

Research

# Use of TikTok by nutrition healthcare professionals: a pilot analysis of the Italian context

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## Abstract

**Aim** Social Media (SM) has become a leading source for health information dissemination. TikTok, one of the newest SMs, became very popular in the last three years. Many healthcare professionals became content creators and science communicators on this SM, and one of the most popular topics is food and nutrition. The present study aims to analyze how nutrition professionals communicate through TikTok and assess the characteristics of their accounts and videos.

**Methods** The study includes 53 Italian health professionals active on TikTok, selected through a search on this SM using nutrition-related keywords. Each tiktokers characteristics of their last ten videos were described through an ad-hoc checklist. Multilevel multivariable linear regression models were performed to identify factors that could be associated with higher video popularity.

**Results** A total of 67.7% of the tiktokers were female; 54% were under 30 years old. The median number of likes for each video was 300 (IQR 75–1070). The linguistic register was 'informal' in 70.7% of the videos. In 67.3%, the topic was 'diet-related' (videos relating to nutrition and nutritional choices). Multivariable multilevel linear regression models showed that 'diet-related' topics were associated with more likes (adj Coeff. 1111.62,  $p=0.048$ ) and comments (adj Coeff. 12.09,  $p=0.036$ ).

**Conclusions** TikTok might be an impactful source for health promotion on food and nutrition topics. The popularity of diet-related videos underlines the potential of this SM for increasing knowledge and skills about healthy diets and good nutritional habits, especially for an audience of adolescents.

**Keywords** TikTok · Nutrition · Dietetics · Healthcare profession

## 1 Introduction

Since their introduction in the late '90 s, Social Media (SM), defined as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user-generated content" [1], have changed social interactions [2].

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The massive diffusion of SM changed how people communicate, also influencing the scientific and healthcare divulgation system that adapted by occupying relevant places on SM, with government agencies and qualified organizations' institutional accounts [3, 4].

At the same time, many healthcare professionals became content creators and science communicators on these platforms [5, 6]. The presence of Healthcare professionals on SMs is relevant: a study conducted in the US showed that in a sample of 4000 healthcare workers, 65% used SM as a professional tool [6]. Since a third of the world population has at least one account on SM, the audience of potential users is broad [6].

At a population level, the use of SM might, in some cases, positively impact individuals, increasing their psychological well-being and finding in them mainly emotional support, the ability to control, self-management, and notions [6–8]. SM allows the population to achieve more equitable doctor-patient communication. On the contrary, it is necessary to pay attention to the negative aspects of SM, such as the lack of privacy or the potential addiction. Furthermore, SM could increase the spread of incorrect notions, as anyone can upload and share content with only a partial review of the truthfulness; in the healthcare sector, the use of SM might allow an excessive spread of disinformation among patients or even override the professional's advice [6–8].

There are various types of SM, and each platform has its target of users, often related to age [6]. One of the most recent and successful SMs is TikTok. This SM includes a highly young audience and explicitly aims at digital natives based on multimedia content. Launched in China in September 2016 under the name musical.ly and currently developed and distributed in 155 countries by the Beijing IT giant Bytedance, the contents of TikTok are based on micro-videos lasting a few seconds (15–180"). In 2020, thanks to the pandemic and the explosion of digital content creation, TikTok was the most downloaded app globally, with 850 million downloads [9]. The platform has over 1 billion monthly active global users, making it the third most used platform after Facebook and Instagram. It has 2.6 billion downloads, mainly from Generation Z (between 16 and 24 years old) [10]. This exponential social network growth has led scientific institutions, such as the WHO [11], to create accounts on this platform. Healthcare professionals have similarly undertaken dissemination activities by producing content that aligns with those published on TikTok. They respect the "canons" of this platform (short videos usually follow specific trends) to broaden their audience [6, 12–15].

The massive use of TikTok to spread health-related information led to many issues and topics addressed by health professionals SM [16]. Nutrition and food information, (the first referring to the study of how food influences the body, the second to the knowledge required to make informed decisions about food and its effects on health) [17], are among the most "popular" [18]. In recent years, food education interventions have increasingly switched to mobile platforms and SM, on which adolescents and young adults, to whom campaigns are addressed, have a strong presence [19–21]. Moreover, adolescents (10–19 years old) and young adults (20–25 years old) have often issues maintaining a healthy diet [22], and their dietary habits tend to worsen during the transition between adolescence, when they live with their family and go to school, into adulthood, when they achieved greater autonomy and independence [23, 24]. Therefore, in this transitional period, they must have the correct information and capabilities to make the right choices.

