Article

Situation of Physiotherapy Clinics in the Community of Madrid in Relation to the Concept of Sustainability: A Survey Study

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Abstract: Introduction: Nowadays, it is increasingly urgent to regulate the use of the natural resources of our planet. From the field of physiotherapy, it is necessary to address this issue to ensure that our centers comply as much as possible with the Sustainable Development Goals (SDGs). Objective: To analyze the current situation in physiotherapy clinics in the Community of Madrid so as to identify whether their managers are aware of the concept of sustainability and its levels of application. Material and Methods: A survey study was carried out with the collaboration of 52 physiotherapy clinics in the Community of Madrid (Spain) to collect relevant data on sustainability. The questions were designed by experts in physiotherapy and sustainability with the aim of obtaining as much information as possible, analyzing the knowledge of sustainability and part of the goals established in the 2030 agenda. The procedures were conducted following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement and checklist, in addition to following the Declaration of Helsinki. The study was approved by the Local Ethics Committee of the European University of Madrid, Madrid, Spain (CIPI/22.016). Results: A total of 35 questions were answered by 52 physiotherapy clinics in the Autonomous Community of Madrid (Spain) that completed the survey. In addition to the results of each question related to the concept of sustainability, significant differences were observed in the proportion of emotions detected with the NRC dictionary in the question about how waste is removed from the center ($p = 0.002$ and 0.008, respectively) with a higher proportion of positive feelings with emotions of joy, anticipation, confidence and surprise expressed by participants from clinics of less than 90 m^2, while in those from clinics of more than 90 m^2, negative feelings predominated with emotions of disgust, fear or sadness; in both cases, the effect of size was large and significant. Conclusions: Most of the physiotherapy clinics in the Community of Madrid that participated in the study are aware of the concept of sustainability. However, in practice, they do not sufficiently apply sustainability protocols in their clinics.

Keywords: sustainability; environmental health; physiotherapy specialty; efficiency

1. Introduction

In the world at present, it is necessary and very important to be aware of both environmental and economic sustainability, since natural resources are becoming scarce and the adequate growth of human beings at all levels could be compromised [1].

The concept of sustainability appeared for the first time in 1987, with the publication of a report in which the negative consequences caused by the deterioration of the environment on economic development and at a global level were described [2]. This report sought to find solutions to all the problems arising from over-industrialization and population growth.

Sustainability means acknowledging that the environment and nature are not inexhaustible, and that their protection and rational use are increasingly urgent. The aim is to achieve a satisfactory quality of life for people and to achieve economic growth that can be distributed equitably in society without damaging the environment [3].

Civilization could be "in the process of collision" with nature, as stated in "Notice to Humanity from the Scientific Community" (carried out in 1992 by more than 1500 scientists, among them 103 Nobel Prize winners) (UCS, 1992) [4].

It is important to recognize that, although the concept of sustainability is a relevant concern at present, many studies, reports and conferences have been carried out in recent years to find valid solutions to all the problems that will have to be faced in the future [5–7].

There are several dimensions of sustainability [8,9]: (1) environmental sustainability, which consists of preserving biodiversity over time, taking care to properly manage natural resources by being aware of and respecting nature in order to use it for human development without harming it; (2) economic sustainability, which is based on the ability to generate wealth in an equitable manner so that all social spheres are able to cope with their economic problems by strengthening production systems and respecting the environment (renewable energies and economic growth); (3) social sustainability, which refers to the need to incorporate values in society to respect nature, educating and raising awareness among the population on the necessity to engage in sustainability behaviors, to create a new society with a better quality of life for all; (4) political sustainability, which aims to create rules or laws to ensure respect for the environment and people, trying to generate solidarity relations between different communities to increase their quality of life, thus generating a clear balance between the environment, the economy and society.

Environmentally sustainable health care is necessary in all health systems to minimize the direct and indirect damage it can cause to our planet and its population [10].

In this regard, a recent systematic review [11], focused on the environmental impacts of healthcare for musculoskeletal conditions, found that most of the research conducted had been published in the last 3 years, reflecting a growing interest in the topic, with surgery being one of the procedures contributing most to the greenhouse effect. Of the 24 original research studies included, the authors found that less than half directly measured the environmental impact related to climate change for any aspect of musculoskeletal healthcare, identified ways to reduce waste in orthopedic surgery and included the increased use of reusable instruments to decrease the impact of the carbon footprint.

Recently, the number of new physiotherapists in the world has increased, as well as the opening of new specialized centers [12]. In the community of Madrid (Spain), this number has increased in recent years, reaching a total of 2000 physiotherapy clinics for a total of 6,769,113 citizens [13].

In physiotherapy clinics, there is a large amount of waste generated daily, including disposable material, organic material, bio-sanitary waste, etc. [14]. Considering the exponential increase in the number of physiotherapists and clinics opened in Spain in recent years, it is possible to estimate the importance of the environmental impact that this entails [15,16].

As the clinics are part of the health field, it is considered essential to achieve an optimal use of the energy systems, which grants Spain a good position in terms of the European Union regulations [16]. For this reason, the consumption of disposable products should be

minimized as much as possible, since, as has been proven in other studies in the healthcare field, their use is exaggerated [17]. Energy expenditure should be controlled, and care should be taken to ensure proper recycling and waste management [15,18].

Considering the relevance of physical therapy in today's world, it is necessary to introduce the study of sustainability in physical therapy clinics [19]. In this way, information can be gathered on the current state and on whether the sustainability objectives are really being considered and applied, to know whether it would be necessary to open new lines of research, as well as to inform the official bodies and the scientific community, so that effective measures can be developed to develop the application of the sustainability guidelines [20].

By studying the situation of sustainability of physiotherapy clinics in the Community of Madrid, data can be obtained to determine the current situation of the centers in terms of sustainable development and what this could mean in terms of energy savings [17,19]. As these are public-facing businesses, making the centers efficient, sustainable and profitable sets an example to society and encourages the development of sustainable objectives [17–21]. It is of interest, therefore, to know the real and current situation of all the physiotherapy clinics in the Community of Madrid, as well as to have an idea of the real repercussion that these practices can have on an environmental, social, economic and profitability level in the clinics [18,19,22].

For this reason, the aim of the present study was to analyze the current situation of physiotherapy clinics in the Community of Madrid so as to identify whether their managers were aware of the concept of sustainability and its levels of application.

2. Materials and Methods

2.1. Study Design

A survey study was carried out with the collaboration of 52 physiotherapy clinics in the Community of Madrid between January 2022 and July 2022 in Madrid, Spain. The procedures were conducted following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement and checklist, in addition to following the Declaration of Helsinki, and all subjects signed an informed consent form before participating in the study. The study was approved by the Local Ethics Committee of the European University of Madrid, Madrid, Spain (CIPI/22.016).

