

Article

Sports Nutrition Misinformation on Spanish-Language YouTube and Digital Health Literacy: Mapping a Young–Adult Relevant Information Environment

Ainoa Sofía Pastor-González ¹, Juan Pablo Hervás-Pérez ², Eva María Rodríguez-González ³,
María Del Carmen Lozano-Estevan ⁴, Carlos Ruíz-Núñez ^{5,6,7}, Cibeles Serna-Menor ¹
and Ivan Herrera-Peco ^{3,6,7,*}

¹ PhD Program in Pharmacy, Faculty of Pharmacy, Complutense University of Madrid, 28040 Madrid, Spain; ainoapas@ucm.es (A.S.P.-G.); ciserna@ucm.es (C.S.-M.)

² Department of Chemistry in Pharmaceutical Sciences, Analytical Chemistry Unit, Faculty of Pharmacy, Complutense University of Madrid, Plaza Ramón y Cajal s/n, Ciudad Universitaria, 28040 Madrid, Spain; jpervas@ucm.es

³ Facultad de Ciencias Biomédicas y de la Salud, Universidad Alfonso X el Sabio, Villanueva de la Cañada, 28692 Madrid, Spain; erodrigu@uax.es

⁴ VALORNUT-UCM (920030) Research Group, Department of Nutrition and Food Science, Faculty of Pharmacy, Complutense University of Madrid, Plaza Ramón y Cajal s/n, Ciudad Universitaria, 28040 Madrid, Spain; mlozan16@ucm.es

⁵ Centro de Emergencias Sanitarias 061, Unidad de Innovación, 29590 Malaga, Spain; carlos.ruiz.nunez.sspa@juntadeandalucia.es

⁶ Faculty of Health Sciences-HM Hospitals, University Camilo José Cela, Urb. Villafranca del Castillo, 49, Villanueva de la Cañada, 28692 Madrid, Spain

⁷ Instituto de Investigación Sanitaria HM Hospitales, 28015 Madrid, Spain

* Correspondence: ivan.herrera@ucjc.edu

Abstract

YouTube is a de facto learning environment for athletes seeking fast, actionable nutritional guidance, yet platform dynamics may favor simplified or testimonial narratives over evidence-aligned messages. This study maps Spanish-language sports-nutrition videos to clarify who is most visible, how advice is framed, and what users encounter first. We conducted a cross-sectional, mixed-methods study of 558 YouTube videos on pre/post-exercise nutrition and supplementation. Data was coded for video types (divul-gation/testimonial), claim presence, evidence links, and creator status (professional/non-professional). Exposure-adjusted metrics (View Ratio, Viewer Interaction) and nonpara-metric tests summarized distributions. An undirected network generated centrality rank-ings to select qualitative samples. Thematic analysis of titles and descriptions identi-fied recurring rhetorical patterns and discourse modes. Divul-gation videos predomi-nated (97.3%). Evidence links were rare (0.2%). Exposure and interaction were right-skewed, indicating concentrated visibility. Non-professionals produced most videos, with older uploads and higher daily view accrual; however, interaction per view was similar across groups. Qualitative synthesis revealed two dominant discourse modes, scientific-cautious and experience-testimonial. Oversimplification and motivational cues clustered in testimonial/non-professional items; instructional language and scarce evidence links concentrated in professional/divul-gation items. In Spanish sports-nutrition content, visibil-ity is concentrated, and creator identity shapes advice framing. Evidence-aligned messages can compete when expressed with clear athletic framing, explicit caveats, and links to trustworthy sources.



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1. Introduction

Young people and emerging adults increasingly use video-first platforms as their primary channel to learn about health behaviors, including nutrition and supplementation, often with an explicit “how-to” intent rather than passive consumption of content (Denniss et al., 2023). In nutrition, this creates a well-documented mismatch between visibility and informational quality: content can be highly engaging while remaining incomplete, biased, or inaccurate (Denniss et al., 2023; Kiss et al., 2023). This tension is especially relevant in sports nutrition because open-access, consensus-based guidance exists for key domains that are frequently discussed online (e.g., protein intake, nutrient timing, creatine, omega-3s), offering a robust benchmark against which popular advice can be contrasted (Jäger et al., 2017, 2025; Kerksick et al., 2017; Kreider et al., 2017).

Within social media ecosystems, simplified narratives, testimonials, and “quick win” heuristics can be amplified because they are easy to process, share, and remember (Denniss et al., 2023; Segado Fernández et al., 2025). For youth audiences, who are intensive social media users and often rely on peer-like creators, digital health literacy becomes central: the same platforms that can enhance understanding also facilitate the spread of “science-washing,” oversimplification, and persuasive claims that lack transparent sourcing (Fitzpatrick, 2023; Mukhtar et al., 2025). In the Spanish-language context, where YouTube use is widespread across diverse countries and age groups, systematically characterizing what users encounter first is critical for both education and public health practice (Kiss et al., 2025; Segado Fernández et al., 2025).

