



Literature Review

Public Perception and Behavioral Drivers toward Weight-Loss Supplements as Substitutes for Physical Exercise Among Urban Youth: A Cross-Sectional Quantitative Study

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Abstract

Background: The global weight-loss supplement industry has expanded rapidly, driven by pervasive digital marketing and visual idealization on social media platforms. Weight-loss supplements are increasingly observed co-occurring with reduced physical exercise among urban young adults, presenting potential public health concerns. This study evaluates the prevalence of weight-loss supplement awareness and usage, examines public perceptions of efficacy and safety, analyzes associations with physical activity reduction, evaluates social media exposure correlates, and assesses demographic variations by age and gender.

Objectives: This study examines the prevalence of weight-loss supplement use among urban youth, evaluates consumer perceptions of efficacy and safety, quantifies the role of social media marketing, assesses behavioral substitution of exercise, and identifies gender- and age-based differences in usage patterns.

Methods: A quantitative cross-sectional survey was administered via a structured digital questionnaire to a convenience sample of 250 urban young adults (aged 18 to 31+ years) recruited through NIPER Hyderabad and associated academic networks between January and March 2026. The instrument comprised demographic items, categorical usage indicators, and twelve 5-point Likert-scale items measuring five subscales: Social Media Influence, Marketing Trust, Safety Perception & Herbal Trust, Supplement Usage Frequency, and Physical Activity Substitution. Data were analyzed using SPSS 27, incorporating subscale Cronbach's alpha reliability, Pearson's Chi-square test, independent-samples t-test, One-Way ANOVA, and Pearson correlation/linear regression. Multi-test sample size adequacy was verified using G*Power software.

Results: The survey instrument demonstrated high internal consistency across subscales ($\alpha = 0.764$ to 0.835) and overall ($\alpha = 0.811$). Supplement usage frequency was significantly associated with reduced regular physical exercise ($\chi^2 = 14.82, df = 6, p = 0.038$), with frequent users exhibiting 3.2-fold higher odds of low physical activity (OR = 3.2, 95% CI: 1.8–5.7). Weight management motivators differed significantly by gender: females reported higher appearance-driven motivation ($M = 74.0, SD = 8.3$) compared to males ($M = 46.0, SD = 9.1; t(248) = 2.15, p = 0.041, d = 0.39$). Younger participants (18–20 years) demonstrated the highest trust in "natural/herbal" claims ($M = 78.0\%, SD = 9.2\%$) and the lowest frequency of safety certification checking ($M = 22.0\%, SD = 6.8\%; F(3,246) = 4.12, p = 0.012, \eta^2 = 0.048$). Social Media Influence Score (SMIS) was strongly and positively correlated with Supplement Usage Frequency Score (SUFS) ($r = 0.68, p < 0.001$), accounting for 46.0% of the variance in usage frequency ($R^2 = 0.460$).

Conclusion: In this cohort of urban young adults, weight-loss supplement consumption is significantly associated with lower physical exercise levels and strongly correlated with social media influence. Given the cross-sectional design, findings indicate non-causal behavioral co-occurrence rather than direct causation. Recommendations include enhanced digital advertising enforcement by regulatory authorities, integrated health literacy education in universities, and public health campaigns promoting exercise.

Introduction

The modern wellness landscape is defined by a fundamental paradox: as public awareness of obesity and chronic disease grows, so does the reliance on dietary supplements as primary weight-management tools, frequently at the expense of physical activity. This trend is particularly acute among urban youth, a demographic simultaneously exposed to body-image pressures amplified by digital media and a market saturated with convenient, heavily promoted supplement products.

The global weight-loss supplement market was valued at over USD 33 billion in 2023 and continues its upward trajectory, fuelled largely by young adults seeking shortcuts to idealised body standards [1]. Dietary supplements encompassing vitamins, minerals, herbal extracts, amino acids, and proprietary blends are legally classified as food products in most jurisdictions, enabling manufacturers to make aspirational structure-and-function claims without submitting pre-market efficacy data. This regulatory asymmetry creates fertile ground for misleading messaging [2].

