographic Challenge providing a carbon footprint calculator: https://www.miteco.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/calculadoras.html.
- Energy use plan: 34.7 % ($n = 124$) planned to optimise energy consumption in their clinics (eg lighting, heating/cooling, renewable energy, energy reduction). Energy reduction measures were used by 59.4 % ($n = 212$) who installed better insulation and energy efficient appliances. Additionally, 81.5 % ($n = 291$) used light emitting diode (LED) lights, and 2.2 % ($n = 8$) had automated lights. However, 95 % ($n = 339$) did not have any renewable energy sources (solar, photovoltaic solar, thermal, biomass boiler, or wind) in their clinics, and 78.2 % ($n = 229$) did not contract from local companies supplying 100 % renewable electricity.
- Responsible production and consumption: 61.3 % ($n = 219$) always separated clinic (plastic, paper) waste, whilst 18.8 % ($n = 67$) never did. Paperless marketing was used by 67.8 % ($n = 242$). However, only 33.9 % ($n = 121$) used certified sustainable paper, and 30.8 % ($n = 108$) did not implement specific measures (e.g., digitizing paper, eliminating packaging for orthotics delivery) to minimize generated waste. Only 24.4 % ($n = 87$) engaged in circular economy practices (viz. reusing, repairing, renewing, recycling materials and equipment). When considering clinic furnishings and decor, 40.1 % ($n = 143$) addressed sustainability criteria or used recycled materials (e.g., avoiding plastics, using recycled materials such as cardboard, wood, or plant fibres).
- Consumption of water: 58.5 % ($n = 209$) did not undertake any water saving measures, and only 6.4 % ($n = 23$) had auto-timing faucet/tap sensors.
- Transport to clinic: 28.3 % ($n = 101$) provided patients with sustainable transport options for clinic access (e.g., map of public transportation, bicycle or scooter parking). A quarter, 25.3 % ($n = 90$), of clinic workers used sustainable transportation, and 18.5 % ($n = 66$) used online meetings.
- Ethical procurement: 87.4 % ($n = 312$) did not consider purchases regarding supplier Corporate Social Responsibility initiatives (ie., voluntary actions aimed at generating a positive impact on society and the environment, e.g., volunteer programs, promoting diversity and inclusion, promoting ethics and transparency, wellness programs for their employees, or initiatives addressing social issues).

Fig. 1 displays the proportional activity of participants' reported sustainability endeavours.

There were no significant sex differences in this study, with male average score of 12.8 ± 4.8 and female 12.8 ± 4.9 ($p = 0.90$), however other studies report a positive association (higher learning) for females [35]. Similarly, no differences were found according to whether the professional had their own clinic or were employed (12.9 ± 4.6 versus 12.4 ± 5.5; $p = 0.05$).

There was no significant relationship between BMI and physical activity (WHO recommendation), $p = 0.26$. There was no significant relationship between BMI and sustainability level, ie sustainability score <12: BMI 24.6 kg/m^2 ± 4.5; sustainability score between 12 and 25: BMI 24.6 kg/m^2 ± 4; and sustainability score >25: BMI 23.5 kg/m^2 ± 2; $p = 0.83$.

There were significant differences between participants who had knowledge of the SDGs and those who did not have sustainability training (15.9 ± 4.6 versus 12.4 ± 4.7; $p < 0.0001$). The correlation between age and sustainability score was low ($r = 0.173$; $p = 0.012$), as was that between professional experience (years) and sustainability level ($r = 0.124$; $p = 0.019$).