The short life of TikTok did not allow the scientific community to study its dynamics and impact on society deeply; even fewer studies refer to health promotion issues on this SM, and to date, there are no studies investigating the role of health workers on TikTok in communication about nutrition issues [18]. Therefore, the objective of this study is to evaluate the phenomenon of medical-scientific dissemination on TikTok through an analysis that includes an assessment of the characteristics of healthcare professionals who produce and share videos related to nutrition on TikTok and the evaluation of factors potentially associated with higher popularity of the videos. Specific objectives of the study are to assess the communication strategies used by Italian healthcare professionals on TikTok, mainly focusing on the tone, style, and format of the videos they produce; to identify the factors related to both healthcare professionals and their videos that are associated with higher popularity, including the use of humor, formal or informal attire, and video setting; to analyze the engagement metrics (likes, comments, shares) of nutrition-related videos to understand which content types and presentation styles garner the most interaction from the audience; to examine the specific topics covered in the videos, such as diet, nutrition, and personal anecdotes, and how these topics influence the engagement and reception of the content; and to assess the overall impact of TikTok as a platform for public health communication, particularly in disseminating information about nutrition to a young audience. The main aim is to offer a practical framework for researchers to analyze the intersection of social media and health communication, providing a methodology that can be applied or improved in future studies. Moreover, the study aims to increase practitioners' practical insights into effective communication strategies on social media platforms, which can enhance their outreach and influence public health behavior. Lastly, users, particularly adolescents and young adults, can benefit from more engaging and accessible health information, leading to improved dietary habits and overall health outcomes. This study also might raise practical

questions about the balance between popularity and credibility in health communication, the role of professional attire and setting in building trust, and the potential impact of social media algorithms on disseminating health information.

## 2 Methods

A content analysis of videos posted on TikTok by nutrition healthcare professionals was conducted through a search on this SM using nutrition-related keywords. Given the high popularity of TikTok in Italy (in this country, the app has about 9 million active monthly users, with a constantly growing trend) [25], the search was focused on Italian TikTok. Ethics approval and informed consent were not sought, as the study design involved content analysis of publicly available TikTok videos, and did not entail collecting sensitive or personal data. To identify the healthcare professionals, a search strategy based on Italian keywords consisting of different phases was adopted:

- After activating two new accounts on TikTok (activated to avoid the influence of previous views on the TikTok algorithm), four researchers participated in a series of consensus meetings to select potential keywords associated with nutrition and eating disorders. Using a brainstorming technique, the four researchers individuated a set of keywords discussed and included in the final search. This ensured comprehensive coverage and relevance of terms related to nutrition and eating disorders, mitigated individual biases, and facilitated agreement on critical terms, resulting in a balanced and objective selection of keywords. Additional keywords were added by selecting TikTok algorithm suggestions. The rationale behind using algorithm suggestions was to include current and trending terms that might not emerge solely from consensus meetings but are relevant and popular among platform users. As indicated in the TikTok website, recommendations are influenced by device settings, language preference, location, time zone, and device type, which may bias suggested keywords even with new accounts created without previous interactions [26]. To minimize such biases, precautions were taken, including cross-verifying suggested keywords under different operational conditions and critically reviewing the final selected keywords. The final keywords included in the search through the consensus meeting were “nutrizionista” (nutritionist), “dietologo” (physician who is specialized in nutrition), “dietista” (healthcare professional who had a bachelor degree in nutrition according to Italian system), “DCA” (Eating Disorder—ED), “disturbi alimentari” (eating disorders), “nutrizione” (nutrition), “educazione alimentare” (nutrition education). The words included through the TikTok algorithm suggestion were “prevenzioneatavola” (a hashtag that means “nutritional prevention”), “anoressiitalia” and “anoressiata” (hashtags meaning “anorexia in Italy”), and “focchettolilla” (a symbol of ED in Italy).
- For each keyword, the first 50 results of the users section were evaluated, and those who met the inclusion criteria were selected. On 12.12.2021, for each professional (“tiktokker”), the ten chronologically most recent videos (excluding the fixed videos) were evaluated. The study group selected fifty users and ten videos for each user to allow multilevel analysis [27]. The analysis included all the videos when a profile had less than ten videos.
- Information about the healthcare professional tiktokers included in the analysis was retrieved on TikTok and on other sites where the professional had bibliographic information.