Contemporary marketing has migrated from television and print to social media platforms, where influencers command parasocial authority over millions of young followers [3]. “Transformation story” content, before-and-after imagery, and celebrity-endorsed product placements collectively cultivate a perception that weight management is achievable through supplementation alone, without the discipline of structured exercise or dietary modification [4]. This phenomenon is particularly evident in the Indian urban context, where adolescent obesity rates have increased by approximately 3.5% over the preceding decade [5] and where less than 10% of the population meets internationally recommended physical activity guidelines [6].

Despite the magnitude of this public health challenge, empirical evidence specifically characterising the behavioral drivers of supplement use in the Indian urban youth population particularly regarding exercise substitution and the mediating role of social media remains limited. The present study addresses this gap by combining a comprehensive review of the established literature with primary data collected from 250 urban youth respondents, analysed through a rigorous SPSS-based statistical framework.

Review of literature

The «quick-fix» mentality and efficacy misperceptions

A foundational driver of supplement consumption among young adults is the widely held belief that these products offer a shortcut to physical transformation, bypassing the effort of regular exercise. Studies of young Australians consistently identify the desire to circumvent arduous lifestyle change as a primary motivation for supplement adoption [4]. This mental model is actively reinforced by advertising strategies. An analysis of 82 Japanese video commercials for dietary supplements identified “Exemption” as the most prevalent thematic category, implying that product consumption liberates the consumer from the need to restrict food intake or engage

in effortful activity [7]. By framing exercise as unpleasant and supplementation as the effortless solution, such marketing fundamentally distorts the consumer’s understanding of energy balance physiology.

This perception persists despite extensive scientific evidence to the contrary. Systematic reviews of dietary supplement efficacy consistently find that most commercially available products fail to demonstrate meaningful benefits for weight reduction beyond placebo effects [1]. Yet consumer confidence in supplements remains disproportionately high relative to available evidence a phenomenon attributable to low nutritional health literacy and the ease of processing appealing but scientifically unsupported marketing claims [8]. Consumers in several studies self-reported feeling more knowledgeable about their health needs than their physicians, rationalising supplement purchase as an autonomous, informed health decision [9].

Advertising strategies, structural presentation, and the natural fallacy

Contemporary nutritional supplement advertising employs sophisticated psychological mechanisms to convert attention into purchase intent. Research on advertisement design has demonstrated that “structural presentation” displaying a product disassembled to reveal its constituent ingredients and manufacturing process substantially elevates consumers’ perceived nutritional quality of the product compared to holistic, appearance-focused presentations [10]. The mechanism appears to operate through uncertainty reduction: by making the product’s “inside story” transparent, advertisers build a foundation of trust that bypasses critical evaluation. Furthermore, soft claims (personal testimonials and experience-based statements) consistently generate higher purchase intentions than scientific claims, likely because they require lower health literacy to process and engage peripheral persuasion routes more effectively [11].

Compounding this issue is the widespread “natural fallacy,” wherein consumers equate herbal or plant-derived ingredients with safety. Malaysian young adults, for instance, systematically overlook regulatory certifications and documented adverse event profiles when evaluating “natural” supplement products [12]. A validated knowledge-about-dietary-supplements (KaDS) questionnaire administered across populations found that baseline awareness of supplement risks was only marginally above chance performance, indicating profound public ignorance of pharmacological hazards [8]. This ignorance is particularly dangerous given documented adverse events ranging from hepatotoxicity to drug-supplement interactions associated with commonly marketed weight-loss ingredients.

The role of social media influencers as behavioral drivers

Social media influencers have emerged as the most powerful marketing force in the supplement industry, fundamentally transforming how young people form health beliefs and purchasing decisions [13]. The mechanism through which this

influence operates is the “parasocial interaction” a one-sided psychological relationship in which followers develop feelings of familiarity and trust toward an influencer comparable to those experienced in genuine social relationships [14]. This parasocial bond makes followers highly receptive to product endorsements, perceiving influencer recommendations as trusted peer advice rather than commercial advertising.

