



Use of Social Media, Network Avenues, Blog and Scientific Information Systems Through the Website Promoting the Mediterranean Diet as a Method of a Health Safeguarding

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The Mediterranean Diet (MD) is considered by the Food and Agriculture Organization of the United Nations (FAO) as “the best for people and the most sustainable for the environment”. In the era of Big Data, new tools are emerging to facilitate health care research. One form of Big Data is the one that accumulates in the traffic caused by publications on the web and social networks. These data can provide valuable information about the epidemiological patterns of certain behavior and interest of the population. The objective of this study was to explore through websites and its associated official social media on information related to different publications of both international or national nutrition official agencies as well as publications of scientific diffusion for the design of future nutritional education and MD programs. This study opens up future avenues of research, such as studying the acceptance of post writing in other languages in those northern European countries where MD is being implemented. Or through the use of subtitled videos, due to the great acceptance of this format. The MD remains in 2020 considered the best option to follow a healthy diet without difficulties, therefore it is very important to continue promoting the need for good nutritional health based on its qualities.

Keywords: website, mediterranean diet, health, blogs, social media

INTRODUCTION

Online videos, shared *via* social media offer the potential to create such a relationship. It is estimated that over 1.4 billion people use Facebook daily. Whilst 800 million people use Instagram and 330 million people use Twitter on a monthly basis. The explosion of digital landscapes has promoted a noticeable increase in the time allocated to social media due to online activity and using

online sources, including videos, also increasing the time dedicated to science information, particularly amongst 18–25 years olds (Pavelle and Wilkinson, 2020). Nutrition is the biological process by which the body uses food and fluids for the proper maintenance of vital functions. It is also the study of the relationship between food and health. Healthy nutrition is the key to keeping our bodies healthy (Maramba et al., 2019; Coumans et al., 2020). The Mediterranean Diet (MD) is considered by the Food and Agriculture Organization of the United Nations (FAO) as “the best for people and the most sustainable for the environment.” But according to a report by the World Health Organization (WHO) presented in Vienna in May 2018, pioneer countries such as Spain, Italy and Greece have abandoned it. Currently, the number of users with Internet access is increasing year after year. At the beginning of 2020, there were 4.54 billion Internet users in the world, which means that 59% of the world’s population has access to all the contents of the network. Regarding the management of social media, 49% of the world population uses them daily with a mean of 6 h and 43 min, being a showcase available to many (Schoeppe et al., 2016, 2017; Kankanhalli et al., 2019). The search for nutritional information on the Internet is a rising topic, and the sources found are not always rigorous and scientifically proved, which can lead to the appearance of health problems. Some countries have already made new technology available to them in order to recover abandoned MD, as is the case of the personalized research study on infant feeding in Italy and Israel “CAPRI” (from its acronym in English), applying a “personalized algorithm” based on the benefits of MD in the control of different diseases. We consider that the use of social networks could be a tool that seeks to achieve nutritional education based on proven sources and that helps us return this healthy eating pattern to many people (Lecube et al., 2017). Extensive research into this *new realm* remains emerging, with researchers who might use social media for communication activities, admitting a continued *limited understanding* about what it really is (Direito et al., 2014; Allgaier, 2019; León and Bourk, 2020; Pavelle and Wilkinson, 2020). Social media has facilitated large-scale science-focused initiatives, notably health

campaigns highlighting the far-reaching influence social media can have on actions, attitudes, and behaviors (Aldred, 2016).

In these recent years, national and international scientific societies and professionals of nutrition are trying to transfer their research results and disseminate healthy lifestyle habits as well as dietary guidelines. Promoting the MD (Lecube et al., 2017), especially as a result of the publication of the PREDIMED study (Prevention with MD), in which adherence to a MD was associated with a lower cardiovascular risk (Estruch et al., 2018; Sutherland et al., 2019). However, the real impact of these information campaigns is not known, as well of the public interest. In the era of Big Data, new tools are emerging to facilitate health care research. One form of Big Data is the one that accumulates in the traffic caused by publications on the web and social networks. These data can provide valuable information about the epidemiological patterns of certain habits and interests of population (Rossignol et al., 2013; Nuti et al., 2014; Schootman et al., 2015; Solano et al., 2016; Mavragani et al., 2018; Strotman et al., 2019; Greenan, 2021) depending on the published information, publication formats and even the language in which it is published. In nutrition, search trends have been studied in some ways (Linkov et al., 2014; Tkachenko et al., 2017; Rahiri et al., 2018), showing how some sources of information on the Internet can be useful for detecting early signs of diabetes when performing keyword combinations. In the field of diets, a study that investigated the annual variation of Internet searches using Google Trends in the United States with respect to the term “diet,” found that those searches conformed to a constant linear model of 12 months, reaching a maximum in January (after New Year’s Eve) and then decreasing linearly until repeating again the following January (Markey and Markey, 2013). However, there are no studies that relate certain diets and which were the most sought after by users. On the other hand, previous studies have addressed global trends in other countries than Spain, so the analysis of Spain individually is considered essential as a Mediterranean country (Gkouskou et al., 2011; Hirasawa et al., 2011).