Previous empirical research has examined YouTube as a source of nutrition- and health-related information in several European contexts, consistently identifying tensions between popularity, engagement, and informational quality (Kiss et al., 2025; Mohamed & Shoufan, 2024). Studies conducted in Spain and other European countries have reported a high prevalence of incomplete, oversimplified, or weakly referenced dietary advice on social media and video platforms, particularly in youth-relevant domains such as fitness, weight control, and supplementation (Kiss et al., 2023; Segado Fernández et al., 2025). Content analyses of European YouTube videos on nutrition and sport-related topics suggest that creator visibility and persuasive framing often outweigh adherence to evidence-based guidelines, reinforcing the need to examine not only accuracy but also exposure and structural prominence (Naderer et al., 2024; Segado-Fernández et al., 2023). Within the Spanish-language ecosystem, where YouTube consumption is widespread among adolescents and young adults, there remains limited systematic mapping of who produces sports-nutrition content, how advice is framed, and which narratives become most visible.

Beyond Europe, research from Asia and South America has similarly highlighted YouTube’s growing role as an informal learning environment for nutrition, physical activity, and health behaviors (Clark et al., 2023). Studies from countries such as the United Arab Emirates, Chile, and Mexico indicate that video-based platforms are frequently used by young audiences to obtain practical dietary and performance-related advice, yet the quality, sourcing, and framing of this information vary widely (Demers-Potvin et al., 2022). Across these regions, testimonial narratives, influencer-style communication, and simplified “rules” are commonly associated with higher engagement, while explicit references to scientific evidence remain scarce (Park et al., 2024; Rogers et al., 2022). However, most existing studies focus on content accuracy or educational quality in isolation, with fewer

analyses integrating visibility, network influence, and discourse patterns to understand what information users are most likely to encounter first.

Exposure on YouTube is not random. Recommendation pathways and attention dynamics can channel viewers toward “anchor” narratives and creator ecosystems, reinforcing what feels credible through repetition and familiarity (Gao et al., 2023; Ibrahim et al., 2023). Although YouTube has introduced features intended to elevate authoritative health (Osman et al., 2022), these interventions coexist with a vast volume of user-generated material in which creator identity, rhetorical style, and commercial incentives strongly shape message framing and uptake (Chan et al., 2021; Guan et al., 2024; Khalil et al., 2025; Mohamed & Shoufan, 2024). Accordingly, a mixed-methods approach that integrates exposure-adjusted engagement metrics, network centrality, and qualitative discourse analysis can clarify both (a) which content becomes structurally prominent and (b) how that content linguistically constructs credibility and performance-related urgency (Denniss et al., 2023; Guan et al., 2024; Nowell et al., 2017).

To capture these dynamics, a mixed-methods approach is warranted. Quantitatively, exposure-adjusted engagement indicators and network measures can characterize visibility and influence. Qualitatively, thematic and discourse-focused analyses of titles and descriptions can identify recurrent rhetorical patterns, such as athletic framing, motivational appeals, oversimplification, supplement-centric messaging, and explicit links to scientific or technical sources, and examine how these patterns align with creator typology and structural prominence (Denniss et al., 2023; Khalil et al., 2025). Taken together, this integrated design addresses both the informational content that users encounter and the pathways through which that content becomes visible.

The objectives of this study were as follows: (i) to characterize the features and visibility of Spanish-language YouTube videos on sports nutrition using exposure-adjusted engagement metrics, (ii) to identify influence patterns based on creator typology, distinguishing nutrition professionals from non-professionals, and (iii) to describe the discursive strategies and rhetorical patterns used in the most structurally central videos through qualitative content analysis.

2. Materials and Methods

Study Design and Setting

This research used a cross-sectional, mixed-methods design to characterize Spanish-language YouTube videos on sports nutrition and to examine how influence and message framing relate to content features and creator typology.

The analytic corpus comprised all videos previously retrieved through a systematic query strategy focused on pre- and post-exercise eating, training-related dietary practices, and supplementation, restricted to the Spanish language regardless of regional variant. The dataset reflects the platform state at the time of collection and was not refreshed thereafter. Although testimonial-style videos constitute a small proportion of the corpus, this distribution reflects the state of the information environment at the time of data collection rather than a sampling constraint. However, the low prevalence of testimonial content necessarily limits the statistical robustness of direct quantitative comparisons between video formats. Accordingly, comparisons involving testimonial videos are interpreted descriptively and in conjunction with the qualitative analysis, rather than as definitive contrasts between formats.