2.2. Study Population

A representative sample of the study was taken from a group of 52 physiotherapy clinics, out of the approximately 2000 that exist in the Autonomous Community of Madrid (Spain), with different characteristics in terms of size of the center, location in the city and physiotherapy specialties. The clinics were contacted to respond to an e-mail survey with 35 questions that examined their knowledge and implementation of sustainability measures in their centers.

2.3. Outcomes Measures and Procedure

The questions were designed with the aim of obtaining as much information as possible by analyzing the knowledge of sustainability and part of the goals set out in the 2030 agenda [5,7,10,13,16]. For this purpose, 35 questions were devised among experts in physiotherapy and sustainability of the Universidad Francisco de Vitoria (Madrid, Spain), and the European University of Madrid, Spain (University that has the full accreditation of the World Confederation for Physical Therapy, WCPT). The questionnaire was developed through meetings that started with brainstorming based on the published literature and expertise, and then developed the questionnaire through expert consensus.: (1) about the origin of the energy used in their centers; (2) about the efficiency and control of all energy systems; (3) about how recycling is carried out, (4) about how waste management is developed; (5) about the predisposition to make changes in their centers that improve the degree of sustainability; (6) about the profitability of their business.

2.4. Statistical Analysis

The statistical analysis was performed with the R software Ver. 3.5.1 (R Foundation for Statistical Computing, Institute for Statistics and Mathematics, Welthandelsplatz 1, 1020 Vienna, Austria) [23]. The significance level was set at $p < 0.05$. Qualitative variables were described in absolute values and frequencies and quantitative variables with mean and standard deviation.

The final power of the study was calculated with the value of Cronbach's α calculated for closed responses under the null hypothesis of obtaining a value greater than 0.7 calculating the right critical value of the F distribution [24,25].

Differences in responses as a function of clinic surface area were analyzed with Fisher's exact test and effect size was calculated with Cramer's V defined as small (0.058–0.173), medium (0.173–0.289) and large (>0.289) [26,27]. In the case of polarity, the Mann–Whitney U test was applied and the effect size was calculated with the nonparametric r statistic, defined as 0.1–0.4 (small), 0.4–0.6 (moderate) and >0.6 (large) [28].

2.4.1. Analysis of the Closed Questions

Internal consistency was calculated from the polychoric or tetrachoric correlation matrix (depending on whether the items were binary or polytomous) using Cronbach's α statistics in their normal, standardized and partitioned versions, Guttman's $\lambda6$, Mc Donald's ω and Greatest Lower Bound (GLB), as well as the consistency at item removal, with values above 0.8 being taken as the cut-off point [29].

The latent structure was analyzed by means of multiple correspondence analysis since all the responses were categorical.

2.4.2. Analysis of Open-Ended Questions
Quantitative Text Analysis

The text of the open-ended questions was lemmatized for analysis. Lemmatization is a linguistic process that consists of, given an inflected form (i.e., plural, feminine, conjugated, etc . . .), finding the corresponding lemma. The lemma is the form that by convention is accepted as representing all the inflected forms of the same word, i.e., the lemma of a word is the word that we would find as an entry in a traditional dictionary: singular for nouns, masculine singular for adjectives and infinitive for verbs.

A sentiment analysis of the text was performed using Bing [30], Afinn [31] and National Research Council Canada (NRC) [32] dictionaries. These three dictionaries are based on unigrams or individual words in Spanish that assign scores for positive or negative sentiments, in addition, the NRC dictionary classifies words into emotional categories of anger, anticipation, disgust, fear, joy, sadness, surprise and confidence, while the Affin lexicon assigns words a score ranging from -5 to 5, with negative values indicating negative sentiments and positive values indicating positive sentiments.

Additionally, the polarity of the sentences was analyzed using the Bing dictionary, the SODictionaries V1.11Spa1 [33,34] dictionary as amplifiers and decrementers, and those proposed by Vilares D et al. (2013) [35] as negators.

- To calculate the polarity (δ), a contextual cluster of words (x_i^T) is formed around each polarized word using the Bing dictionary, taking by default four words before and two words after it (if there is a comma in the cluster, only the words after the comma will be included in the cluster) and these will be treated as valence modifiers;
- The words in this cluster are labeled as neutral (x_0^i), negating (x_i^N), amplifying (x_i^a) or deamplifying (x_i^d), using for this purpose the SODictionariesV1.11Spa dictionary and the negators proposed by Vilares D et al. (2013) [35]. Neutral words do not contribute to the equation but affect the word count (n);
- Each polarized word (negative or positive) is weighted (w) according to the contextual cluster weights (x_i^T) and again weighted according to the number and position of the surrounding valence modifiers. A weight c can be added and applied to both

amplifiers and deamplifiers (with a default value of 0.8 and with a lower limit for deamplifiers of -1);
- Finally, the contextual cluster (x_i^T) is summed and divided by the square root of the number of words ($\sqrt{n}$) to generate a polarity score (δ) that by default is not constrained in its value;
- The result is the formula:

$$\delta = \frac{x_i^T}{\sqrt{n}}$$

where:

$$x_i^T = \sum\left(\left(1 + c\left(x_i^A - x_i^D\right)\right) \cdot w (-1)^{\Sigma\ x_i^N}\right)$$

$$x_i^A = \sum\left(w_{neg} \cdot x_i^a\right)$$

$$x_i^D = max\left(x_i^{D'}, -1\right)$$

$$x_i^{D'} = \sum\left(-w_{neg} \cdot x_i^a + x_i^d\right)$$

$$w_{neg} = \left(\sum x_i^N\right)$$

A structural topic models analysis (STM) was also applied, which allows us to analyze the occurrence of topics throughout the comments and, in addition, allows us to add the type of clinic as a covariate [36]. The selection of the optimal number of topics was based on the ratio between semantic coherence and exclusivity [37,38]. Exclusivity evaluates whether the main words of topics also appear as main words of other topics, while semantic coherence shows whether or not the words most associated with a topic occur equally within the documents; in both cases, higher values are better.

Qualitative Text Analysis

A qualitative analysis of the open-ended questions was carried out using an inductive methodology based on the phenomenological theoretical framework [39]. For this purpose, we started with a rapid and impressionistic coding and then subjected the text to several cycles of coding–recoding until the emerging codes were saturated.

The emerging codes were also analyzed by means of coincidence analysis (CNA) [40] to detect the presence of causal chains between the codes. CNA is a comparative configurational method oriented to the analysis of binary data based on Boolean algebra, in which combinations of levels of variables with an occurrence greater than 50% that explain the result of other variables are detected.

3. Results

A total of 35 questions were answered by 52 physiotherapy clinics in the Autonomous Community of Madrid (Spain) that completed the survey.

3.1. Power Analysis

With the sample of 52 clinics responding to the survey and accepting a risk $\alpha < 0.05$, the final power of the study was 37.6% [41–43].