TABLE 1 | Type of information published according to sources.

			(%) total	(%) FADI*	(%) MM**
Sources	Unofficial organizations	Newspapers and TV	13.50	11.50	14.30
		Nutrition magazines	1.90	1.90	0.00
		Beauty magazines	3.80	3.80	0.00
		Personal blog	32.70	11.60	21.10
		Information blog	26.90	9.60	17.30
		Universities	9.60	3.80	5.80
		Social media	0.00	0.00	0.00
		Official organizations	Spanish	9.60	5.80
		Foreigners	1.90	1.90	0.00

*FADI: #FadiResearch-Novedades in health and sports performance.

**MM: Ventures.whatstudio.es/noticias.

TABLE 2 | Comparison of the mean values measured on the websites according to the communication medium.

		Mean	SD	Minimum	Maximum	P*
Number of visits to the web	Newspapers and TV	107.00	19.65	80.00	143.00	0.121
	Nutrition magazines	128.11	29.73	80.00	178.00	
	Beauty magazines	97.00	-	97.00	97.00	
	Blogs and social media	135.00	36.97	56.00	191.00	
	Universities	149.36	46.90	76.00	231.00	
	Total	132.27	38.57	56.00	231.00	
% of visits on the web	Newspapers and TV	3.23	0.45	2.72	3.81	0.078
	Nutrition magazines	2.72	-	2.72	2.72	
	Beauty magazines	-	-	-	-	
	Blogs and social media	5.97	0.48	5.54	6.49	
	Universities	4.98	1.80	2.58	7.85	
	Total	4.63	1.69	2.58	7.85	
Number of page views on the web	Newspapers and TV	70.25	10.14	58.00	80.00	0.023
	Nutrition magazines	62.00	-	62.00	62.00	
	Beauty magazines	-	-	-	-	
	Blogs and social media	147.00	13.23	137.00	162.00	
	Universities	117.00	38.79	63.00	181.00	
	Total	108.56	40.14	58.00	181.00	
% of page views on the web	Newspapers and TV	2.98	0.43	2.46	3.39	0.023
	Nutrition magazines	2.63	-	2.63	2.63	
	Beauty magazines	-	-	-	-	
	Blogs and social media	6.23	0.56	5.81	6.87	
	Universities	4.96	1.64	2.67	7.67	
	Total	4.60	1.70	2.46	7.67	
Average time on the web	Newspapers and TV	1.27	0.73	0.46	2.23	0.389
	Nutrition magazines	2.03	-	2.03	2.03	
	Beauty magazines	-	-	-	-	
	Blogs and social media	2.43	1.49	1.13	4.06	
	Universities	2.04	0.78	1.18	3.52	
	Total	1.94	0.91	0.46	4.06	
Web entries	Newspapers and TV	48.50	11.62	35.00	62.00	0.012
	Nutrition magazines	52.00	-	52.00	52.00	
	Beauty magazines	-	-	-	-	
	Blogs and social media	129.00	19.97	107.00	146.00	
	Universities	94.60	33.62	55.00	144.00	
	Total	87.72	37.88	35.00	146.00	
Percentage of entries on the web	Newspapers and TV	2.61	0.63	1.88	3.34	0.012
	Nutrition magazines	2.80	-	2.80	2.80	
	Beauty magazines	-	-	-	-	
	Blogs and social media	6.95	1.08	5.76	7.86	
	Universities	5.09	1.81	2.96	7.75	
	Total	4.72	2.04	1.88	7.86	
Bounce rate on the web	Newspapers and TV	70.89	8.56	61.36	79.03	0.444
	Nutrition magazines	82.69	-	82.69	82.69	
	Beauty magazines	-	-	-	-	
	Blogs and social media	77.96	14.10	61.68	86.57	
	Universities	75.79	4.05	66.18	79.73	
	Total	75.45	7.36	61.36	86.57	
% of exit on the web	Newspapers and TV	51.38	9.45	39.56	61.86	0.014
	Nutrition magazines	67.50	-	67.50	67.50	

(Continued)