For clarity, several analytical terms used throughout the Methods and Results are briefly defined here. Supplement-centric claims refer to titles or descriptions that present a specific supplement or dietary product as essential, superior, or outcome-determining (e.g., “best,” “essential,” “don’t use X, use Y”). Exposure-adjusted metrics (e.g., View

Ratio, Viewer Interaction) describe visibility and engagement relative to time since upload rather than raw counts. Eigenvector centrality is a network metric used in this study to identify videos that are structurally influential within YouTube recommendation pathways, accounting not only for direct connections but also for links to other influential videos. The term science-washing denotes the rhetorical invocation of scientific authority without transparent or verifiable sourcing.

Data Sources and Collection

We queried YouTube in March 2025 using a predefined Spanish-language query list that covered pre- and post-exercise nutrition, training-related dietary practices, and common supplements (e.g., creatine, whey protein, caffeine, beta-alanine, etc.). Searches were performed in a logged-out browser with cookies cleared, the interface language set to Spanish, and the location set to Spain. Although we did not measure viewers' age, we frame this work as an information environment likely salient to adolescents and young adults, who are intensive users of video-based platforms for health and lifestyle learning.

We retrieved the top N results per query under default relevance ranking, merged lists, and removed duplicates across queries. We excluded non-video entities and items lacking nutrition content. The full query list, de-duplicated video IDs, and the collection script are provided in the public repository.

Videos were coded along four dimensions. Video Type distinguished divulgation content (informational/tutorial) from testimonial content. Claim captured whether titles, descriptions, or tags endorsed a specific practice as especially effective or superior (e.g., references to creatine, whey, BCAA, or pre-workout products). Evidence links recorded the presence of direct links in descriptions to recognizable scientific or technical sources. Creator typology classified channels as Nutrition professional when clear nutrition credentials or affiliations were stated (e.g., registered dietitian, sports nutritionist); channels without such signals were coded as Non-professional. Classification was based exclusively on credentials or affiliations explicitly stated in the channel description, video description, or on-screen self-identification. Perceived expertise, popularity, or audience size were not considered classification criteria. When credentials were ambiguous or incomplete, videos were discussed by the research team and classified by consensus, using a predefined examples list included in the codebook. To account for exposure time, we computed days since upload, the View Ratio (views per day), and the Viewer Interaction ratio ($VI = [\text{likes} + \text{comments}] / \text{views}$).

In relation to the coding rules and decision criteria, a claim was coded present when titles or descriptions asserted superiority or special effectiveness for a practice or product or promised categorical outcomes; ambiguous or descriptive phrasing without superiority assertions was coded absent. An evidence link required a direct URL to a recognizable scientific or technical source; links to blogs, commercial pages, or link aggregators were coded absent. Creator typology was Nutrition professional when the channel or video stated a credentialed role or a formal institutional affiliation, otherwise Non-professional. Borderline cases were adjudicated by consensus using an example list archived with the codebook.

Data analysis

To examine how messages were linguistically framed in the most structurally central content, two purposefully ranked selections were defined using eigenvector centrality, a network-based indicator of structural influence. Within the Video Type factor, the top ten divulgation and the top ten testimonial videos were selected. Within the Creator typology, the top ten videos from Nutrition professionals and the top ten from Non-professionals were likewise selected. When a single channel dominated the ranking, a

sensitivity variant enforcing at most one video per creator was prepared to ensure diversity; the primary analyses reported in the manuscript refer to the raw top ten sets. The selection of videos for qualitative analysis followed a purposive, rank-based strategy aimed at identifying structurally prominent cases rather than representative samples. Eigenvector centrality scores were used to rank videos within each predefined category (Video Type and creator typology), as this measure captures not only direct connections but also influences highly connected nodes. The top ten videos in each category were selected as analytically information-rich cases that users are more likely to encounter through recommendation pathways. These videos were not selected based on popularity metrics or perceived quality, but on their structural position within the network. This approach allows the qualitative analysis to focus on discursive patterns embedded in content with higher potential visibility and influence within the YouTube ecosystem. For each selected video, the public title and description constituted the textual unit of analysis.

Two coders independently applied first-cycle open codes to all selected items. Initial inter-coder agreement on code presence/absence was [$\alpha = 0.81$], after which discrepancies were reconciled by discussion and codebook refinement. Qualitative coding was conducted independently by two researchers with formal training and research experience in nutritional communication and digital health. Both coders hold doctoral degrees and have prior experience in qualitative content analysis of health-related digital media. A reflexivity memo was maintained throughout the analytic process to document coder backgrounds, theoretical lenses, and potential sources of interpretive bias.