3.2. Closed Questions Analysis

The following is a list of the 27 closed questions. Due to the length of the questions, their titles have been coded in some graphs and tables (Supplementary Material) to improve their clarity (Table 1).

Table 1. List of the 27 closed questions and their abbreviations answered by the 52 selected physiotherapy clinics.

	Abbreviations
Have you ever heard of sustainability in the field of physical therapy?	SUST
Do you know the exact energy consumption of your clinic, electricity, heating, water, etc … ?	CONSUM
Have you heard of so-called "green electricity"?	GREEN
Do you know the origin of the electrical energy consumed in your clinic?	ORIG
Do you have any electricity and light saving system in your center (timers, low consumption bulbs, led, etc … ?	SAVE
Which of the following measures do you carry out in your clinic: Control of the luminous flux	MES1
Which of the following measures do you carry out in your clinic: Elimination of Standby	MES2
Which of the following measures do you carry out in your clinic: Thermal management	MES3
Which of the following measures do you carry out in your clinic: Choice of energy-efficient devices	MES4
Which of the following measures do you carry out in your clinic: Adequate ventilation	MES5
Are there any water saving systems in your clinic (flow reducers, liquid flow automations, toilet flushing with differentiated flow)?	WATER
Do you think you are sufficiently aware of the classification of the waste generated in your center?	BELIEVE
How do you consider your current management of bio-sanitary waste (hazardous or special)?	CONSI
If you use air conditioning equipment with heat pump/cooling (Splitz, portable, etc …) Do you know the number of frigories that your clinic would need to achieve the most efficient air conditioning in your clinic?	FRIG
Do you carry out a periodic maintenance of the air conditioning systems?	MANT
Do you use an environmentally friendly laundry system (biodegradable detergents, low toxicity, efficient water and electricity consumption)?	LAUNDRY
Do you try to use recycled materials as much as possible?	TRAT
Do you use environmentally friendly cleaning and disinfection products?	PROD
Do you use the clean points in your community to dispose of deteriorated lighting equipment (ultraviolet, fluorescent, etc …)?	PUNT
Do you consider that taking care of the physical and mental health of your salaried physiotherapists should be part of a sustainable development project?	FISI
Do you know the Three Rs rule? Reduce, Reuse and Recycle	RRR
In which of the following areas of your clinic do you think you can improve from a sustainability point of view: Energy consumption MEJ1	MEJ1
In which of the following areas of your clinic do you think you can improve from a sustainability point of view: Waste management	MEJ2
In which of the following areas of your clinic do you see room for improvement from a sustainability point of view: Furniture layout	MEJ3
In which of the following areas of your clinic do you think you can improve from a sustainability point of view: Decrease consumption of disposable material	MEJ4
In which of the following areas of your clinic do you think there is room for improvement from a sustainability point of view: Improvements in the work system of my employees	MEJ5
Are you aware of the goals set out in the 2030 agenda for sustainable development?	AGEND

It could be seen that a large majority of respondents had heard of "green electricity" (73.1%), had energy saving systems (90.4%) and took energy saving measures although they did not usually eliminate standby (76.9%), maintain air conditioning systems (84. 6%), use recycled materials (73.1%) and clean points (84.6%), and considered it part of sustainable development to take care of the physical and mental health of their physiotherapists (84.6%), and also know and use the three Rs rule (69.2%). In contrast, they did not know what the

optimal number of frigories for their air conditioning equipment was (36.5%), did not use ecological cleaning products (76.9%) and did not know the objectives of the 2030 agenda (63.5%). No significant differences were observed between clinics in the survey responses (Table 2 and Supplementary Material Table S1).

Table 2. Responses to the survey provided by the 52 clinics.

Have you ever heard of sustainability in the field of physical therapy?	No	33 (63.5)	If you use heat pump/cooling air conditioning equipment, do you know the number of frigories that your clinic would need in order to achieve the most efficient air conditioning in your clinic?	No	44 (84.6)
	Yes	19 (36.5)		Yes	8 (15.4)
Do you know the exact consumption of your clinic, electricity, heating, water, etc.?	Approximately	17 (32.7)	Do you perform periodic maintenance of air conditioning systems?	No	8 (15.4)
	No	19 (36.5)		Yes	44 (84.6)
	Yes	16 (30.8)	Do you use an environmentally friendly laundry system?	No	30 (57.7)
Have you heard of so-called "green electricity"?	No	14 (26.9)		Yes	22 (42.3)
	Yes	38 (73.1)	Do you try to use recycled materials as much as possible?	No	14 (26.9)
Do you know the origin of the electrical energy consumed in your clinic?	No	31 (59.6)		Yes	38 (73.1)
	Yes	21 (40.4)	Do you use cleaning and disinfection products considered environmentally friendly?	No	40 (76.9)
Do you have in your center a system for saving light and electricity?	No	4 (7.7)		Yes	12 (23.1)
	Yes	47 (90.4)	Do you use your community's clean points to dispose of deteriorated lighting equipment?	No	8 (15.4)
	Missing data	1 (1.9)		Yes	44 (84.6)
Which of the following measures do you carry out in your clinic: Luminous flux control	No	30 (57.7)	Do you consider that taking care of the physical and mental health of your salaried physiotherapists should be part of a sustainable development project?	I have never thought about it	8 (15.4)
	Yes	22 (42.3)		Yes	44 (84.6)
Which of the following measures do you carry out in your clinic? Elimination of standby	No	40 (76.9)	Do you know the Three Wrongs rule? Reduce, reuse and recycle	No	6 (11.5)
	Yes	12 (23.1)		Yes, and I practice it	36 (69.2)
Which of the following measures do you carry out in your clinic: Thermal control	No	22 (42.3)		Yes, but I do not practice it	10 (19.2)
	Yes	30 (57.7)	In which of the following areas of your clinic do you think you can improve from a sustainability point of view: energy consumption	No	30 (57.7)
Which of the following measures do you carry out in your clinic: choice of energy efficient devices	No	26 (50.0)		Yes	22 (42.3)
	Yes	26 (50.0)	In which of the following areas of your clinic do you think you can improve from a sustainability point of view: waste management	No	30 (57.7)