TABLE 2 | Continued

		Mean	SD	Minimum	Maximum	P*
	Beauty magazines	-	-	-	-	
	Blogs and social media	71.82	12.20	58.38	82.21	
	Universities	65.13	4.87	57.85	73.08	
	Total	63.32	9.75	39.56	82.21	
Likes in instagram	Newspapers and TV	41.00	18.95	18.00	74.00	0.011
	Nutrition magazines	29.86	15.36	18.00	61.00	
	Beauty magazines	25.00	-	25.00	25.00	
	Blogs and social media	55.33	15.33	30.00	81.00	
	Universities	40.47	13.76	25.00	73.00	
	Total	42.60	17.12	18.00	81.00	
Instagram comments	Newspapers and TV	7.67	7.31	2.00	17.00	0.264
	Nutrition magazines	5.86	4.56	0.00	13.00	
	Beauty magazines	5.00	-	5.00	5.00	
	Blogs and social media	3.33	4.05	0.00	15.00	
	Universities	9.29	8.89	0.00	34.00	
	Total	6.74	7.07	0.00	34.00	
Times shared from instagram	Newspapers and TV	11.00	7.35	0.00	23.00	0.814
	Nutrition magazines	13.71	2.81	10.00	19.00	
	Beauty magazines	6.00	-	6.00	6.00	
	Blogs and social media	11.33	5.68	1.00	18.00	
	Universities	14.88	14.71	0.00	56.00	
	Total	12.95	10.13	0.00	56.00	
Times saved on instagram	Newspapers and TV	0.83	0.75	0.00	2.00	0.467
	Nutrition magazines	0.71	0.76	0.00	2.00	
	Beauty magazines	0.00	-	0.00	0.00	
	Blogs and social media	0.75	1.14	0.00	4.00	
	Universities	1.24	0.90	0.00	3.00	
	Total	0.93	0.94	0.00	4.00	
Number of visits on instagram	Newspapers and TV	39.20	13.18	24.00	59.00	0.173
	Nutrition magazines	27.00	11.28	11.00	44.00	
	Beauty magazines	24.00	-	24.00	24.00	
	Blogs and social media	30.08	17.46	2.00	61.00	
	Universities	43.50	18.32	9.00	79.00	
	Total	34.92	16.93	2.00	79.00	
Reach from instagram	Newspapers and TV	484.40	314.88	206.00	864.00	0.146
	Nutrition magazines	412.86	280.20	197.00	921.00	
	Beauty magazines	205.00	-	205.00	205.00	
	Blogs and social media	694.83	281.84	214.00	988.00	
	Universities	448.75	290.52	245.00	967.00	
	Total	520.00	302.01	197.00	988.00	
Interactions from instagram	Newspapers and TV	39.20	13.18	24.00	59.00	0.168
	Nutrition magazines	27.00	11.28	11.00	44.00	
	Beauty magazines	24.00	-	24.00	24.00	
	Blogs and social media	30.08	17.46	2.00	61.00	
	Universities	43.58	18.24	9.00	79.00	
	Total	34.95	16.92	2.00	79.00	
Visits to instagram profile	Newspapers and TV	39.20	13.18	24.00	59.00	0.218
	Nutrition magazines	27.00	11.28	11.00	44.00	
	Beauty magazines	24.00	-	24.00	24.00	
	Blogs and social media	30.08	17.46	2.00	61.00	
	Universities	65.33	66.43	27.00	271.00	
	Total	42.00	42.01	2.00	271.00	

(Continued)

TABLE 2 | Continued

		Mean	SD	Minimum	Maximum	P*
Clicks on the web from instagram	Newspapers and TV	17.20	8.17	8.00	26.00	0.480
	Nutrition magazines	10.43	4.54	7.00	20.00	
	Beauty magazines	8.00	-	8.00	8.00	
	Blogs and social media	15.78	10.27	4.00	37.00	
	Universities	16.82	9.00	2.00	31.00	
	Total	14.97	8.49	2.00	37.00	
Accounts reached from instagram	Newspapers and TV	484.40	314.88	206.00	864.00	0.146
	Nutrition magazines	412.86	280.20	197.00	921.00	
	Beauty magazines	205.00	-	205.00	205.00	
	Blogs and social media	694.83	281.84	214.00	988.00	
	Universities	448.75	290.52	245.00	967.00	
	Total	520.00	302.01	197.00	988.00	
Impressions from instagram	Newspapers and TV	569.00	371.06	242.00	987.00	0.197
	Nutrition magazines	485.00	324.84	242.00	1062.00	
	Beauty magazines	236.00	-	236.00	236.00	
	Blogs and social media	799.50	326.44	248.00	1142.00	
	Universities	543.18	345.73	306.00	1102.00	
	Total	612.36	350.06	236.00	1142.00	
Instagram hashtags impressions	Newspapers and TV	15.75	10.72	4.00	30.00	0.661
	Nutrition magazines	30.17	44.94	2.00	117.00	
	Beauty magazines	5.00	-	5.00	5.00	
	Blogs and social media	56.33	99.76	1.00	367.00	
	Universities	17.90	23.55	1.00	67.00	
	Total	33.45	65.13	1.00	367.00	
Instagram start impressions	Newspapers and TV	428.00	358.68	159.00	843.00	0.262
	Nutrition magazines	342.14	318.85	140.00	895.00	
	Beauty magazines	161.00	-	161.00	161.00	
	Blogs and social media	615.25	328.74	155.00	967.00	
	Universities	345.73	332.91	131.00	883.00	
	Total	441.17	339.48	131.00	967.00	
Instagram profile impressions	Newspapers and TV	15.80	14.72	3.00	40.00	0.072
	Nutrition magazines	35.71	26.49	4.00	66.00	
	Beauty magazines	45.00	-	45.00	45.00	
	Blogs and social media	15.75	20.91	3.00	75.00	
	Universities	12.45	8.47	3.00	35.00	
	Total	19.44	19.91	3.00	75.00	
Impressions of another origin from instagram	Newspapers and TV	112.00	44.97	40.00	156.00	0.002
	Nutrition magazines	81.71	38.47	18.00	122.00	
	Beauty magazines	25.00	-	25.00	25.00	
	Blogs and social media	112.42	50.31	19.00	182.00	
	Universities	168.73	44.23	131.00	276.00	
	Total	121.17	56.25	18.00	276.00	