Qualitative coding followed an inductive thematic approach conducted by two researchers working independently on titles and descriptions. Open coding identified recurrent rhetorical and content patterns, including athletic-performance framing, supplement-centric messaging, motivational appeals, simplification of guidance, references to “science” without source transparency, and explicit links to scientific or technical sources. Codes were iteratively consolidated into a codebook, grouped into higher-order themes, and each video received multiple thematic codes as applicable, plus one dominant discourse label reflecting its prevailing rhetorical mode (scientific-cautious, experience-testimonial, instructional-simplified, or promotional-commercial). Disagreements were resolved by discussion, and thematic saturation was reached within the selected corpora. To support trustworthiness, procedures emphasized clear coding rules, reflexive documentation, and analyst triangulation consistent with guidance for rigorous thematic analysis (Guan et al., 2024). The qualitative analysis was conducted using an inductive, manual thematic and discourse-analytic approach rather than lexicometry or automated text-analysis tools. This choice was guided by the study’s focus on identifying broad rhetorical patterns, framing strategies, and modes of credibility construction, rather than on formal argumentation structures or inferential logic. While this approach allows for contextual and interpretive depth, it also limits the systematic examination of internal argumentative rationality, including the distinction between rhetorical simplification, inferential error, and strategic invocation of scientific authority. This constraint is therefore acknowledged as a methodological limitation.

Finally, the descriptive statistics were produced for all variables. Skewed or count-like measures (views, likes, comments, View Ratio, VI, and days since upload) were summarized as medians with interquartile ranges. Group comparisons across two levels of the principal factors (Video Type, Claim, creator typology, and evidence link) used the Mann–Whitney U test for continuous or ordinal variables. Statistical significance was set at $p < 0.05$ for all tests.

Ethics and Data Availability

All analyses used publicly available video-level metadata and publicly posted textual fields; no interaction with users or access to private information occurred. No ethics committee approval was required.

3. Results

Descriptive characteristics

We analyzed 558 Spanish-language YouTube videos on sports nutrition from 329 unique channels (Table 1). Divulgence videos represented 97.3% of the sample ($n = 543$) and testimonial videos 2.7% ($n = 15$; $\chi^2 = 499.61$; $p < 0.0001$). Supplement-centric claims were identified in 7.7% ($n = 43$; $\chi^2 = 399.25$; $p < 0.0001$). Creators categorized as Nutrition professionals accounted for 27.8% ($n = 155$), versus 72.2% Non-professionals ($n = 403$; $\chi^2 = 110.22$; $p < 0.0001$). Strict evidence links in descriptions were rare (0.2%, $n = 1$; $\chi^2 = 554.01$; $p < 0.0001$). Given the deliberately strict operationalization applied in this study, this proportion should be interpreted as a minimum estimate of explicit and easily verifiable referencing practices. Non-standard forms of source attribution (e.g., verbal citations within the video, pinned comments, or indirect references via link aggregators) were not captured by this measure and may therefore be underestimated. Aggregate counts, medians (IQR), and the corresponding statistical tests are summarized in the global quantitative table (Table 1).

Exposure and engagement variables displayed marked right-skewness. Median views were higher in divulgation than testimonial videos, but differences in views, likes, comments, View Ratio, and VI between these two formats did not reach statistical significance (all $p > 0.05$), with distributions detailed in Table 1. Comparing videos with and without supplement-centric claims, median engagement and exposure-adjusted metrics did not differ significantly (all $p > 0.05$) (see Table 2). Non-professional videos showed longer time on platform (days since upload: median 1447 vs. 1022; $U = 24,336$; $p < 0.001$), and a trend toward higher View Ratio ($U = 34,082$; $p = 0.095$), whereas VI remained comparable between groups ($U = 31,484$; $p = 0.567$) (Table 1).

In relation to associations between content features and structural visibility, the pairwise comparisons of centrality scores across content categories are consistent with the global quantitative contrasts. The presence of a supplement-centric claim was associated with higher eigenvector centrality ($U = 13,571.5$; $p = 0.014$), whereas differences by Video Type (divulgence vs. testimonial) and by creator typology (Nutrition professional vs. Non-professional) were not statistically significant for eigenvector, degree, or betweenness (all $p \geq 0.26$), with the exception of selected exposure or temporal metrics already noted above.

Discursive patterns in the most central videos

We conducted an inductive thematic analysis of titles and descriptions in the selected videos. Codes were grouped into themes and mapped to a discourse typology capturing the dominant rhetorical mode. Each video could receive multiple theme codes, but only one dominant discourse label (Table 3).

Table 1. Description of video features by category.