Table 2. *Cont.*

Which of the following measures do you carry out in your clinic: adequate ventilation	No	13 (25.0)		Yes	22 (42.3)
	Yes	39 (75.0)	In which of the following areas of your clinic do you think you can improve from a sustainability point of view: Furniture distribution	No	30 (57.7)
Are there water saving systems in your clinic?	No	31 (59.6)		Yes	22 (42.3)
	Yes	21 (40.4)	In which of the following areas of your clinic do you think you can improve from a sustainability point of view: decrease consumption of disposable material.	No	30 (57.7)
Do you think you are sufficiently familiar with the classification of waste generated at your clinic?	No	7 (13.5)		Yes	22 (42.3)
	It is not clear to me	11 (21.2)	In which of the following areas of your clinic do you think you can improve from a sustainability point of view: improvements in the work system of my employees.	No	30 (57.7)
	Yes	34 (65.4)		Yes	22 (42.3)
What do you consider your current management of biohazardous waste to be like?	Good	22 (42.3)	Are you aware of the goals set out in the 2030 agenda for sustainable development?	It rings a bell, but I don't really know them	13 (25.0)
	Insufficient	2 (3.8)		No	33 (63.5)
	Very good	24 (46.2)		Yes	6 (11.5)
	Regular	4 (7.7)			
Data expressed with absolute and relative values (%)					

Only Cronbach's α in its normal and standardized versions was below 0.8, while the rest of the indicators presented values above 0.8, indicating that the survey presented a unidimensional latent structure. No item removed decreases by at least one point the initial values of both α in its two versions and $\lambda 6$, indicating the relevance of all the questions included in the survey (Table 3 and Supplementary Material Table S2).

Table 3. Internal validity indices.

Cronbach's α	0.767 IC95% (0.705, 0.823)
α standardized	0.677 IC95% (0.59, 0.754)
α per partition	0.831 IC95% (0.66, 0.956)
$\lambda 6$ of Guttman	1 CI95% (1, 1)
ω categorical	0.897 IC95% (0.271, 0.644)
Greatest Lower Bound (GLB)	1.28

CI95%: 95% confidence interval.

Multiple correspondence analysis shows that all dimensions explained less than 10% of the inertia except dimension 1, which explained 21.3% of the inertia, which reinforced the unidimensionality of the survey (Supplementary Material Figure S1).

A large majority of the questions were clustered around dimension 1. The questions: "Which of the following measures do you carry out in your practice?" and "In which of the following areas of your practice do you think you can improve from the point of view of sustainability?" were the ones with the highest inertia values and therefore the ones that

contributed most to dimension 1 (Supplementary Material Figure S2). A low contribution from the categories was observed, again being the categories of the questions "Which of the following measures do you carry out in your practice?" and "In which of the following areas of your clinic do you think you can improve from a sustainability point of view?" which were the top contributors, followed by the affirmative responses to the question "If you use heat pump/cooling air conditioners (Splitz, portable, etc . . .), do you know the number of cooling units your clinic would need to achieve more eco-sustainable and energy efficient air conditioning?" (Supplementary Material Figure S3). It could be seen how the participants were grouped into two clearly differentiated blocks with a majority of clinics larger than 90 m^2 in the block that contributed the most to dimension 1 (16 versus 6) while in the block with the lowest contribution were almost all the clinics smaller than 90 m^2 (12 out of a total of 18) (Supplementary Material Figure S4).

3.3. Open-Ended Questions Analysis

The following is a list of the eight open-ended questions. Due to the length of the questions, their titles have been coded in some graphs and tables (Supplementary Material) to improve their clarity (Table 4).

Table 4. List of the 8 open questions and their abbreviations answered by the 52 selected physiotherapy clinics.

	Abbreviation
If you answered yes to the previous question, please specify which electricity saving systems you use.	AHE
If your facility generates waste such as kerosene, creams, medicines, cosmetics, etc., please specify how you carry out the removal of these wastes in your clinic?	RET
What type of heating/air conditioning systems do you use?	CLI
What made you make this choice of air conditioning/heating system, did you consider looking for a type of heating as sustainable as possible in relation to the environmental impact?	CLIMOT
If you are aware of it, write down the cleaning products used in your clinic.	LIM
Which of the 17 Sustainable Development Goals are you familiar with?	17OBJ
Which of these Agenda 2030 goals apply to your clinic?	AG2030
Would you be willing to implement the necessary sustainability measures in the clinic to further adapt to the 2030 agenda? If yes, please define briefly the measures you would adapt	MED

Significant differences were observed in the proportion of sentiments and emotions detected with the NRC dictionary in the question about how the residuals are removed from the center (p = 0.002 and 0.008, respectively) with a higher proportion of positive sentiments with emotions of joy, anticipation, confidence and surprise expressed by participants from clinics of less than 90 m^2, while in those from clinics of more than 90 m^2, negative feelings predominated with emotions of disgust, fear or sadness; in both cases, the effect size was large and significant. Significant differences were also observed in the polarity of the sentences in the answers to the question on the implementation of the Agenda 2030 measures (p = 0.047) with the expression of positive sentiments in the answers of the participants belonging to clinics of less than 90 m^2 and negative in those of more than 90 m^2, with a small and significant effect size (0.25 ± 0.46 vs. −0.04 ± 0.33) (significant values are shown in red) (Supplementary Material Table S3).

Analyzed globally, it was verified in the questions CLIMOT, LIM, 17OBJ, AG2030 and MED the predominance of positive feelings with the Bing dictionary and with the NRC with emotions of joy and anticipation, and of negative feelings with the Afinn dictionary, although with scores in the limit of negativity of −1, while the polarity of the sentences was slightly positive. This pattern was nuanced in the questions AHE, RET, CLI where the feelings and emotions with the NRC and Afinn dictionaries were balanced, while with the

Bing dictionary the predominant feelings were negative, corroborated by the polarity of the sentences that also remained in negative values (Table 5).

Table 5. Global analysis of sentiments, emotions and polarity.

		AHE	RET	CLI	CLIMOT	LIM	17OBJ	AG2030	MED
NRC Dictionary	Negative (%)	52.9	41.5	85.0	11.1	20.0	27.3	10.5	14.3
	Positive (%)	47.1	58.5	15.0	88.9	80.0	72.7	89.5	85.7
	Joy (%)	15.0	18.6	7.7	11.1		9.1	20.0	8.8
	Anticipation (%)	20.0	20.9		25.9	50.0	4.5	16.0	20.6
	Confidence (%)	15.0	14.0	1.5	42.6	25.0	31.8	40.0	32.4
	Dislike (%)		20.9	1.5	7.4	25.0	13.6	4.0	8.8
	Anger (%)	10.0		21.5	1.9		13.6	4.0	5.9
	Fear (%)	15.0	7.0	20.0	1.9		15.9	8.0	11.8
	Surprise (%)	15.0	4.7	27.7	7.4			4.0	5.9
	Sadness (%)	10.0	14.0	20.0	1.9		11.4	4.0	5.9
Afinn Dictionary	Negative (%)	54.5	71.9	44.8	55.0	33.3	84.4	85.3	26.9
	Positive (%)	45.5	28.1	55.2	45.0	66.7	15.6	14.7	73.1
Afinn Dictionary	Score of −1 (%)	45.5	71.9	44.8	50.0	33.3	68.8	85.3	26.9
	Score of −2 (%)	9.1			5.0		15.6		
	Score of 1 (%)	18.2	18.8	3.4	40.0		3.1		61.5
	Score of 2 (%)	27.3	9.4	51.7	5.0	66.7	12.5	11.8	7.7
	Score of 3 (%)							2.9	3.8
Bing Dictionary	Negative (%)	69.2	88.2	72.9	14.3	22.2	23.3	19.4	21.1
	Positive (%)	30.8	11.8	27.1	85.7	77.8	76.7	80.6	78.9
Polarity of sentences		−0.02 ± 0.12	−0.03 ± 0.18	0.07 ± 0.21	0.10 ± 0.45	0.03 ± 0.33	0.06 ± 0.34	0.05 ± 0.39	0.04 ± 0.27

Data expressed as mean ± standard deviation or with relative values (%).