*ANOVA.

Taking all this into account, this case study explored how can be digitally obtained a high-quality MD. The aim of this study is investigate through the official website of the Andalusian Winter Sports Federation (FADI, Spain), the official website of MM Health Science and its associated official social media (Instagram and Facebook), the interests of federated population in Andalusia (Spain) about publishing

information (both Spanish and foreign), related to different publications of both international or national nutrition official agencies as well as publications of scientific diffusion for the design of future nutritional education projects and MD promoting programs, which allowed us to directly observe how this audience engages with online web and social media.

TABLE 3 | Comparison of the mean values measured on the websites according to the source of information.

		Mean	SD	Minimum	Maximum	P*
Number of visits to the web	Unofficial organism	130.03	39.69	56.00	231.00	0.955
	Official organism	139.18	35.73	80.00	195.00	
	Total	132.27	38.57	56.00	231.00	
Likes in instagram	Unofficial organism	42.25	16.09	18.00	81.00	0.125
	Official organism	43.64	20.67	18.00	73.00	
	Total	42.60	17.12	18.00	81.00	
Instagram comments	Unofficial organism	7.53	7.67	0.00	34.00	0.093
	Official organism	4.45	4.44	0.00	13.00	
	Total	6.74	7.07	0.00	34.00	
Times shared from instagram	Unofficial organism	12.41	11.49	0.00	56.00	0.098
	Official organism	14.55	4.20	9.00	23.00	
	Total	12.95	10.13	0.00	56.00	
Times saved on instagram	Unofficial organism	0.81	0.97	0.00	4.00	0.809
	Official organism	1.27	0.79	0.00	2.00	
	Total	0.93	0.94	0.00	4.00	
Number of visits on instagram	Unofficial organism	35.00	16.69	2.00	64.00	0.957
	Official organism	34.73	18.32	11.00	79.00	
	Total	34.92	16.93	2.00	79.00	
Reach from instagram	Unofficial organism	490.19	292.20	205.00	988.00	0.375
	Official organism	590.45	327.30	197.00	967.00	
	Total	520.00	302.01	197.00	988.00	
Interactions from instagram	Unofficial organism	35.04	16.67	2.00	64.00	0.949
	Official organism	34.73	18.32	11.00	79.00	
	Total	34.95	16.92	2.00	79.00	
Visits to instagram profile	Unofficial organism	45.08	48.72	2.00	271.00	0.473
	Official organism	34.73	18.32	11.00	79.00	
	Total	42.00	42.01	2.00	271.00	
Clicks on the web from instagram	Unofficial organism	16.18	9.27	2.00	37.00	0.153
	Official organism	12.55	6.35	5.00	23.00	
	Total	14.97	8.49	2.00	37.00	
Accounts reached from instagram	Unofficial organism	490.19	292.20	205.00	988.00	0.375
	Official organism	590.45	327.30	197.00	967.00	
	Total	520.00	302.01	197.00	988.00	
Impressions from instagram	Unofficial organism	576.88	339.24	236.00	1,142.00	0.377
	Official organism	693.00	377.34	242.00	1,102.00	
	Total	612.36	350.06	236.00	1,142.00	
Instagram hashtags impressions	Unofficial organism	37.26	76.85	1.00	367.00	0.339
	Official organism	24.70	22.90	2.00	67.00	
	Total	33.45	65.13	1.00	367.00	
Instagram Start impressions	Unofficial organism	403.48	332.82	131.00	967.00	0.490
	Official organism	526.82	354.82	148.00	895.00	
	Total	441.17	339.48	131.00	967.00	
Instagram profile impressions	Unofficial organism	17.92	17.06	3.00	75.00	0.040
	Official organism	22.91	25.89	3.00	66.00	
	Total	19.44	19.91	3.00	75.00	
Impressions of another origin from instagram	Unofficial organism	121,20	50,72	19.00	203.00	0,388
	Official organism	121,09	70,00	18.00	276.00	
	Total	121,17	56,25	18.00	276.00	

*Student t-test.