Tiktokers were included in the study if they met the following inclusion criteria on TikTok:

- more than 1000 followers;
- public account;
- account that has been active in the last year;
- Italian language;
- being a nutrition-related health professional (e.g., nutritionist, nutritionist biologist, dietitian, pharmacist, psychologist, nurse), according to Italian legislation, or a student of a nutrition-related university course.

Information about Tiktokers, such as qualification, engagement indices (likes, shares, and comments for each video), and their content on SM, were extracted and coded.

For each TikTok account selected, were also collected data on:

- age and gender of the tiktokker(s), when available on the SM;
- number of users included in the management of the TikTok profile (one or more than one);

- profession of the tiktokers (nutritionist, nutritionist biologist, dietitian, pharmacist, psychologist, nurse, student...)
- geographical location of the tiktokers (north, center, south of Italy). The division of the Italian territory into three macro-regions is due to economic, social, and cultural differences among these three regions [28]:
- number of followers.

Using a systematic review on the use of social media in healthcare as a basis [12], a framework with key elements for the video analysis checklist was assessed through consensus meetings among the four above-mentioned researchers. On the basis of the six categories of patients' use of social media identified by Smailhodzic et al., items that could assess emotions, information, esteem, network support, social comparison and emotional expression from the point of view of the nutrition professionals were evaluated [29]. The final elements included in an ad-hoc checklist were the linguistic register of the video [30], the presence of voice, subtitles, notes, music, playback, the type of clothing worn by the tiktokers, the location in which the video was recorded, and the content of the video. The linguistic register reflects how effectively videos communicate support and information essential for emotional and informational support, while audiovisual elements (Voice, Subtitles, Notes, Music, Playback) enhance clarity, emotional impact, and information retention, making content potentially more engaging and accessible. The type of clothing influences credibility and reliability, affecting viewer engagement and trust, and the recording location assesses authenticity and credibility, conveying varying levels of professionalism or personal reliability. At the same time, the video content categorizes the purpose (educational, supportive, motivational), capturing the video's relevance and impact. Further details about the checklist, data extraction, and coding are included in the supplementary material (Appendix 1). Two independent researchers analyzed the videos and extracted the data, and conflicts were resolved by a third researcher. Periodic meetings were held among all the researchers to discuss potential issues in data extraction. To retrieve data about the popularity of the videos included in the analysis, the same two independent researchers retrieved the number of comments, shares, and likes for each video.

A 10-post pilot analysis was performed to verify that the topics included in the checklist were correct and exhaustive, to train the researchers, and to uniform the researchers' choices. The ten posts were identified by taking the most recent video for each of the first ten authors in alphabetical order among all those identified. All these ten posts were included in the final analysis. Although all the conflicts were discussed and resolved in the pilot analysis, the inter-rater agreement for the ten posts was calculated using Cohen's K statistics. The result was 0.72, showing a substantial agreement between the two researchers who performed the evaluation. The study's methods were designed according to the STROBE Statement for cross-sectional studies (Appendix Form).

Descriptive analysis was presented as absolute numbers and percentages (for categorical variables) and medians with interquartile ranges (for continuous variables). Fisher exact tests (for categorical variables) and Wilcoxon rank sum tests (for continuous variables) were performed to assess potential differences in the characteristics of the videos based on the linguistic register. Multilevel univariable and multivariable linear regression models were performed to identify factors (healthcare professional or video-related) that could have been associated with a higher popularity of the video. The number of likes for each video, comments, and interactions (likes + comments + shares) were used as outcome variables. For each outcome variable, univariable regression models were performed. As independent variables, the (healthcare professional-related or video-related) items of the ad-hoc checklist were selected. Variables included in the multivariable analyses were selected through a stepwise selection process (Hosmer et al., 2013). The regressions had two levels: content creators (nutrition-related healthcare professionals) at a higher level and videos at a lower level. Analyses were performed with Stata 16 [31]. A p-value < 0.05 was considered statistically significant for the present analyses.