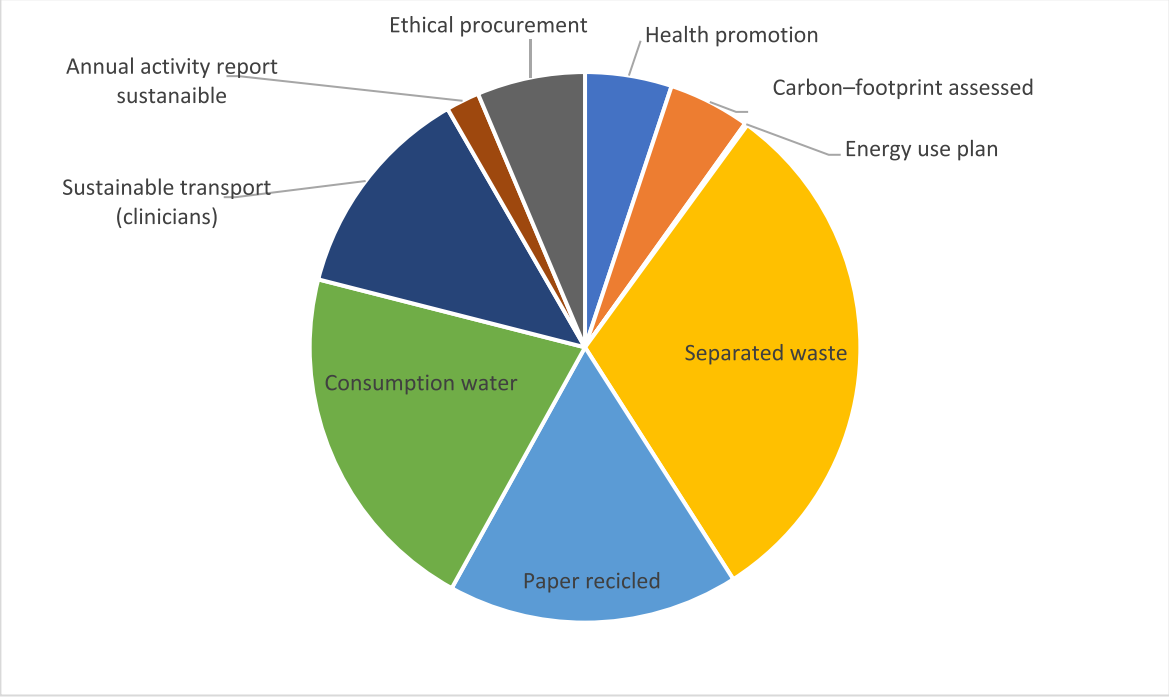

Fig. 1. Paper recycling and the separation of waste (plastic, metal, glass, paper) in clinics approximated half of participants sustainability activity. Activity to reduce water consumption and clinicians adopting sustainable transport were the next most reported sustainability activities.

Acknowledging that score categories were arbitrary, participant sustainability was evaluated (Table 3). The average score was 12.80 ± 4.9 (range: 2 to 27), with

- 41.7 % ($n = 149$) returning low sustainability (score <12)
- 56.9 % ($n = 203$) returning medium sustainability (score between 12 and 25)
- 1.4 % ($n = 5$) exhibited high sustainability (score >25).

Although the World Health Organisation (WHO) recommends adults undertake in 5 h of exercise per week, 14 % ($n = 50$) did not engage in any physical activity, and 25.5 % ($n = 91$) engaged in only 1 to 2 h of physical activity per week. (Table 1).

Private motor vehicles were used by 90.5 % ($n = 324$), with 89.6 % ($n = 293$) using fossil fuels (gasoline/diesel), 8.9 % ($n = 29$) using hybrid fuel/power, and 1.5 % ($n = 5$) using electric vehicles (Table 1). Only 8.7 % ($n = 31$) used bicycles or electric scooters as means of transportation, and 82.6 % ($n = 295$) did not regularly use public transportation.

Discussion

Environmental action is urgent, and all governments, all industry sectors, all communities and all individual citizens must act, if the Paris target to limit temperature rise to 1.5 °C is to be realised. Several international agendas have been established to address various global challenges: Climate Change (Paris Agreement) [36], Sustainable Development (2030 Agenda) [34], disaster risk reduction (Sendai Framework) [37], and Sustainable Urban Transformation (New Urban Agenda) [38].

The 2022 Lancet Countdown report on health and climate change indicates that rising temperatures have exposed vulnerable populations to significantly more heatwave days in 2021 compared to the annual period between 1986 and 2005, and 68 % more heat-related deaths between 2000 and 2004, and 2017 to 2021. Floods and wildfires have led to thousands of displacements in recent years [39].

The results of our study found that 90.5 % of participants drove a private motor vehicle using fossil fuels (89.6 %). Renewable energy still makes up only 2.2 % of global energy supply [39], and our study aligned, finding that 95 % of participants had no renewable energy sources in their clinics. The energy and transport sectors are both crucial for avoiding global temperature increases, yet still rely heavily on fossil fuels.

Fig. 1 shows that most participant sustainability activity addressed waste and water management within the clinics. Given that supply chains, energy, and transport, dominate healthcare emissions, this likely pairs with a sustainability knowledge deficit, as does the low awareness of UN SDGs.