Regarding to structural topic modelling, maximum coherence is reached with 6–8 themes while exclusivity stabilizes between 6 and 10 themes (Supplementary Material Figure S5). The ratio of exclusivity vs. semantic coherence is at its maximum with 8–10 themes, so the model with eight themes is finally chosen (Supplementary Material Figure S6).

The presence of significant differences was verified in item 6 in the question "Which of these goals of the 2030 agenda do you apply in your clinic?" ($p = 0.033$) (significant values are shown in red) (Table 6).

The analysis of item 6 of the question on knowledge of the goals of the 2030 agenda revealed how it is in the clinics of more than 90 m^2 that the goals of the 2030 agenda related to health and well-being are known, while in the clinics of less than 90 m^2 they acknowledged not knowing these goals (Figure 1).

In the question on the electricity saving systems used, the most important item was 5, referring to the use of timers. In relation to waste removal, the most important items were 6, referring to the use of clean points, and 7, related to the use of containers for plastics. Regarding air conditioning systems, themes 1 and 4 indicated that air conditioning systems, hot/cold pumps and radiators were the most used; the air conditioning system used tended to be the one already installed in the center (theme 5). As theme 5 indicated, the cleaning products used tended to be ordinary detergents; it was not common to know whether these products were environmentally friendly. Respondents were not aware of the 17 Sustainable Development Goals (theme 7) nor were they aware of the goals of the 2030 agenda (theme 4), postponing their implementation to the future (theme 6) (Figure 2).

Table 6. Thematic models according to the type of clinic.