### 3 Results

A total of 526 videos posted on TikTok by 53 Italian nutrition healthcare professionals were retrieved and analyzed. The prevalence of female tiktokers was over 67%. Almost all profiles were managed by a single person (96.2%). Most of the included tiktokers were under 30 (54%). Only slightly more than 9% were still students, while more than 90% were healthcare professionals. Concerning the type of profession, 62% were nutritional biologists. (Table 1).

The median number of likes for the videos was 300 (IQR 75–1070). In over 70% of the videos, the tiktokers adopted an informal register, while only 11% presented a formal register. Music was present in only 27% of the videos, while overlapping writing or drawings were present in almost 90% of the videos. Tiktokers were dressed in "casual" clothing in more than half of the videos, while professional clothes were used in about 32% of the videos. A total of 32% of the videos were filmed in a professional context, and 35% at home. Individuals were present in almost 90% of the videos, while

**Table 1** Tiktokers characteristics. Total tiktokers (profiles) = 53

Variable		N (%)
Gender of the tiktokerb	Male	17 (33.33%)
	Female	34 (67.67%)
Age of the tiktoker	< 30	27 (54%)
	> 30	23 (46%)
Geographical Area of the tiktoker(s)	North of Italy	15 (31.91%)
	Centre of Italy	14 (29.79%)
	South of Italy	18 (38.30%)
Qualification	Student	5 (9.43%)
	Professional	48 (90.57%)
Type of healthcare professional <sup>a</sup>	Nutritionist biologist	33 (62,26%)
	Dietitian	6 (11,32%)
	Medical nutritionist	2 (3,77%)
	Nutrition sciences	4 (7,55%)
	Nutritionist	4 (7,55%)
	Other	4 (7,55%)

<sup>a</sup> In Italy, healthcare professionals in nutrition might have different academic backgrounds. The Medical Nutritionist is a professional with a degree in Medicine and Surgery and a specialization in Food Science. The Dietitian and the Nutritionist are healthcare professionals responsible for all activities related to the proper application of diet and nutrition, including educational aspects and collaboration in implementing food policies, following current regulations. The Nutritionist Biologist holds a degree in Biology with subsequent specialization or a master's degree in Food Science and Human Nutrition

<sup>b</sup> The percentage was calculated based on the total number of TikTokers who have an individual account (n = 51). The two accounts that include more than one TikTok were not considered

food was present in only 28%, with a predominance of sweets accounting for nearly 43% of the food shown. The most frequent video content was "Diet-nutrition" (67%), followed by "Tiktokers-related" topics (37%) and "Physiopathology/disorders" related topics (25%). (Table 2).

In more than half of the cases (57.6%), a formal linguistic register was related with formal clothing. In comparison, in only 32.1% of the videos with informal linguistic registers, the tiktokers wore formal attire. Concerning the qualification of the tiktoker, students performed more videos with a humoristic linguistic register when compared to healthcare professionals. (Appendix 2).

Concerning the topics covered in the videos, the topic "diet and nutrition" was present in 73% of the videos with formal linguistic registers and in only 39.6% of those with humoristic linguistic registers. However, the number of likes was significantly higher in the videos with a humoristic linguistic register compared to those with formal and informal linguistic registers. (Appendix 2).

Multivariable analyses (Table 3, 4, 5), conducted to identify factors potentially associated with higher popularity of the video, showed that the number of likes, the number of comments and the total number of interactions (likes + comments + shares) were significantly correlated with the presence of 'Diet-nutrition' related topics (adjusted coefficient (adj coeff) 1111.63 p=0.048, adj coeff. 12.09 p=0.04 and adj coeff. 1136.94, p=0.04 respectively).

## 4 Discussion

The present study aimed to analyze how Italian healthcare professionals in the field of nutrition communicate through TikTok, to assess the characteristics of their accounts and videos, and identify factors (healthcare professionals-related and video-related) potentially associated with the higher popularity of the videos.

The results retrieved were heterogeneous. In most of the videos analyzed, the tiktoker used an informal register, a characteristic that is in line with the target of this SM, which has 41% of its users aged between 16 and 24 [16].