Health professionals have great potential to influence the renewable energy transformation, but may not be adequately prepared for climate change. Environmental sustainability should be integrated into university education [40] through Planetary Health Education [41]. Recently, the Royal College of Physicians and Surgeons of Glasgow, have made Green Podiatry teaching and learning modules freely available, which are beginning to be integrated into undergraduate podiatry training. This study reinforces the education need for health professional and students, with only 10.1 % of participants aware of the UN SDGs. Achieving sustainability will require profound, strategic, and structural changes across the global healthcare ecosystem [42], and individual awareness and commitment are essential, if we are to affect life-saving global change.

Green Podiatry [28] aligns with the actions of other health and medical areas, in beginning to implement measures to reduce the environmental impact of their disciplines. Gordon [43] suggests reducing the use of volatile anaesthesia agents (especially nitrous oxide), medications, and anaesthesia equipment in the operating room. Spruell et al. [44] provide examples of sustainable practices in

Table 3
Frequency of measures taken to improve sustainability in podiatry clinics from survey questionnaire responses.

Podiatry Clinic Sustainability Questionnaire	no, never % (n)	occasionally, or sometimes % (n)	yes, always % (n)
Do you collaborate with institutions or companies to develop activities that promote sustainability (e.g., participating in sustainable events at the clinic)?	86.3 (308)	11.7 (42)	2.0 (7)
Do you collaborate with institutions, associations, or companies to develop activities that promote foot health and well-being of the population (e.g., health screenings for groups, talks on podiatry prevention, etc.)?	71.1 (254)	19.3 (69)	9.5 (34)
Have you ever measured the carbon footprint of your consultation?	98.0 (350)	1.7 (6)	0.3 (1)
Have you received any awards or recognition for the environmental management of your consultation?	98.3 (353)	–	1.1 (4)
Do you have any environmental certification such as ISO 14,001, EMAS, or similar?	96.9 (346)	–	3.1 (11)
Do you prepare an annual activity report (report) for your consultation that includes environmental, social, and economic aspects?	92.2 (329)	3.9 (14)	3.9 (14)
Is there a communication channel for suggestions, complaints, etc. for your consultation?	47.6 (170)	–	52.4 (187)
Do you have a specific strategic plan to optimize energy consumption in your consultation, including lighting, air conditioning, renewable energies, and/or energy reduction?	65.3 (233)	–	34.7 (124)
Have you considered improving the energy efficiency of your consultation through better enclosures, replacing appliances with more efficient ones, etc.?	40.6 (145)	–	59.4 (212)
Regarding lighting, have you implemented efficiency systems?	15.1 (54)	–	84.9 (303)
When contracting energy with a company, do you opt for 100 % renewable electricity?	78.2 (279)	–	21.8 (78)
Do you have any renewable energy installations in your consultation (solar thermal, solar photovoltaic, wind, geothermal, biomass boiler)?	95.0 (339)	–	5.0 (18)
Regarding air conditioning, do you limit temperatures to 19 and 27° for greater efficiency (temperature regulated by the Government since August 2022)?	11.8 (42)	67.8 (242)	20.4 (73)
Do you separate non-hazardous waste in your consultation (plastic, metal, paper, glass)?	18.8 (67)	19.9 (71)	61.3 (219)
Do you implement measures to minimize waste (paper, cardboard, packaging, cartridges, etc.)?	30.3 (108)	69.7 (249)	–
Do you engage in any circular economy activities (e.g., donating equipment, reusing workshop waste, etc.)?	75.6 (270)	–	24.4 (87)
Do you use paper for marketing your clinic (e.g., promotions, types of offered treatments)?	12.3 (44)	19.9 (71)	67.8 (242)
When purchasing office supplies and printed paper, do you consider sustainable materials? For example, post-consumer recycled paper (certified with Blue Angel or equivalent) or paper from sustainably managed forests (FSC)	66.1 (236)	–	33.9 (121)
When purchasing furniture or decorating the clinic (e.g., for Christmas), do you consider	59.9 (214)	–	40.1 (143)

(*continued on next page*)

Table 3 (*continued*)