MATERIALS AND METHODS

Digital health provides the opportunity to enhance the reach, engagement and intensity of supporting specialists to improve the MD quality in the population (Zarnowiecki et al., 2020). Social media has an increasingly important influence on science and environmental communication, particularly amongst young people, but research on such sources, and the potential of their role, is also still emerging (Allgaier, 2019; León and Bourk, 2020; Pavelle and Wilkinson, 2020). To analyse the traffic of the information published on the web and their social media by the population under study, the official websites of the Andalusian Winter Sports Federation and the official website of MM Health Science [web section: “#lasaludnutricionalnoseconfina” (#nutritionalhealthisnotconfined)] were used as well as the official social media associated (Instagram and Facebook): @fadiandalucia and @mmhealthscience. Publications were made from February 2020 to May 2020, with a diary frequency publication, organized in an international or national nutrition official agency and publication of diffusion (changing languages and formats). This study was approved by the research ethics committee of the Andalusian Public Health Service.

The material we have available is all the data traffic generated by the publication of 58 posts between the months of February to May 2020, by a group of 15 health professionals on the federative official web platforms “#FadiResearch-News in health and performance sports” and MM Health Science official web under the title #nutritionalhealthisnotconfined [“#lasaludnutricionalnoseconfina”] referring to the situation experienced as a result of the State of Alarm decreed by the Government of Spain for the situation generated by COVID-19 (Coronavirus disease 19) (Sjölander-Lindqvist et al., 2020).

It is intended to analyse the type of information that is generated in these posts, whether written, visual or in the form of a Podcast. Seeking to know the type of people, gender, nationality, age, how to know what information is most interesting in short, to know how they interact with these types of posts.

This information generated has been studied and analyzed following different methods, divided into type of information published according to sources, classifying it according to its origin, whether from official or unofficial bodies; type of format used grouping it around the categories articles, news, videos or

audio; people who have interacted using classification based on gender and age range; nationality of the people who interacted, whether Spanish, sectoring in cities and towns or foreign, inside or outside the European Union (EU).

The global results obtained on the two platforms through Instagram are also compared. And finally, researchers studied and analyzed how are the sessions on the webs.

Result Variables: The variables studied will be the ones that throw the web as well as the social networks regarding the traffic caused by the publication during the study period. All these variables will be grouped by socio-economic factors (age, sex, city, country, geographic region from where it is accessed, etc.) as well as the type of publication [written/video(YouTube), Spanish/English, etc.].

Statistical analysis: Statistical analysis was performed using SPSS Version 22.0 statistic software package. All coded variables will be analyzed, presenting the descriptive values as mean, minimum, maximum, Standard Deviation (SD), ranges. Statistical normality tests were performed using the Kolmogorov-Smirnov test. For correlation and differences between groups, T-tests and analysis of variance (ANOVA) were performed. A value of $P \leq 0.05$ was considered statistically significant.

RESULTS

The type of information finally published corresponds to official and unofficial organizations, and it was well distributed between the two websites used with a large amount of information from blogs (personal blogs 32.70% and information blogs 26.90%), and newspapers and TV (13.50%). Of all the information published, more than 10% was from official organizations (**Table 1**). When comparing the mean values measured on the websites according to the communication medium (**Table 2**), statistically significant differences ($p < 0.05$) were found about number, percentage of page views on the web and webs entries, with blogs and social media having the higher mean values. Similarly, blogs and social media obtained the higher mean values of “likes” ($p = 0.011$). However, it is the information from universities that obtains the highest mean values ($p = 0.002$) for Impressions of another origin from Instagram (**Table 2**).

Differences are only found in the mean values obtained from official and unofficial information (**Tables 3, 4**) for Instagram profile impressions. The format of the post statistically influenced ($P < 0.05$) at the compartment of the mean results obtained for “likes,” comments, times shared, reach, visits, clicks, accounts reached and impressions, with video-format receiving the highest mean values (**Tables 5, 6**).

DISCUSSION

Digital nutrition promotion interventions provide an opportunity to address the public health issue of improving people’s nutrition (Zarnowiecki et al., 2020). There are inherent elements of subjectivity in the interpretation of this case study (Niebuurt, 2020), however it presents insight into how our subjects (audience) engaged with one science

TABLE 4 | Type of format used.

			% total	% FADI*	% MM**
Format type	Articles	Opinion	40.40	15.40	25.00
		Tips	40.40	25.00	15.40
	News		9.60	1.90	7.70
	Videos		9.60	7.70	1.90
	Audio		0.00	0.00	0.00

*FADI: #FadiResearch-Novedades in health and sports performance.

**MM: Ventures.whatstudio.es/noticias.

TABLE 5 | Comparison of the mean values measured on the websites according to the format.