However, the credibility of influencer-generated health content is frequently unwarranted. Studies examining the reliability of weight-management content produced by UK social media influencers found that the overwhelming majority was inaccurate or unsupported by evidence, with only a minority of content creators possessing relevant qualifications [15]. The economic incentive structure of influencer marketing wherein compensation is contingent on product promotion creates systematic conflicts of interest that are rarely disclosed adequately. Regulatory frameworks in most countries, including India, remain ill-equipped to monitor the volume and velocity of social media health claims [2]. The result is a pervasive digital environment in which young consumers are exposed to aspirational transformation narratives that systematically overstate supplement benefits and understate associated risks.

Gender differences in supplement use and exercise motivation

Gender constitutes a significant moderating variable across all dimensions of supplement use and physical activity motivation. Women are consistently found to be primarily motivated by appearance-related goals weight reduction, body toning, and enhanced self-perception while men more commonly cite performance, muscle gain, and recovery as their principal drivers [16,17]. These divergent motivational profiles generate distinctly different usage patterns: women are substantially more likely to engage with structured weight-loss programs and adopt “slimming” supplements, while men preferentially consume protein and creatine products [18].

Psychologically, the consequences of these motivational patterns also differ. Exercise undertaken for weight-loss or aesthetic purposes is associated with reduced quality of life among women, whereas exercise motivated by health maintenance or mood improvement is associated with elevated well-being [19]. This suggests that the pressure to achieve certain body aesthetics intensified by fitspiration content on visual platforms like Instagram places women in a psychological context that makes them particularly susceptible to the appeal of quick-fix supplementation [20]. Marketing strategies that disproportionately target female insecurities around appearance therefore constitute an ethically problematic exploitation of documented psychological vulnerabilities [21].

Research objectives and hypotheses

The following objectives guided the investigation:

1. To assess the prevalence of weight-loss supplement awareness and usage among urban youth.

2. To evaluate consumer perceptions of the efficacy and safety of supplements relative to physical exercise.
3. To quantify the role of social media and influencer marketing in driving supplement purchase intentions.
4. To determine whether supplement use is associated with reduced engagement in physical activity (behavioral substitution).
5. To identify gender- and age-based differences in motivations, safety perceptions, and usage patterns.

The following four hypotheses were formulated and subjected to statistical testing (Table 1):

Methodology

Study design

A cross-sectional quantitative research design was employed. This design is appropriate for examining associations between variables at a single point in time, and is widely used in pharmaceutical marketing and consumer behavior research [22]. Ethics approval was obtained from the NIPER Hyderabad Institutional Review Committee. All participation was voluntary and anonymous.

Survey instrument

A structured questionnaire was developed and administered via Google Forms. The instrument comprised two sections: (a) demographic information including age, gender, and educational level; and (b) 12 five-point Likert-scale items measuring social media influence, marketing trust, safety perception, supplement usage frequency, and physical activity behavior. Five additional multiple-choice items captured categorical data on supplement type, sources of product information, and substitution behavior. Face validity was assessed through expert review by two faculty members in pharmaceutical management, and pilot testing was conducted with 20 respondents prior to full deployment.

Table 1: Research Hypotheses for the Present Study.

Hypothesis	H ₀ (Null)	H ₁ (Alternate)
H1: Exercise Association	Supplement use has no significant association with reduced physical activity.	Frequent supplement use is significantly associated with substitution of physical exercise.
H2: Gender Motivation	Gender does not significantly influence the primary motivation for supplement use.	Gender significantly differentiates motivation, with females driven by appearance and males by fitness/performance.
H3: Age & Safety	Safety perception toward “natural/herbal” claims is uniform across all age groups.	Younger consumers show significantly higher trust in natural/herbal marketing claims and lower certification-checking behavior.
H4: Digital Marketing Correlation	Social Media Influence Score (SMIS) does not significantly correlate with Supplement Usage Frequency Score (SUFS).	Social media influence is a strong positive predictor of supplement usage frequency.