	AHE	RET	CLI	CLIMOT	LIM	17OBJ	AG2030	MED
(Intercept)	0.108 (SE = 0.053), t = 2.017, *p* = 0.052	0.075 (SE = 0.045), t = 1.672, *p* = 0.104	0.072 (SE = 0.043), t = 1.652, *p* = 0.108	0.083 (SE = 0.051), t = 1.64, *p* = 0.111	0.289 (SE = 0.067), t = 4.324, *p* = <0.001	0.103 (SE = 0.058), t = 1.78, *p* = 0.085	0.073 (SE = 0.04), t = 1.841, *p* = 0.075	0.197 (SE = 0.058), t = 3.398, *p* = 0.002
Topic 1 and less than 90 m^2	−0.066 (SE = 0.085), t = −0.777, *p* = 0.443	−0.005 (SE = 0.067), t = −0.076, *p* = 0.94	0.068 (SE = 0.08), t = 0.856, *p* = 0.398	−0.018 (SE = 0.074), t = −0.242, *p* = 0.81	−0.035 (SE = 0.101), t = −0.347, *p* = 0.731	0.077 (SE = 0.097), t = 0.788, *p* = 0.436	−0.013 (SE = 0.067), t = −0.2, *p* = 0.843	−0.005 (SE = 0.091), t = −0.059, *p* = 0.953
(Intercept)	0.109 (SE = 0.041), t = 2.686, *p* = 0.01	0.072 (SE = 0.045), t = 1.577, *p* = 0.123	0.07 (SE = 0.041), t = 1.715, *p* = 0.094	0.162 (SE = 0.045), t = 3.608, *p* = 0.001	0.145 (SE = 0.042), t = 3.41, *p* = 0.001	0.206 (SE = 0.04), t = 5.103, *p* = <0.001	0.153 (SE = 0.051), t = 3.015, *p* = 0.004	0.083 (SE = 0.029), t = 2.871, *p* = 0.006
Topic 2 and less than 90 m^2	−0.066 (SE = 0.067), t = −0.988, *p* = 0.329	0.066 (SE = 0.091), t = 0.726, *p* = 0.472	0.081 (SE = 0.085), t = 0.949, *p* = 0.348	0.026 (SE = 0.09), t = 0.287, *p* = 0.775	−0.097 (SE = 0.075), t = −1.304, *p* = 0.2	−0.09 (SE = 0.071), t = −1.263, *p* = 0.214	0.081 (SE = 0.095), t = 0.853, *p* = 0.399	0.001 (SE = 0.054), t = 0.024, *p* = 0.981
(Intercept)	0.22 (SE = 0.041), t = 5.338, *p* = <0.001	0.099 (SE = 0.039), t = 2.565, *p* = 0.014	0.068 (SE = 0.032), t = 2.13, *p* = 0.039	0.213 (SE = 0.043), t = 4.94, *p* = <0.001	0.084 (SE = 0.036), t = 2.317, *p* = 0.025	0.11 (SE = 0.036), t = 3.033, *p* = 0.004	0.114 (SE = 0.043), t = 2.668, *p* = 0.011	0.092 (SE = 0.033), t = 2.759, *p* = 0.008
Topic 3 and less than 90 m^2	−0.001 (SE = 0.076), t = −0.015, *p* = 0.988	−0.061 (SE = 0.059), t = −1.035, *p* = 0.306	0.004 (SE = 0.063), t = 0.058, *p* = 0.954	0.016 (SE = 0.073), t = 0.213, *p* = 0.833	0.023 (SE = 0.065), t = 0.354, *p* = 0.725	0.026 (SE = 0.068), t = 0.382, *p* = 0.704	−0.053 (SE = 0.069), t = −0.763, *p* = 0.45	0.051 (SE = 0.059), t = 0.866, *p* = 0.391
(Intercept)	0.129 (SE = 0.057), t = 2.276, *p* = 0.029	0.102 (SE = 0.056), t = 1.82, *p* = 0.077	0.157 (SE = 0.065), t = 2.423, *p* = 0.02	0.106 (SE = 0.057), t = 1.848, *p* = 0.072	0.248 (SE = 0.081), t = 3.061, *p* = 0.004	0.104 (SE = 0.069), t = 1.515, *p* = 0.138	0.08 (SE = 0.056), t = 1.43, *p* = 0.161	0.077 (SE = 0.039), t = 1.963, *p* = 0.057
Topic 4 and less than 90 m^2	−0.091 (SE = 0.085), t = −1.063, *p* = 0.295	0.073 (SE = 0.096), t = 0.756, *p* = 0.454	−0.087 (SE = 0.099), t = −0.879, *p* = 0.385	0.022 (SE = 0.087), t = 0.246, *p* = 0.807	−0.086 (SE = 0.12), t = −0.716, *p* = 0.479	0.131 (SE = 0.121), t = 1.084, *p* = 0.285	0.077 (SE = 0.092), t = 0.836, *p* = 0.408	−0.041 (SE = 0.055), t = −0.75, *p* = 0.458
(Intercept)	0.172 (SE = 0.094), t = 1.825, *p* = 0.089	0.072 (SE = 0.052), t = 1.364, *p* = 0.194	0.128 (SE = 0.096), t = 1.333, *p* = 0.204	0.105 (SE = 0.079), t = 1.333, *p* = 0.204	0.254 (SE = 0.107), t = 2.373, *p* = 0.032	0.117 (SE = 0.1), t = 1.169, *p* = 0.262	0.094 (SE = 0.075), t = 1.259, *p* = 0.228	0.06 (SE = 0.032), t = 1.866, *p* = 0.083
Topic 5 and less than 90 m^2	−0.017 (SE = 0.15), t = −0.115, *p* = 0.91	−0.035 (SE = 0.083), t = −0.427, *p* = 0.676	0.119 (SE = 0.158), t = 0.755, *p* = 0.462	−0.008 (SE = 0.133), t = −0.063, *p* = 0.95	−0.229 (SE = 0.145), t = −1.579, *p* = 0.137	0.141 (SE = 0.18), t = 0.785, *p* = 0.445	0.032 (SE = 0.14), t = 0.231, *p* = 0.821	−0.006 (SE = 0.057), t = −0.113, *p* = 0.912
(Intercept)	0.119 (SE = 0.056), t = 2.11, *p* = 0.041	0.125 (SE = 0.058), t = 2.16, *p* = 0.037	0.112 (SE = 0.049), t = 2.268, *p* = 0.029	0.112 (SE = 0.056), t = 1.984, *p* = 0.054	0.119 (SE = 0.057), t = 2.101, *p* = 0.042	0.102 (SE = 0.046), t = 2.229, *p* = 0.031	0.273 (SE = 0.062), t = 4.402, *p* = < 0.001	0.037 (SE = 0.018), t = 2.112, *p* = 0.041
Topic 6 and less than 90 m^2	0.119 (SE = 0.132), t = 0.898, *p* = 0.374	0.114 (SE = 0.114), t = 0.996, *p* = 0.325	−0.015 (SE = 0.093), t = −0.163, *p* = 0.871	0.023 (SE = 0.095), t = 0.24, *p* = 0.812	−0.01 (SE = 0.109), t = −0.088, *p* = 0.93	0.014 (SE = 0.094), t = 0.149, *p* = 0.882	−0.225 (SE = 0.102), t = −2.202, *p* = 0.033	−0.017 (SE = 0.027), t = −0.63, *p* = 0.532
(Intercept)	0.085 (SE = 0.07), t = 1.211, *p* = 0.233	0.068 (SE = 0.045), t = 1.518, *p* = 0.137	0.28 (SE = 0.089), t = 3.165, *p* = 0.003	0.296 (SE = 0.091), t = 3.264, *p* = 0.002	0.079 (SE = 0.051), t = 1.543, *p* = 0.131	0.08 (SE = 0.051), t = 1.546, *p* = 0.13	0.085 (SE = 0.042), t = 2.023, *p* = 0.05	0.026 (SE = 0.022), t = 1.18, *p* = 0.245
Topic 7 and less than 90 m^2	0.221 (SE = 0.149), t = 1.482, *p* = 0.147	0.026 (SE = 0.09), t = 0.286, *p* = 0.776	−0.165 (SE = 0.131), t = −1.259, *p* = 0.216	−0.136 (SE = 0.174), t = −0.783, *p* = 0.438	−0.012 (SE = 0.087), t = −0.138, *p* = 0.891	0.038 (SE = 0.103), t = 0.37, *p* = 0.713	−0.003 (SE = 0.09), t = −0.035, *p* = 0.972	0.032 (SE = 0.041), t = 0.771, *p* = 0.445
(Intercept)	0.087 (SE = 0.046), t = 1.887, *p* = 0.067	0.155 (SE = 0.055), t = 2.829, *p* = 0.007	0.137 (SE = 0.065), t = 2.103, *p* = 0.042	0.105 (SE = 0.052), t = 2.035, *p* = 0.049	0.126 (SE = 0.058), t = 2.15, *p* = 0.038	0.205 (SE = 0.07), t = 2.943, *p* = 0.006	0.143 (SE = 0.056), t = 2.562, *p* = 0.014	0.044 (SE = 0.018), t = 2.368, *p* = 0.023
Topic 8 and less than 90 m^2	−0.004 (SE = 0.076), t = −0.058, *p* = 0.954	−0.051 (SE = 0.096), t = −0.532, *p* = 0.598	0.133 (SE = 0.111), t = 1.195, *p* = 0.239	−0.027 (SE = 0.09), t = −0.3, *p* = 0.766	0.084 (SE = 0.118), t = 0.714, *p* = 0.48	−0.095 (SE = 0.109), t = −0.872, *p* = 0.389	−0.03 (SE = 0.1), t = −0.301, *p* = 0.765	−0.01 (SE = 0.031), t = −0.329, *p* = 0.744

SE: standard error. Significant if *p* < 0.05 (in red).
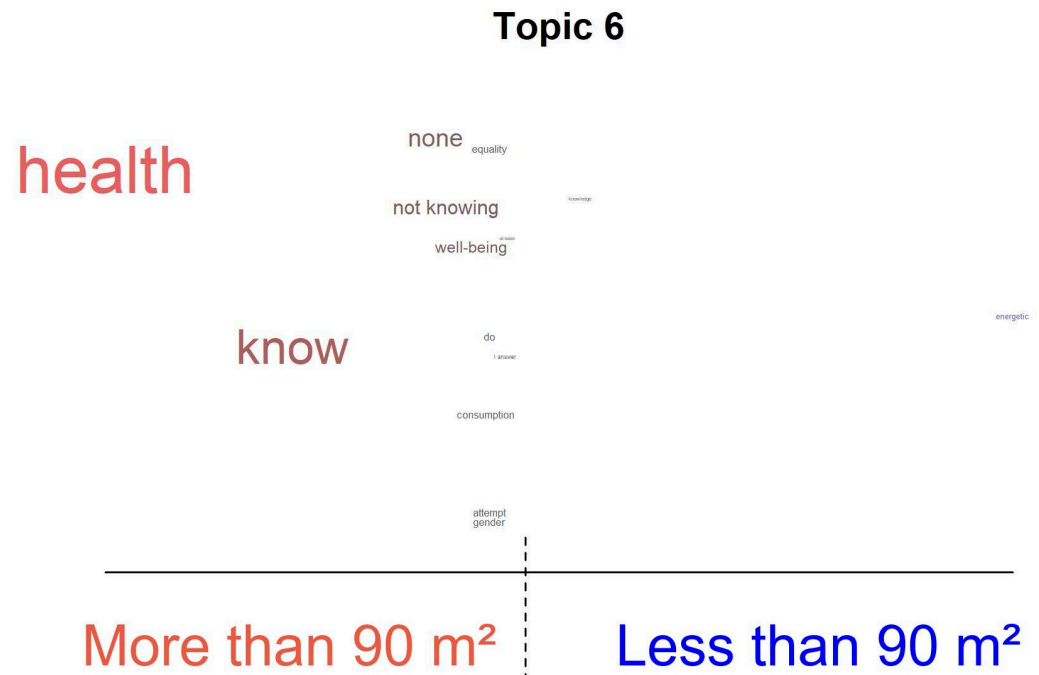
Topic 6