		Mean	SD	Minimum	Maximum	P*
Number of visits to the web	Text	134.84	38.61	76.00	231.00	0.342
	Video	-	-	-	-	
	Text and Video	120.38	38.59	56.00	178.00	
	Total	132.27	38.57	56.00	231.00	
Likes on instagram	Text	39.83	16.03	18.00	77.00	0.018
	Video	43.00	7.07	38.00	48.00	
	Text and Video	62.40	16.02	39.00	81.00	
	Total	42.60	17.12	18.00	81.00	
Instagram comments	Text	6.92	7.13	0.00	34.00	0.049
	Video	16.00	2.83	14.00	18.00	
	Text and Video	1.80	2.17	0.00	5.00	
	Total	6.74	7.07	0.00	34.00	
Times shared from instagram	Text	10.81	6.73	0.00	23.00	0.001
	Video	46.50	13.44	37.00	56.00	
	Text and Video	15.00	5.05	9.00	23.00	
	Total	12.95	10.13	0.00	56.00	
Times saved on instagram	Text	0.94	0.98	0.00	4.00	0.803
	Video	0.50	0.71	0.00	1.00	
	Text and Video	1.00	0.71	0.00	2.00	
	Total	0.93	0.94	0.00	4.00	
Number of visits on instagram	Text	36.10	17.76	2.00	79.00	0.666
	Video	27.00	25.46	9.00	45.00	
	Text and Video	31.00	8.37	20.00	38.00	
	Total	34.92	16.93	2.00	79.00	
Reach from instagram	Text	476.90	291.84	197.00	988.00	0.012
	Video	299.00	39.60	271.00	327.00	
	Text and Video	867.00	118.81	690.00	987.00	
	Total	520.00	302.01	197.00	988.00	
Interactions from instagram	Text	36.13	17.74	2.00	79.00	0.663
	Video	27.00	25.46	9.00	45.00	
	Text and Video	31.00	8.37	20.00	38.00	
	Total	34.95	16.92	2.00	79.00	
Visits to instagram profile	Text	36.10	17.76	2.00	79.00	0.001
	Video	158.00	159.81	45.00	271.00	
	Text and Video	31.00	8.37	20.00	38.00	
	Total	42.00	42.01	2.00	271.00	
Clicks on the web from instagram	Text	16.85	8.19	4.00	37.00	0.017
	Video	2.00	-	2.00	2.00	
	Text and Video	7.40	1.52	5.00	9.00	
	Total	14.97	8.49	2.00	37.00	
Accounts reached from instagram	Text	476.90	291.84	197.00	988.00	0.012
	Video	299.00	39.60	271.00	327.00	
	Text and Video	867.00	118.81	690.00	987.00	
	Total	520.00	302.01	197.00	988.00	
Impressions from instagram	Text	553.97	334.17	236.00	1137.00	0.013
	Video	347.00	-	347.00	347.00	
	Text and Video	1015.80	126.50	829.00	1142.00	
	Total	612.36	350.06	236.00	1142.00	
Instagram hashtags Impressions	Text	33.93	70.66	1.00	367.00	0.923
	Video	-	-	-	-	

(Continued)

TABLE 5 | Continued

		Mean	SD	Minimum	Maximum	P*
Instagram Start impressions	Texto and Video	30.80	14.81	12.00	47.00	0.008
	Total	33.45	65.13	1.00	367.00	
	Text	383.80	320.31	140.00	883.00	
	Video	131.00	-	131.00	131.00	
Instagram profile impressions	Texto and Video	847.40	97.71	709.00	967.00	0.191
	Total	441.17	339.48	131.00	967.00	
	Text	22.10	20.79	3.00	75.00	
	Video	13.00	-	13.00	13.00	
Impressions of another origin from instagram	Texto and Video	4.80	1.92	3.00	8.00	0.289
	Total	19.44	19.91	3.00	75.00	
	Text	116.50	58.16	18.00	276.00	
	Video	203.00	-	203.00	203.00	
	Texto and Video	132.80	33.90	100.00	182.00	
	Total	121.17	56.25	18.00	276.00	

*ANOVA.

TABLE 6 | People who have interacted.

		Web fadi (%)	Web Whats Ventures (%)
Aged (years)	13–17	1.00	0.00
	18–24	11.00	27.59
	25–34	28.00	33.50
	35–44	29.00	15.00
	45–54	20.00	12.50
	55–64	7.00	5.50
	≥65	2.00	5.50
Gender	Men	62.00	54.15
	Momen	38.00	45.85
Location	Granada (Spain)	70.00	13.67
	Madrid (Spain)	17.54	8.74
	Málaga (Spain)	5.26	1.90
	Barcelona (Spain)	3.50	5.62
	Sevilla (Spain)	3.50	7.35
	Murcia (Spain)	0.00	5.02
	Valencia (Spain)	0.00	5.19
	Almería (Spain)	0.00	3.29
	Lorca (Murcia, Spain)	0.00	3.11
	(not set)	0.00	22.15
Nationality	European Union	Spain	100.00
		England	0.00
		France	0.00
	Outside European Union	EEUU	0.00
		Mexico	0.00
		Australia	0.00

communication endeavor using digital platforms as webs or social media. Awareness is difficult to quantify especially on social media, however the growth in reach and engagement

across platforms (web and social media) indicated a likely growing consciousness. Zarnowiecki et al. (2020) found a positive effect of the digital intervention on child nutrition

TABLE 7 | Comparison of results of both platforms through Instagram.