Variable	Total	Video Categorization			Claim		Test; <i>p</i> -Value	Type of User		Test; <i>p</i> -Value	Scientific Evidence		
		Divuligation	Testimonial	Test; <i>p</i> -Value	Yes	No		NP	Non-NP		No	Yes	Test; <i>p</i> -Value
Videos (n)	558	543 (97.3%)	15 (2.7%)	$\chi^2 = 499.61$; $p < 0.0001$	43 (7.7%)	515 (92.3%)	$\chi^2 = 399.25$; $p < 0.0001$	155 (27.8%)	403 (72.2%)	$\chi^2 = 110.22$; $p < 0.0001$	557 (99.8%)	1 (0.2%)	$\chi^2 = 554.01$; $p < 0.0001$
Views	30,699,425	30,563,936	135,489	U = 5139; $p = 0.084$	1,893,108	28,806,317	U = 11,500; $p = 0.674$	9,497,097	21,202,328	U = 33,099; $p = 0.274$	30,699,423	2	U = 547; $p = 0.096$
Likes	936,988	930,567	6421	U = 4469; $p = 0.519$	60,599	876,389	U = 11,393; $p = 0.752$	169,697	767,291	U = 34,116; $p = 0.091$	936,988	0	U = 525; $p = 0.125$
Comments	15,236	15,113	123	U = 4414; $p = 0.552$	1311	13,925	U = 12,041; $p = 0.307$	3067	12,169	U = 33,447; $p = 0.164$	15,236	0	U = 416; $p = 0.360$
View Ratio Median (IQR)	0.46 (0.06–4.92)	0.49 (0.06–5.04)	0.13 (0.06–0.72)	U = 4956; $p = 0.151$	0.28 (0.07–20.7)	0.50 (0.06–4.73)	U = 11,570; $p = 0.624$	0.71 (0.09–6.11)	0.42 (0.06–4.51)	U = 34,082; $p = 0.095$	0.47 (0.07–4.93)	0.00 (0.00–0.00)	U = 543; $p = 0.101$
VI Median (IQR)	0.04 (0.02–0.06)	0.04 (0.02–0.06)	0.06 (0.03–0.10)	U = 3062; $p = 0.113$	0.04 (0.02–0.06)	0.04 (0.02–0.06)	U = 11,992; $p = 0.296$	0.04 (0.02–0.06)	0.04 (0.02–0.06)	U = 31,484; $p = 0.567$	0.04 (0.02–0.06)	0.00 (0.00–0.00)	U = 522; $p = 0.122$
Days Since Upload Median (IQR)	1362 (892–1988)	1380 (892–2029)	1050 (667–1508)	U = 5131; $p = 0.086$	1248 (967–1972)	1386 (877–1986)	U = 11,039; $p = 0.974$	1022 (668–1886)	1447 (936–2116)	U = 24,336; $p < 0.001$	1379 (892–1990)	665 (665–665)	U = 533; $p = 0.115$

Note: NP means Nutrition professional, and No NP means Non-nutrition professional; View Ratio = views/days since upload; VI = (likes + comments)/views. Continuous/ordinal variables compared with Mann–Whitney U tests (two-sided). Proportions tested with chi-square (df = 1). Chi-square tests were used descriptively to summarize distributional contrasts. Given the presence of sparse cells in some variables (e.g., evidence link), these tests were not interpreted inferentially, and results are reported for transparency rather than hypothesis testing.

Table 2. Themes by Video Type and user type, co-occurrence highlights, and verbatims.

Theme	By Video Type (n = 10 Each)	By User Type (n = 10 Each)	Co-Occurrence Highlights *	Example Verbatim
Athletic framing	Divulcation: 10/10; Testimonial: 9/10	Professional: 9/10; Non-professional: 10/10	+ Oversimplification (22), + Motivational (16), + Supplement (14)	“Pre-workout foods to train harder”; “Fuel for faster recovery”; “Key meals for definition days”; “Build mass with smarter pre-session carbs”
Supplement-centric	Divulcation: 5/10; Testimonial: 3/10	Professional: 3/10; Non-professional: 6/10	+ Oversimplification (15), + Science-washing (12), + Athletic (14)	“If you’re not taking creatine, you’re leaving gains on the table”; “Best whey for every athlete”; “BCAA essential for recovery, no excuses”; “Pre-workout combo that changes everything”
Science-washing	Divulcation: 3/10; Testimonial: 7/10	Professional: 2/10; Non-professional: 7/10	+ Oversimplification (14), + Supplement (12), + Athletic (10)	“Clinically proven to burn fat fast”; “Studies show this breakfast boosts performance”; “Science says: never mix fats pre-workout”; “Backed by research, results guaranteed”
Motivational framing	Divulcation: 4/10; Testimonial: 10/10	Professional: 3/10; Non-professional: 8/10	+ Athletic (16), + Oversimplification (13), + Supplement (10)	“Don’t sabotage your gains with bad food”; “Fuel like a champion”; “This routine unlocked my progress”; “Eat to win every session”
Oversimplification	Divulcation: 8/10; Testimonial: 10/10	Professional: 5/10; Non-professional: 9/10	+ Athletic (22), + Supplement (15), + Science-washing (14)	“Everyone should eat this before training, always”; “Never pair fats before a workout”; “One breakfast fits all athletes”; “This single rule changes everything”
Evidence link	Divulcation: 3/10; Testimonial: 1/10	Professional: 4/10; Non-professional: 0/10	Low co-occurrence overall; sporadic with Athletic (5)	“According to WHO/EFSA guidance (link)”; “See PubMed trial on creatine timing”; “Consensus statement (link)”; “Guideline summary (open access)”