TikTok started as an SM for fun and playful music-related videos, so even healthcare professionals should adapt their register, following the content trend to engage a broader audience [32]. It should also be considered that the TikTok algorithm sends popular videos to be viewed by increasing users, thereby attracting a trending video's

**Table 2** Content analysis

Variable		N (%)	
Number of likes (median (IQR <sup>a</sup> ))		300 (75—1070)	
Register <sup>b</sup>	Humoristic	94 (17.99%)	
	Informal	371 (70.67%)	
	Formal	59 (11.34%)	
Voice	Yes	266 (50.57%)	
	No	260 (49.43%)	
Annotations	Yes	461 (87.64%)	
	No	65 (12.36%)	
Subtitles	Yes	28 (5.32%)	
	No	498 (94.68%)	
Music	Yes	145 (27.57%)	
	No	381 (72.43%)	
Playback	Yes	48 (9.13%)	
	No	478 (90.87%)	
Clothing	Professional	168 (31.94%)	
	Casual	266 (50.57%)	
	N/A	92 (17.49%)	
Location	Ambulatory and related locations	168 (31.94%)	
	House	186 (35.36%)	
	Outdoors and public places	31 (5.89%)	
	Green screen / virtual	24 (4.57%)	
	Various	25 (4.75%)	
	Not determinable	92 (17.49%)	
Presence of people	Yes	462 (88%)	
	No	63 (12%)	
Presence of food	Yes	150 (28.52%)	
	No	376 (71.48%)	
Categories of contents <sup>c</sup>	Tiktokers related	Yes	194 (36.88%)
		No	332 (63.12%)
	Diet-nutrition related	Yes	354 (67.30%)
		No	172 (32.70%)
	Physiopathology-disorders	Yes	132 (25.10%)
		No	394 (74.90%)
	Other	Yes	9 (1.71%)
		No	517 (98.29%)

<sup>a</sup> IQR = Interquartile Range

<sup>b</sup> the linguistic register of the video content includes: humoristic/playful: ironic video with writings and/or dialogues with the intent to entertain; informal: serious content of the video, but with conversational language; formal: serious content of the video and exclusively professional tone

<sup>c</sup> each video might include more than one category of content

attention [33, 34]. In the present analysis, videos with a humoristic register had higher popularity than videos with a formal linguistic register. The latter were also videos with more health-related content. This could mean that the “more serious” videos are less popular and that healthcare professionals might also produce “informal” videos to catch the audience. Integrating scientific data with popular content on social media might be essential for nutrition professionals to engage and educate the public effectively. While using humor can make information more relatable and engaging, it must not undermine scientific integrity. Balancing accurate data with approachable delivery helps maintain credibility while reaching a broader audience. However, when used appropriately, humor can also aid in breaking down complex scientific concepts, making them more digestible and less intimidating for the general public.

**Table 3** Multilevel multivariable analysis: outcome NUMBER OF LIKES

	Coefficient	Confidence interval	P	
Author gender				
Male	Ref			
Female	1108.24	−390.09	2606.58	0.14
Number of Followers	0.01	0.00	70.02	<b>0.001</b>
Presence of topics related to diet-nutrition	1111.62	10.40	2212.83	<b>0.048</b>
Presence of voice in the video	795.04	−362.61	1952.71	0.18
Presence of subtitles in the video	708.73	−1866.86	3284.34	0.59
Age of the tiktoker	−880.47	−2337.04	576.10	0.23
Geographical origin				
North	ref			
Centre	1759.24	−58.44	3576.92	0.06
South	131.29	−1594.19	1856.77	0.88
Register				
Humoristic	Ref			
Informal	−867.73	−2272.20	536.73	0.23
Formal	−1711.63	−3887.64	464.38	0.12

**Table 4** Multilevel multivariable: outcome NUMBER OF COMMENTS

	Coefficient	Confidence interval	P	
Presence of Music in the video	−1.85	−14.71	11.00	0.78
Number of Followers	0.00018	0.000077	0.00029	0.001
Presence of topics related to diet and nutrition in the video	12.09	0.81	23.36	0.04
Presence of food in the video	−11.32	−26.46	3.82	0.14
Presence of people in the video	−5.47	−39.24	28.29	0.69
Location of the video	7.87	−10.74	26.48	0.56
Geographical origin				
North	ref		35.72	
Centre	15.7	−4.31		0.12
South	−0.34	−19.81	19.13	0.97
Clothing				
Professional	ref			
Casual	−2.84	−20.17	15.27	0.78
None	−6.68	−40.79	27.43	0.7
Date in which the video was published	0.08	0.015	0.14	0.02

This approach can enhance audience retention and understanding, provided the core scientific messages remain accurate and precise, even though its effects might vary depending on individuals' knowledge [35].