		Minimum	Maximum	Mean	SD	P*
Likes on Instagram	FADI	39.00	81.00	60.94	11.44	0.455
	MM	18.00	61.00	33.57	10.03	
	Total	18.00	81.00	43.09	16.80	
Instagram comments	FADI	0.00	5.00	1.69	1.58	0.001
	MM	1.00	34.00	8.97	7.38	
	Total	0.00	34.00	6.43	6.94	
Times shared from Instagram	FADI	4.00	26.00	14.69	5.56	0.073
	MM	0.00	56.00	12.33	12.04	
	Total	0.00	56.00	13.15	10.25	
Times saved on Instagram	FADI	0.00	2.00	0.94	0.77	0.402
	MM	0.00	4.00	0.93	1.01	
	Total	0.00	4.00	0.93	0.93	
Number of visits on Instagram	FADI	2.00	66.00	32.69	14.55	0.154
	MM	9.00	79.00	37.78	18.88	
	Total	2.00	79.00	35.69	17.22	
Reach from Instagram	FADI	690.00	988.00	873.75	83.86	0.615
	MM	197.00	873.00	309.00	147.43	
	Total	197.00	988.00	540.69	307.50	
Interactions from Instagram	FADI	2.00	66.00	32.69	14.55	0.158
	MM	9.00	79.00	37.83	18.85	
	Total	2.00	79.00	35.72	17.20	
Visits to Instagram profile	FADI	2.00	66.00	32.69	14.55	0.175
	MM	11.00	271.00	49.17	51.53	
	Total	2.00	271.00	42.41	41.09	
Clicks on the web from Instagram	FADI	4.00	26.00	11.53	6.50	0.194
	MM	2.00	37.00	17.40	8.83	
	Total	2.00	37.00	14.89	8.35	
Accounts reached from Instagram	FADI	690.00	988.00	873.75	83.86	0.615
	MM	197.00	873.00	309.00	147.43	
	Total	197.00	988.00	540.69	307.50	
Impressions from Instagram	FADI	829.00	1142.00	1016.13	89.10	0.568
	MM	236.00	1008.00	360.64	168.00	
	Total	236.00	1142.00	636.63	356.10	
Instagram hashtag impressions	FADI	12.00	67.00	37.00	16.99	0.108
	MM	1.00	367.00	31.16	85.54	
	Total	1.00	367.00	33.83	63.32	
Instagram Home Impressions	FADI	709.00	967.00	837.69	61.17	0.713
	MM	131.00	822.00	190.45	141.90	
	Total	131.00	967.00	462.97	343.25	
Instagram profile impressions	FADI	2.00	11.00	5.38	2.39	0.001
	MM	6.00	75.00	28.36	21.05	
	Total	2.00	75.00	18.68	19.65	
Impressions of another origin from Instagram	FADI	78.00	209.00	136.25	34.37	0.026
	MM	18.00	276.00	114.91	67.78	
	Total	18.00	276.00	123.89	56.57	

*Student t-test.

FADI: #FadiResearch-Novedades in health and sports performance; MM: Ventures.whatstudio.es/noticias.

across a range of dietary outcomes. Additionally, having reviewed and analyzed the data obtained from both web pages and their interactions on Instagram, we consider these

data to be of great use for future research related to the implementation of MD, as well as to promote nutritional health through social media, applications, blogs, etc. (Gkouskou

et al., 2011; Hirasawa et al., 2011). Moreover, Instagram epitomize interactive media through which users can comment, share, tag friends or “like a post” (Pavelle and Wilkinson, 2020).

It should be noted the influence that the confinement situation due to COVID-19 may have on the use of the Internet as a source of information on health-related issues in the world population. This situation of confinement could have affected the perception, the feeding, the use of social media, etc.

It was expected that the so-called Generation X, born in 1969–1980, who lived through the splendor of consumerism and the obsession with triumph, were the first to familiarize themselves with computers as a work tool. Also, Generation Y (born in 1981–1993), also called *Millennials* (Strotman et al., 2019), is the first generation that can be considered global. In contrast to the previous ones, in this generation there are no differences between countries and all young Westerners can identify with the same moral values. They have grown up with the beginnings of digitalisation. A stigmatized generation that has been described as lazy, individualistic, bourgeois, but it is also these young people who promoted healthy living, healthy eating or environmentalism), would be the age groups that would most interact with the posts, since they are generations linked to the use of the Internet. They are also in the stage of life when they begin to be self-sufficient, enter the labor market and start to form their own families. Thus, they want to learn to cook or simply take care of themselves and eat healthy. There are no differences between gender (Tkachenko et al., 2017).

