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).

| Sources          | Unofficial organizations | Newspapers and TV | (%) total | (%) FADI* | (%) MM** |
|------------------|--------------------------|-------------------|----------|-----------|----------|
|                  |                          | 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     |
|                  |                          | Spanish            | 9.60     | 5.80      | 3.80     |
|                  |                          | 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    | 7.86    |      |
| Total                          | 4.83  | 1.69  | 2.58    | 7.86    |      |
| 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                          | 4.80  | 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  | 1.86    | 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)
|                         | 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   | 81.00   |      |
| 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  |      |
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 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| 358.88| 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.*
### 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  | 0.965|
| 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   | 0.967|
| 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 (Nieubuurt, 2020), however it presents insight into how our subjects (audience) engaged with one science

| TABLE 4 | Type of format used. |
|---|---|---|
| Format type | % total | % FADI* | % MM** |
| Articles | 40.40 | 15.40 | 25.00 |
| Opinion | 40.40 | 25.00 | 15.40 |
| Tips | 9.60 | 1.90 | 7.70 |
| News | 9.60 | 7.70 | 1.90 |
| Videos | 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                          | -      | -      | -       | -       |     |
| Texto 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   |     |
| Texto 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   |     |
| Texto 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   |     |
| Texto 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    |     |
| Texto 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   |     |
| Texto and Video                | 31.00  | 8.37   | 20.00   | 38.00   |     |
| Total                          | 34.92  | 10.13  | 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  |     |
| Texto 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   |     |
| Texto and Video                | 31.00  | 8.37   | 20.00   | 38.00   |     |
| Total                          | 34.95  | 10.13  | 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  |     |
| Texto 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    |     |
| Texto 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  |     |
| Texto 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  |     |
| Texto 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** |       |      |         |         |      |
| Text                     | 383.80| 320.31| 140.00  | 883.0   | 0.008|
| Video                    | 131.00| -    | 131.00  | 131.00  |      |
| Text and Video           | 847.40| 97.71 | 709.00  | 967.00  |      |
| Total                    | 441.17| 339.48| 131.00  | 967.00  |      |
| **Instagram profile impressions** |       |      |         |         |      |
| Text                     | 22.10 | 20.79| 3.00    | 75.00   | 0.191|
| Video                    | 13.00 | -    | 13.00   | 13.00   |      |
| Text and Video           | 4.80  | 1.92 | 3.00    | 8.00    |      |
| Total                    | 19.44 | 19.91| 3.00    | 75.00   |      |
| **Impressions of another origin from Instagram** |       |      |         |         |      |
| Text                     | 116.50| 58.16| 18.00   | 276.00  | 0.289|
| Video                    | 203.00| -    | 203.00  | 203.00  |      |
| Text 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         | 5.60                   |
| ≥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           | 100.00       | 86.91                  |
| Spain                    |              |                        |
| England                  | 0.00         | 1.49                   |
| France                   | 0.00         | 6.87                   |
| Outside European Union   |              |                        |
| EEUU                     | 0.00         | 0.74                   |
| Mexico                   | 0.00         | 0.56                   |
| Australia                | 0.00         | 0.46                   |

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           | 18.88           |                 |
|                  | 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     | 987.00          | 837.69          | 61.17           | 0.713           |
|                  | MM 131.00       | 822.00          | 190.45          | 141.90          |                 |
|                  | Total 131.00    | 987.00          | 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 (Dussaillant 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/nex 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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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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