Similarly, the clothing is casual in over 50% of the videos and professional in only 30%. Nonverbal communication via dress attire has the potential to influence viewers and, therefore, needs to receive greater recognition [36]. Professional clothing, such as a formal suit, might be perceived as overbearing. Alternatively, viewers could not see underdressing as appropriate for a nutrition professional. Previous studies on this topic show controversial results. A meta-analysis conducted in 2015 showed that perceptions of attire are influenced by age, setting, and context of care. Specifically, preference for formal attire and white coats was more prevalent among older patients, and studies were conducted in Europe and Asia [37]. A study conducted in South Africa found that patients preferred their surgeons to be dressed in scrubs, as this attire quickly identified surgeons and instilled confidence in the wearer [38]. An Austrian study stated that parents tolerate the pediatrician's casual outfit and even prefer it without losing trust [39]. However, a recent study conducted in Germany after the pandemic period concluded that the dress code of healthcare professionals on the internet depends on the setting: if they want to appear medically competent on a

**Table 5** Multilevel multi-variable: outcome INTERACTIONS (LIKES + COMMENTS + SHARES)

	Coefficient	Confidence interval	P	
Number of Followers	0.02	0.007	0.027	0.001
Presence of topics related to diet and nutrition	1136.94	29.64	2244.24	0.04
Presence of voice in the video	653.38	-507.85	1814.62	0.27
Presence of subtitles in the video	750.53	-1846.11	3347.18	0.57
North	ref			
Geographical origin				
Centre	2444.98	547.79	4342.16	0.01
South	764.18	-1049.26	2577.62	0.41
Date in which the video was published	5.63	-0.18	11.46	0.06
Register				
Humoristic	ref			
Informal	-856.73	-2253.41	539.93	0.23
Formal	-2049.05	-4242.92	143.92	0.07

practice homepage, they should choose classic clothing with a white coat, while if it is about the presentation in social networks, they should present a picture in a relaxed mood [40]. Furthermore, the clothing style and appearance of the tiktokers could affect TikTok users, who could see their bodily size/shape as a role model [41].

Concerning the location in which the video was filmed, in 32% of cases, the videos were filmed at professional premises, while the others were filmed in places not work-related. The physical environment has an essential impact on communication [42]. Previous studies on this topic found that videos of healthcare professionals for educational purposes were primarily recorded in healthcare-related environments [43]. However, videos filmed in less formal settings might decrease trust in healthcare professionals and raise the interest of the new generations in critical health-related topics. Indeed, TikTok's prerogative to make how videos are shown less severe allows the professional to aim to educate a younger audience. Young people are likelier to listen to their peers [39], and most professionals included in this study are under 30.

The professionals included in the analysis also tend to produce content related to their private lives (in almost 37% of the videos) and not only to the professional sphere. This factor might allow the professional to get closer to the user, making it clear that the professional is an "ordinary" person. As mentioned above, these peculiarities have the advantage of making the videos very popular with TikTok's young fanbase, but they can also undermine the professional's credibility. Some tiktokers used medical coats (32%) and filmed themselves in professional places, such as medical clinics and pharmacies (32%), increasing credibility for older audiences.

Among the topics of the videos included in the study, diet is the most popular topic (67%). Diet-related issues were also found to be positively correlated with a higher number of likes, comments, and total interactions, as well as the number of followers of the tiktoker. This demonstrated the need to deepen diet-related topics and strengthen the information about a healthy diet and healthy foods using different communication media. Moreover, it is essential not only to act on knowledge, beliefs, and values, but also on enabling factors, which include skills and capabilities [44]. In this regard, tiktokers might play a pivotal role in increasing the nutritional skills of the general population. However, given the TikTok standards and the increased popularity of nutrition videos on this platform, each video's general median number of likes is not so high [45]. This might pose the problem of these nutrition professionals' impact on TikTok's audience. Considering that food and nutrition is a trendy topic, that most food and nutrition contents were published by the general audience, who might be more prone to share fake news, there is the risk that all the efforts of the "nutrition professionals tiktokers" to spread solid and scientific-based information are vane and ineffective [46, 47]. This might pose the question of whether it is the right choice to encourage healthcare professionals to engage in SM to fight misinformation, even though some studies showed few promising results [48].