* Co-occurrence values refer to the number of videos in which pairs of codes co-appear at least once within the pooled top-ranked sets.

Table 3. Discourse typology and thematic codes.

Code Family	Code	Operational Definition	Unit
Discourse type (dominant)	Scientific–cautious	Uses tentative language; mentions guidelines/evidence; avoids absolute claims	Video-level
	Experience–testimonial	Centers personal narrative/transformations; first-person evidence	Video-level
	Instructional–simplified	Step-by-step tips with generalized prescriptions (“always/never”)	Video-level
	Promotional–commercial	Explicit brand, affiliate links, discount codes	Video-level
Thematic codes	Athletic framing	Links nutrition to performance: pre/post, mass gain, cutting, recovery	Segment
	Supplement-centric	Mentions/recommends creatine, whey, BCAA, pre-workout, etc.	Segment
	Science-washing	“Studies show/clinically proven” without verifiable references	Segment
	Motivational framing	Appeals to identity/effort/fear of failure (“fuel like a champion”)	Segment
	Oversimplification	Broad rules, ignoring individual variability	Segment
	Evidence links present	Direct link to peer-review/guideline repository	Segment

Across the most central videos, two discourse families dominated: a scientific–cautious register that relied on hedged language, tentative claims, and occasional references to guidance; and an experience–testimonial register anchored in first-person narratives, transformation arcs, and motivational imperatives. In practice, these discourse modes aligned strongly with both Video Type and creator typology. Within testimonial content, the dominant mode was experience–testimonial, accompanied by near-universal motivational framing (10/10) and oversimplification (10/10), while science-washing appeared frequently (7/10), that is, scientific-sounding assertions without verifiable sources. By contrast, divulgation videos more often adopted a scientific–cautious or instructional tone, showing higher evidence-link presence (3/10 vs. 1/10) and lower science-washing (3/10 vs. 7/10), though oversimplification remained common (8/10).

Creator identity further stratified discourse. Nutrition professionals showed higher rates of evidence links (4/10) and lower science-washing (2/10), while maintaining substantial athletic framing (9/10). Non-professionals displayed more motivational framing (8/10), greater oversimplification (9/10), and more science-washing (7/10), with evidence links virtually absent (0/10). These patterns align with the quantitative strand that locates supplement-centric messages in structurally influential zones of the network, and they elucidate how influence is linguistically packaged in the most central videos.

Qualitative coding of titles and descriptions in the most structurally central videos revealed two prevailing discourse modes, scientific–cautious and experience–testimonial, with instructional–simplified and promotional–commercial appearing as secondary modes depending on creator and format. In testimonial videos, the experience–testimonial mode was dominant: titles and descriptions frequently employed first-person framing and transformation arcs (e.g., “I was stuck until I changed my pre-workout meal,” “This breakfast finally unlocked my progress”). These items consistently coupled motivational framing with oversimplification, compressing multi-factor dietary decisions into single-rule prescriptions (e.g., “One rule changed everything,” “Never eat fats before training”). By contrast, divulgation videos more often adopted a scientific–cautious register (e.g., “Cur-

rent evidence suggests. . .” “Guidelines indicate that. . .”), occasionally supplemented by instructional–simplified phrasing (“Three steps to plan your pre-workout meal”), which presented procedure without categorical absolutes.

Across themes, athletic framing was nearly ubiquitous and typically positioned nutrition as instrumental to performance (“Fuel for faster recovery,” “Meals that boost power in your session,” “Key foods for mass-gain phases”). In testimonial content, athletic framing co-occurred with motivational cues (“Don’t sabotage your gains,” “Eat to win every session”), while in divulgation content it appeared alongside procedural sequencing (“Carbs first, protein second, here’s why”). Supplement-centric messaging was common in high-centrality items and frequently employed assertive or necessity language (“If you’re not taking creatine, you’re leaving gains on the table,” “Best whey for every athlete,” “BCAA essential for recovery, no excuses”). In non-professional creators, these claims were more likely to appear without hedging, whereas professional creators tended to include conditions or scope statements (“May benefit athletes with high training frequency,” “Particularly relevant when energy intake is constrained”).