Podiatry Clinic Sustainability Questionnaire	no, never % (n)	occasionally, or sometimes % (n)	yes, always % (n)
sustainability criteria? (e.g., avoiding plastics, using recycled materials such as cardboard, wood, or plant fibres, etc.)			
Do you use QR codes or similar in the consultation to provide podiatry advice, promotion videos on prevention, etc.?	80.1 (286)	16.8 (60)	3.1 (11)
Do you apply any water-saving measures in your consultation?	58.5 (209)	–	41.3 (148)
Do you provide information to patients on sustainable transportation options to reach your consultation? (e.g., a map with nearby bus stops, bike parking area, scooter area, etc.)	71.7 (256)	–	28.3 (101)
Do you and the clinic staff use sustainable mobility options to get to work? (e.g., walking, cycling, scooters, etc.)	46.8 (167)	28.0 (100)	25.2 (90)
If you need to meet with another healthcare professional regarding a patient's treatment, do you conduct online meetings?	28 (100)	53.5 (191)	18.5 (66)
When purchasing podiatry materials from a company or distributor, do you consider whether the company has Corporate Social Responsibility (CSR) initiatives? (e.g., ethical corporate practices, respect for human and workers' rights, activities to reduce their environmental impact, etc.)	87.4 (312)	–	12.6 (45)
Do you collaborate with any association to provide consultations or podiatry materials to low-income or at-risk populations? (e.g., collecting gently used footwear to donate; offering special prices to at-risk groups, etc.)	60.8 (217)	25.2 (90)	14.0 (50)

Emergency Departments and gynaecology clinics [45].

A potential avenue for future work is the development of a comprehensive framework for assessing sustainability in podiatry. Such a framework could include metrics for evaluating environmental impact, resource consumption, and waste management specific to podiatry practices. A similar approach has been proposed in other healthcare areas, such as those outlined in studies like el de Maldovan F [8], which emphasize the need for tailored sustainability assessments. Establishing this framework could enable better benchmarking of practices across different regions and provide a roadmap for podiatry professionals to adopt more sustainable approaches. This would support not only the environmental objectives but also align with broader healthcare goals for promoting planetary health.

The three Green Podiatry pillars direct podiatrists to adopt:

1. Exercise: assess and advise physical activity for every patient, promoting low-carbon, health-enhancing transport
2. Evidence: stop all diagnoses and interventions that are not supported by evidence (e.g. asymptomatic paediatric flat feet [46]). Overdiagnosis is expensive, can fuel unnecessary treatments, which generate carbon emissions without improving health [47].
3. Everyday changes, both inside and outside the clinics (implementing recycling programs and adopting digital record-keeping to reduce paper consumption, choosing environmentally friendly materials, encouraging the use of public transportation, educating patients on the importance of sustainability and how their actions can contribute to environmental preservation, and selecting suppliers and products that follow sustainable practices) that contribute to sustainability to ensure the continuity of quality healthcare and environmental preservation. These changes have been outlined against effort [28, 29].

Partnering with sustainable companies and suppliers for proper resource management, reduced consumption and waste, are further possible and important examples. Such changes not only benefit patients and the community but also show leadership to other healthcare professionals, promoting a responsible approach to healthcare.

There are limitations to this study. Firstly, the survey was answered online on a voluntary basis, which may have introduced bias, as it might have been completed by podiatrists who are more aware of the need for change. Further, this study is limited to Spain, hence the need for comparisons with other countries.

This is a novel investigation, which addresses the knowledge of podiatrists as a discrete area of healthcare, at a time when the relationship between human and planet health has never been more crucial. Given the fact that there is no prior research in this field, there are no comparative references, which necessitated the development of a new and specific survey tool.

Conclusions

Overall, Podiatry clinics in Spain demonstrate a low level of sustainability, in terms of both knowledge and actions, which is not varied by gender, age, or professional experience. Most of the sustainability activity addresses waste and water management within the clinics. Whilst a positive intention, this activity yields relatively low impact, in comparison to addressing supply chains, energy, and transport, all of which result in far greater emissions. Coupled with the low awareness of UN SDGs, the knowledge of podiatrists regarding healthcare and climate change appears limited.

Further concern is the inadequate level of physical activity in at least 40 % of podiatrists. As primary health practitioners, podiatrists are influential, and need to act as role models for the community. Physical activity is as primary for community health, as feet are to podiatry.

Incorporating sustainability principles into podiatry clinics benefits patient health, promotes responsible resource management, and contributes to environmental conservation. The integration of sustainable practices aligns with global initiatives for environmentally responsible healthcare, and ensures the long-term viability of podiatric services, as many citizens become increasingly concerned, and favour good environmental business practices.

Action is required to promote sustainable practices and lifestyles for Spanish podiatrists. The implementation of *Green Podiatry* principles needs to be disseminated and incorporated into Spanish podiatry clinics, and all podiatry clinics world-wide.

Declaration of competing interest

None declared.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.hlpt.2024.100940.

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