Discussing diet on SM is difficult. The possibility of reaching a large audience is attractive, but one has to be sure to convey the right messages to a primarily young audience. On the other hand, the subject of diet is very personal and can be linked to a variety of behavioral disorders. Hence, the communication of specific information needs to be conducted carefully [45].

Tied to the diet-related topic, one recent media criticism of TikTok was that it encouraged disordered eating and triggered people with ED; despite TikTok's efforts to ban pro-ED hashtags (e.g., #proana) and remove pro-ED hashtags, other social networks such as Twitter were affected by this controversy [49].

To our knowledge, this study is the first that has analysed how healthcare professionals focused on nutrition disclosure information in Italian on TikTok, assessing the characteristics of their accounts and videos. The scientific production focused on this SM is still limited, mainly due to the novelty of the SM [29]. Around 300 articles can be found on the scientific database Pubmed by searching for the term "TikTok," but none regard the Italian scenario. Describing how health professionals use TikTok might help the scientific community understand how to improve their communication through SM and use the great potential of SM to disseminate verified information quickly to a broad audience.

Some limitations of this study should be mentioned. A non-probabilistic convenience sampling composed of all the eligible professionals and videos according to our protocol was used. The study's cross-sectional design allows only to make hypotheses about association between variables, but further research is needed to demonstrate cause-effect relationships. Moreover, the algorithm with which TikTok shows the videos to the audience is still unknown. Through a detailed search strategy, the researchers tried to select the tiktokers and the videos as objectively as possible. However, due to the functioning of this SM, the exact search (with the same search strategy) conducted by other researchers could have led to different results. The non-generalizability of TikTok research due to the lack of information about the algorithm is well-known in the academic scenario. In a systematic review of early approaches to studying TikTok, the authors stated that the TikTok algorithm is essentially a "black box" and that studies are needed to recommend methodological approaches to studying TikTok's algorithms[26]. At the beginning of our study, creating two new TikTok accounts helped minimize these differences. However, as stated in the previously mentioned systematic review, with a Social Media so heavily dependent on algorithmic curation, creating a "default" user profile meant to capture an "average" stream of content is impossible. This problem is not wholly unique to TikTok, but is common in other social media[26].

Furthermore, a deep content analysis of the messages included in the videos selected was not possible due to the high heterogeneity of the videos' messages. This also includes the assessment of the validity of the information retrieved in the videos. However, the videos' content was categorized according to the abovementioned checklist, which can give some insights about the messages conveyed. More studies are needed to broaden the findings on this topic.

TikTok, to date the most popular SM, might be an impactful source for health promotion on food and nutrition topics. The popularity of diet-related videos produced by healthcare professionals underlines the potential of this SM for increasing knowledge and skills about healthy diet and good nutritional habits, especially for an audience of adolescents that is often difficult to catch and involve in health educational programs. The lack of government and control over the content of this SM and SMs, in general, leaves open the debate on controlling information and the fight against (healthcare-related) fake news that circulates unrestrained. Further studies are needed to analyze healthcare professionals' communication on these new media.

**Author contributions** FB and RS conceived and designed the study; GS, GLM, and FB finalized the study methodology; AD and AP collected the data; GS, GLM, and FB performed the analysis; RS and FB interpreted the data analyzed; AD, AP, and AD wrote the paper; GLM, FB, and RS revised the paper for important intellectual content; All the authors approved the final version to be published, agreed with the manuscript, and declare that the content has not been published elsewhere; All the authors agree to be accountable for all aspects of the work to ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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**Data availability** Data are available upon request from the Corresponding Author (Giuseppina Lo Moro).

**Code availability** Not available.

## Declarations

**Ethics approval and consent to participate** Ethics approval and informed consent were not sought, as the study design involved content analysis of publicly available TikTok videos, and did not entail collection of sensitive or personal data.

**Competing interests** The authors declare no competing interests.

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