Science-washing, invocations of scientific authority without transparent sourcing, was identifiable through formulaic phrases such as “Studies show,” “Clinically proven,” and “Science says,” often attached to universal rules (“Science says: never mix fats pre-workout”). This theme co-appeared with oversimplification and supplement-centric messaging in non-professional content, whereas professional creators more commonly used hedged constructions (“Evidence is mixed,” “Limited trials suggest”) and, where present, included evidence link items in descriptions (“Consensus statement,” “See PubMed trial on creatine timing”). Overall, evidence-linked entries were infrequent but, when present, were concentrated in divulgation videos from nutrition professionals and typically referenced guidelines or primary studies via recognizable repositories.

Within the instructional–simplified mode, descriptions frequently used stepwise or list-based formulations that emphasized clarity over nuance (“Plan your pre-workout in 3 steps,” “Top 5 foods for definition”). Although these sequences avoided categorical language more often than testimonial items, they still reduced contextual variability to general templates. The promotional–commercial mode appeared in a subset of high-centrality videos, identifiable by brand mentions and affiliate signals (“Code XYZ for 10% off,” “My stack”), sometimes embedded within instructional content. In such cases, supplement-centric and promotional codes co-occurred with athletic framing, while evidence linking was rarely present. (Table 3).

Creator typology stratified phrasing across modes. Nutrition-professional videos displayed a higher prevalence of hedges and scope delimiters (e.g., “for high-volume training weeks,” “may not apply during tapering”), and their instructional items were more likely to acknowledge contingency (“adjust portions according to session intensity”). Non-professional videos more often used definitive and motivational cues (“always,” “never,” “must,” “no excuses”), particularly in testimonial narratives. These contrasts were reflected in co-occurrence patterns: athletic + oversimplification + motivational triads were frequent in testimonial/non-professional items, while athletic + instructional + evidence-link combinations appeared, albeit less often, in divulgation/professional items (Table 3).

4. Discussion

This study maps a Spanish-language sports-nutrition “learning environment” on YouTube and shows a concentrated visibility pattern: a small subset of videos and channels captures disproportionate attention, while most content remains peripheral. Consistent with prior syntheses, our findings reinforce that engagement indicators are weak proxies for educational value and should not be interpreted as markers of accuracy or trustworthiness

(Park et al., 2024). For youth and emerging adults, this matters because first-encounter content can shape subsequent choices through familiarity and perceived social proof, especially when messages are packaged as simple rules or transformation narratives.

A key practical concern is the scarcity of verifiable sourcing. Even within predominantly divulgation-style videos, strict evidence links in descriptions were exceedingly rare, which limits users' ability to cross-check claims against open-access position stands and guidelines that are readily available for sports nutrition (Jäger et al., 2017, 2025; Kerksick et al., 2017; Kreider et al., 2017). This gap creates fertile ground for "science-washing," where scientific authority is invoked without traceable references, a pattern that is particularly persuasive in performance contexts because it offers certainty and urgency ("best," "essential," "never," "no excuses") (Denniss et al., 2023; Guan et al., 2024; Khalil et al., 2025). From an educational standpoint, the priority is not only correcting false claims but also making evidence-checking frictionless in the same format users already prefer.

While much of the discussion around YouTube and sports nutrition rightly emphasizes risks related to oversimplification and misinformation, the platform also presents clear advantages for youth-facing health communication. YouTube offers a highly accessible, visual, and context-rich environment that aligns with how adolescents and emerging adults seek practical guidance, particularly for performance-oriented behaviors. Our findings suggest that evidence-aligned messages are not inherently disadvantaged: when professional creators adopt athlete-relevant framing, concise explanations, and transparent caveats, their content can achieve levels of visibility and engagement comparable to non-professional videos. From an applied perspective, this indicates that YouTube can function as a meaningful educational tool when evidence-based guidance is translated into platform-compatible formats, including short summaries, explicit conditions of applicability, and prominent links to open-access guidelines or consensus statements (Park et al., 2024; Schröder et al., 2025).

Creator typology helped explain how credibility is constructed. Non-professional creators dominated the content pool and tended to rely more heavily on motivational and categorical language, particularly in testimonial formats, whereas nutrition professionals more often used hedging, scope delimiters, and conditional applicability. This aligns with literature describing how perceived authenticity, parasocial trust, and influencer-like communication can increase receptivity to health messages independent of their evidentiary base (Berjawi et al., 2024; Fitzpatrick, 2023; Osman et al., 2022; Steeb et al., 2022; Suarez-Lledo & Alvarez-Galvez, 2021). For youth-facing interventions, an important implication is that "professional" communication need not be less competitive, provided it is optimized for platform dynamics (concise framing, explicit conditions/exceptions, and immediately visible links or pinned summaries that lower the cost of verification).