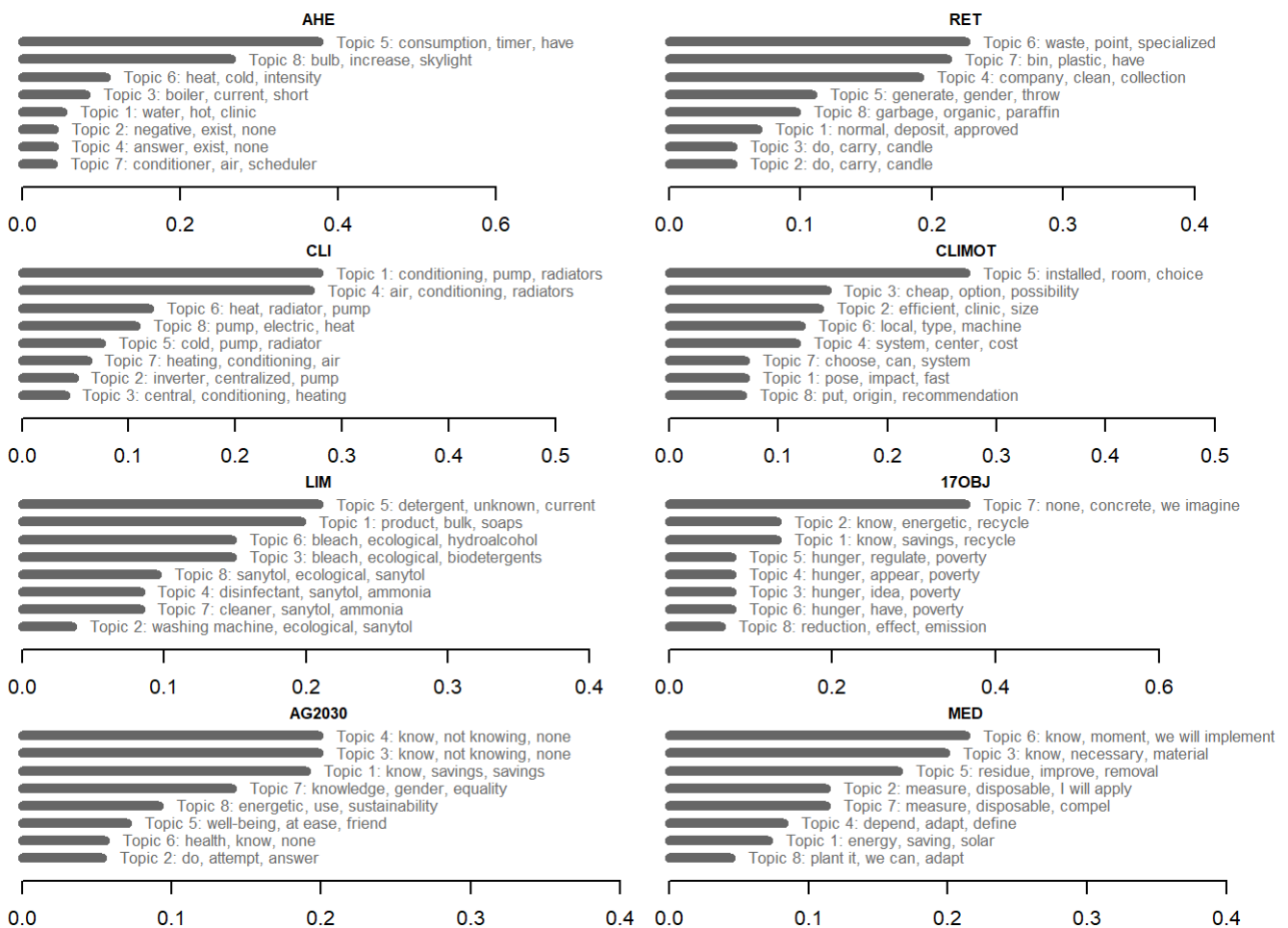**Figure 1.** Words weighted according to the type of clinic.

Figure 2. Weighted topics and most important words in each question.

Significant differences were found in the qualitative codes depending on the type of clinic in the use of bleach as a cleaning product ($p = 0.012$), with the use of this product being most common in centers of less than 90 m^2. Regarding the application of the objectives of the 2030 agenda ($p = 0.044$), the absence of energy saving measures was observed in clinics of more than 90 m^2, with a large and significant effect size in both cases (significant values are shown in red) (Supplementary Material Table S4).

Analyzed globally, timers and LED lights were the most widely used energy saving systems. Bio-sanitary waste was also not specifically managed—"6[0:37] I deposit it in a normal container"—and when it existed, specialized companies and sorting containers were the most used resources. The cold/heat pumps and air conditioning systems were the most used alternatives since, in general, there was a tendency to maintain the pre-existing air conditioning systems in the center—"21[0:85] System from the beginning of the center. It was the most practical due to the infrastructure of the center". The high level of ignorance of the 2030 agenda goals stood out—"15[0:14] I do not know them"—which reinforced the inertia of not implementing them in some way in the center—"20[0:22] I could if I knew them"—(significant values are shown in red) (Supplementary Material Table S5).

The match analysis showed complex solutions only for the questions "If you answered yes in the previous question, please could you specify which energy saving systems you use" and "If you are aware of it, please write down the cleaning products used in your clinic". The solutions indicated that respondents who used timers combined with energy-efficient devices ended up carrying out work to improve structural insulation, and that the use of bleach and soaps or bleach and disinfectants often led to the systematic use of ammonia as a cleaning product (Table 7).

Table 7. Coincidence analysis.