Regarding the format, if we look at the comparative tables (Tables 2, 3, 5, 7, 8), the type used when publishing the information is very important depending on where it is done on Instagram. This means that the mentioned social network has several ways in which the person can interact with the account, either directly in the profile or in the stories (information that is only available for 24 h). It is observed that the mixed formats (text and video), considering impressions and reactions, reach more public through Instagram accounts. However, when publishing in the profile, more interaction has been made with the video format, perhaps due to the more frequent use and greater custom of social media apps in which short videos are published. Online videos, shared via social media, can be used as a modern gateway raising awareness of a scientific topic to motivate users’ curiosity

and potential behavioral change (Allgaier, 2019; Pavelle and Wilkinson, 2020). This does not mean that the individual text or video format is not important, since observing the comparative tables (Tables 2, 3, 5, 7, 8) and according to the information we want to send, we simply have to take into account how we should publish it (Gkouskou et al., 2011; Hirasawa et al., 2011).

We observe that there are no significant differences regarding the official or unofficial sources. Perhaps a slight difference in the impressions of the Instagram profile that are directed toward official organizations. In future scientific investigations it would be interesting to focus on the reason for this circumstance. Among the unofficial sources, the greater acceptance of publications from social media, blogs, universities, newspapers and TV before nutrition magazines is also surprising. The beauty magazines in this study have not had the expected acceptance, even though they are magazines dedicated to the care and improvement of personal well-being.

Regarding nationality, the majority have been Spanish-speaking Internet users, perhaps because all the posts have been published in Spanish. However, 15% of the visits come from countries where Spanish is not the official language. We can highlight that not only the original founding countries of MD are interested in maintaining nutritional habits (Greenan, 2021).

It is important for the purpose raised in the objective of this study that the content published reaches the largest possible population. Social media and new technologies can be, good tools. The content must be easily accessible, verified and easy to understand for the user since it has been observed that no more than two minutes pass in each publication.

Digital interventions in MD appear to be a promising avenue for improving people’s nutrition and are intervention approaches aligned with shifts in society and trends for how health information is accessed (Pollard et al., 2015; Drumm et al., 2017; Zarnowiecki et al., 2020). Social media and all kind of apps are growing incredibly fast which is exciting. We must take advantage of all the opportunities and advantages that they offer us when delivering both the MD and any other important nutritional information. People should try to keep the information simple, accurate and direct in order to reach the largest possible population due to the excess of information that exists on the Internet (Rossignol et al., 2013; Schootman et al., 2015; Solano et al., 2016; Strotman et al., 2019; Greenan, 2021). It also supports the growing popularity of social media especially among young people, who are adept at navigating digital spaces and therefore using social media in crafting impactful content. It appears a beneficial way, to mobilize this cohort to participate in science (Groffman et al., 2010; Hargittai et al., 2018; Pavelle and Wilkinson, 2020).

This study opens up future avenues of research, such as studying the acceptance of post writing in other languages in those northern European countries where MD is being implemented. Or through the use of subtitled videos, due to the great acceptance of this format (Dussaillant et al., 2016). The increasing acceptance of social media as a source of information provides opportunities to integrate science communication (Fletcher, 2017; Pavelle and Wilkinson, 2020). Via federative web, MM Health Science web and social

TABLE 8 | Sessions.

	Web fadi (N)	Web Whats Ventures (N)
Users (N)	1,816.00	1,058.00
Sessions (N)	1,924.00	1,857.00
Number of sessions per user (N)	1.92	1.76
Number of visits to pages (N)	3,421.00	2,943.00
Pages per session (N)	1.86	1.58
Mean session duration (min:seg)	00:01:23	00:01:10
% Rebound	81.27	75.61

media Instagram (@fadiandalucia and @mmhealthscience respectively) using the MD, this case study has highlighted implications for the use of social media, and webs, in science communication and engagement. The effective use of social media requires a balance between crafting an informative yet entertaining narrative without compromising rigor and scientific accuracy; however ultimately, these platforms may represent an implementation for practitioners to consider implementing in an upstream engagement. The review of Zarnowiecki et al. (2020), suggest that nutrition promotion websites and social media can achieve small to moderate changes in fruits, vegetables and nutrient-poor foods and drinks, showing promising results. Leveraging both social media and traditional means of marketing may achieve reach and awareness, as well as targeting and engaging with more intended users (James et al., 2013; Laws et al., 2016; Zarnowiecki et al., 2020). The MD remains in 2020 considered the best option to follow a healthy diet without difficulties, therefore it is very important to continue promoting the need for good nutritional health based on its qualities (Dussailant et al., 2016).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

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ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Granada. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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