Network patterns further contextualize these risks and opportunities. The modular graph structure and the prominence of the largest connected component are compatible with "attention corridors" shaped by recommendation pathways, which can repeatedly route users toward a limited set of highly visible nodes (Berjawi et al., 2024). In practice, this means that improving youth-facing nutrition literacy on YouTube is not only a matter of producing accurate content, but also of ensuring that evidence-aligned content is structurally discoverable and rhetorically legible within the platform's incentive structure. Measures such as athlete-relevant titling, micro-summaries with ranges and caveats, and prominent short links to open-access consensus documents represent low-burden strategies that federations, coaches, and educators can implement without changing the underlying scientific message (Jäger et al., 2017; Kerksick et al., 2017; Kreider et al., 2017; Mohamed & Shoufan, 2024).

The present study has several limitations. First, the dataset represents a platform snapshot at the time of collection and was not refreshed; exposure metrics and recommendation ties evolve, and visibility patterns may shift with new uploads, creator behavior, and platform-level policy or algorithm changes (Berjawi et al., 2024). Second, our “evidence link” definition was intentionally strict (direct links to recognizable scientific/technical sources), which may underestimate sourcing practices that occur in non-standard locations (e.g., pinned comments, link aggregators, verbal citations in-video). While this enhances specificity, it likely undercounts partial transparency and therefore should be interpreted as a lower-bound estimate of explicit verifiability. Third, the qualitative component analyzed titles and descriptions, not audiovisual content. Thumbnails, on-screen text, narration style, editing cues, sponsor segments, and affective delivery may contribute materially to persuasion and perceived credibility, particularly in testimonial content. Fourth, creator typology relies on publicly stated credentials and affiliations; misclassification is possible when credentials are ambiguous, incomplete, or strategically framed. Fifth, centrality rankings were used to select qualitative samples rather than to formally test hypotheses about centrality differences across discourse types; alternative diffusion-aware or community-sensitive metrics could further refine how “influence” is operationalized in sparse, modular ecosystems (Gao et al., 2023; Ibrahim et al., 2023). Finally, in relation to the statistical analysis, some categorical variables exhibited highly unbalanced distributions, which limits the inferential interpretability of chi-square statistics. These contrasts are therefore reported descriptively and interpreted alongside non-parametric and qualitative findings.

Future research should move beyond deficit-based models of misinformation to examine how YouTube can be used effectively as a youth-facing educational environment when evidence-based guidance is translated into platform-compatible formats. Experimental and quasi-experimental studies are needed to test how specific design features, such as title phrasing, thumbnail cues, pinned summaries, and explicit conditions of applicability, affect visibility, retention, and understanding of evidence-aligned sports nutrition content. Pragmatic experiments with professional creators can quantify the impact of title phrasing, thumbnail cues, pinned evidence summaries, and clearly stated conditions or exceptions on click-through, completion, and retention. Linking viewing patterns to athlete self-reports on pre/post-exercise meals and supplement use would clarify behavioral consequences. Finally, integrating digital health literacy frameworks into sports and physical education contexts may help young athletes develop practical skills to evaluate persuasive online nutrition content without disengaging from the platforms they actively use.

5. Conclusions

This mixed-methods study maps the Spanish-language sports-nutrition landscape on YouTube and shows a consistently concentrated visibility pattern: a small cluster of videos, channels, and narratives attracts disproportionate attention, while most content remains peripheral. Although divulgation formats dominate numerically, explicit, verifiable links to scientific or technical sources are exceedingly rare under a strict operationalization.

Creator identity stratifies how advice is packaged. Nutrition-professional channels favor a scientific-cautious or instructional register that includes hedging, scope delimiters, and occasional references to guidance. Non-professional channels lean on motivational hooks, categorical rules, and testimonial arcs that promise fast, clear outcomes. In the most central content, two discourse modes prevail, scientific-cautious and experience-testimonial, with athletic framing nearly ubiquitous.

Oversimplification and motivational cues concentrate in testimonial/non-professional items; instructional language, and the few evidence links, concentrate in professional/divulgation items. Taken together, the findings indicate that who speaks and how the

message is framed meaningfully shape potential reach and perceived credibility. Practically, evidence-aligned communication can compete in this environment when it is concise, context-sensitive, and paired with athlete-relevant framing and visible, user-friendly references (e.g., short links, pinned comments, brief summaries of “when this applies/when it doesn’t”).

In this study, influence is conceptualized in structural terms, referring to a video’s position within the information ecosystem as captured by visibility, connectivity, and centrality indicators. These measures reflect the likelihood of exposure and circulation within recommendation pathways, rather than direct cognitive, attitudinal, or behavioral effects on viewers.

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