Question	Complex Solution Formula
If you answered yes to the previous question, please specify which electricity saving systems you use.	Timers * Energy-efficient appliances ↔ Structural insulations
If you are aware of it, write down the cleaning products used in your clinic.	Bleach * Soap and/or detergents ↔ Ammonia
	Disinfectant products * Soap and/or detergents ↔ Ammonia

* Indicates interaction between codes.

4. Discussion

A detailed analysis is presented on the current situation of 52 physiotherapy clinics in the Community of Madrid (Spain) with respect to whether their managers are aware of the concept of sustainability, as well as its level of application.

The results obtained through the survey allow us to infer that those responsible of the clinics know about the concept of sustainability and that the analyzed physiotherapy clinics guarantee the sustainability of their centers, although several contradictions were also detected in the data collected in this regard.

To our knowledge, this is the first time that mixed (qualitative–quantitative) and text mining techniques have been applied to a survey related to knowledge and practices of sustainability in physiotherapy clinics. The results show a high reliability to identify sustainability practices widely used in physiotherapy clinics in the Community of Madrid, especially in relation to energy saving and waste management, as well as the use of cleaning products, although a high level of ignorance of the objectives set by the 2030 agenda is evident. These practices are perceived more positively in small clinics compared to those of more than 90 m^2, although in larger clinics there seems to be a better knowledge of the 2030 agenda [7,15,44].

It was found that, being a survey aimed at the managers of physical therapy clinics, most of them answered that they were neither familiar with nor informed about the concept of sustainability in the field of their profession, as can be seen in the answers to question 1,

in which a total of 33 clinics answered that they did not know about sustainability. On the other hand, 73% of the participants answered that they were "aware of the so-called green electricity" (question 3) and 46 of the 52 clinics said they were aware of the "Three Rs rule" (question 21), although 10 of them do not practice it. This may mean that physical therapists do know about sustainability in general, but when looking specifically at sustainability in physical therapy they do not seem to have much information about it.

One of the clearest facts is that most of the managers of these clinics are aware of the energy consumption that is carried out in their centers, that is, they know their consumption of electricity, heating, water, etc. Therefore, it would be necessary to carry out a comparative study of clinics of an approximate size, in which the differences in energy consumption could be verified and identify in which of the energy elements unnecessary consumption is taking place [45].

About the questions related to waste management, it was found to be one of the most sensitive environmental problems, making it a major challenge for health professionals. Of the 52 clinics that took part in the study, 22 considered that they could improve their waste management (question 23). Although most of the clinics analyzed are sufficiently aware of the classification of the waste that originates in their center, 34% of them state that they do not know this waste classification well enough, as can be seen in the results obtained in question 12. A significant fact is that, although it was observed that most of the clinics participating in the study did not know exactly the classification of waste in general, the same did not occur in relation to the so-called biosanitary waste (hazardous, toxic, or special, question 13), since almost all the centers answered that their management of this type of waste is adequate (88%).

Like the results obtained in the present study, Sabbahi et al. [46] found that many oral health professionals did not accurately manage dental waste generated in their clinics. Their study was conducted in the field of dentistry, carried out in Saudi Arabia, and its main objective was to assess the knowledge of oral health care professionals about dental waste management and to evaluate their behavior in this regard.

Another area in which the managers of the 52 clinics examined said that they could improve from the point of view of sustainability was in trying to reduce their consumption of disposable materials. A total of 22 of the 52 clinics stated that they should improve in this aspect (question 25), since these materials produce a very large amount of waste, thus causing a high burden on environmental deterioration and exaggerated costs that are probably not justified. In this sense, there is a study conducted in the surgical setting by Baxter et al. [47] that aimed to demonstrate that variation in the use of disposable supplies contributes to the environmental and financial burdens of medical care. The study revealed that if the concept of sustainability was considered, financial expenditures could decrease, as could carbon dioxide emissions.

Regarding water consumption, according to the data obtained in question 2, most of the participants (60%) stated that they did not use water-saving systems to reduce water consumption, such as flow reducers, liquid flow automations or toilet flushing with differentiated flow. Given the scarcity of water in the world today, it would be necessary to optimize existing water systems by looking for models that make our clinics sustainable and environmentally friendly. In this sense, Arora et al. [48] propose a simulation–optimization model of water supply based on minimum energy use while producing essential information to know the real water consumption.

Regarding whether the 52 physiotherapy clinics analyzed do guarantee the sustainability of their centers, it was observed that although some centers are currently applying several of the measures of the concept of sustainability (as can be seen in the answers to questions 5 and 17), it can be considered that these measures are still insufficient. This is due to the fact that in order to consider that sustainable development is applied in the clinics, fundamental measures should also be applied, such as knowing the origin of the electrical energy consumed in their centers, as well as increasing the use of water consump-

tion saving systems, using an environmentally friendly laundry system, in addition to consuming cleaning and disinfection products that are considered ecological [6]

In the search for information relating Spain's energy consumption at a global level, we see that the G20 countries (including Spain) are the largest consumers of energy and the ones that release the most CO_2 emissions into the world. That is why the policy makers of all these countries should promote the production of renewable energies in all areas and with greater force [49].

Currently in Switzerland, one of the G20 countries, research is already being carried out to promote the use of green energy; implementing measures that have led to the conclusion that non-monetary incentives can be very effective in both the domestic and business sectors [50].

4.1. Strengths and Limitations

Given that there are 2000 physiotherapy clinics in the Community of Madrid (Spain), the sample size of 52 clinics may have been small. A larger sample would be desirable, which would allow generalizations with greater statistical strength to be made from the available data.

However, to date, no similar study had been carried out in the Community of Madrid or in Spain, so the present study is considered a good start for the scientific analysis of the knowledge of the concept of sustainability and its application by the managers of physiotherapy clinics.

It also recognizes the bias inherent in conducting a survey study, such as the absence of the possibility of verifying the veracity of responses or memory bias.

4.2. Future Directions

Based on this study, it is important to open new lines of research on sustainability in physiotherapy clinics:

To carry out comparative studies of the physiotherapy clinics between the different Autonomous Communities of Spain, and in/between other countries of the European Union and extra-communitarian;

To quantify the impact that the application of these measures have meant and would mean for these centers and to be able to extrapolate the results to the largest possible number of physiotherapy clinics;

Finally, it is necessary to study in more detail each of the elements of sustainable development of our clinics in order to obtain much more reliable and decisive data, and to make decisions based on them.

5. Conclusions

Most of the physiotherapy clinics in the Community of Madrid (Spain) that participated in the study are aware of the concept of sustainability.

The survey provides a detailed model of the sustainability of a physiotherapy clinic, along with the results collected from the 52 clinics.

However, in practice they are not sufficiently applying sustainability protocols in their clinics.

These practices are perceived more positively in small clinics compared to those of more than 90 m^2, although in larger clinics there seems to be a better knowledge of the 2030 agenda.

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