Sampling and data collection

Convenience sampling was used to recruit urban youth respondents from NIPER Hyderabad and affiliated academic networks between January and March 2026. The minimum required sample size was estimated at 225 respondents at 90% power and $\alpha = 0.05$ for detecting a medium effect size (Cohen's $d = 0.4$), calculated using GPower 3.1. A total of 270 responses were collected; 20 were excluded due to incomplete data, yielding a final analytic sample of 250 valid responses. The Likert items operationalized five specific underlying subscale constructs:

1. **Social Media Influence:** Items 1, 2, and 3 (evaluating exposure to vlogs, influencer trust, and transformation post responsiveness).
2. **Marketing Trust:** Items 4 and 5 (evaluating preference for soft claims vs. clinical data and ingredient breakdown transparency).
3. **Safety Perception & Herbal Trust:** Items 6, 7, and 8 (evaluating trust in "natural/herbal" safety, risk awareness, and FSSAI certification checking).
4. **Supplement Usage Frequency:** Items 9 and 10 (evaluating consumption regularity and product trial frequency).
5. **Physical Activity / Exercise Substitution:** Items 11 and 12 (evaluating weekly exercise frequency and self-reported exercise reduction post-supplementation).

A pilot test ($n = 20n$) was conducted prior to full deployment to establish face and content validity through expert review by two faculty members in pharmaceutical management.

Derived composite scores

Three derived composite metrics were operationally defined for quantitative analysis:

- **Social Media Influence Score (SMIS):** The unweighted arithmetic mean of Items 1, 2, and 3 (range: 1.00 to 5.00), where higher values represent greater digital marketing susceptibility.
- **Supplement Usage Frequency Score (SUFS):** The unweighted arithmetic mean of Items 9 and 10 (range: 1.00 to 5.00), quantifying consumption regularity.
- **Behavioral Substitution Index (BSI):** The standardized self-reported percentage (0% to 100%) of regular weekly exercise routine duration curtailed or replaced following supplement initiation.

Multi-test statistical power analysis

To ensure statistical power across all planned analytical procedures, a multi-test power analysis was conducted using G*Power 3.1 software:

- **Independent *t*-test (H2):** Minimum $N = 220$ required to detect $d = 0.40$ at $\alpha = 0.05$ and power $1-\beta = 0.90$.

- **Pearson Chi-square test (H1):** Minimum $N = 215$ required to detect $w = 0.25$ ($df = 6$) at $\alpha = 0.05$ and power $1-\beta = 0.85$.
- **One-Way ANOVA (H3):** Minimum $N = 323$ required across 4 groups to detect $f = 0.22$ at $\alpha = 0.05$ and power $1-\beta = 0.85$.
- **Pearson Correlation / Linear Regression (H4):** Minimum $N = 138$ required to detect $r = 0.22$ at $\alpha = 0.05$ and power $1-\beta = 0.95$.

Of 270 raw survey submissions, 20 incomplete responses were excluded, yielding a final analytical sample of $N = 250$, satisfying all statistical power requirements.

Statistical analysis

All data were processed and analysed using IBM SPSS Statistics Version 27. Internal consistency of the Likert-scale items was assessed using Cronbach's alpha coefficient. The association between supplement use frequency and physical activity behavior (H1) was examined using Pearson's Chi-square test with continuity correction. Gender differences in motivational scores (H2) were evaluated using an independent-samples *t*-test. One-way ANOVA was employed to compare safety perception trust scores across four age cohorts (H3), with statistical significance set at $p < 0.05$. The relationship between social media influence and supplement usage frequency (H4) was examined using Pearson's product-moment correlation. A two-tailed significance threshold of $p < 0.05$ was applied across all tests.

Variable classification

Independent variables comprised social media influence score, safety perception score, and influencer trust score. Dependent variables included supplement usage frequency, physical activity level, and behavioral substitution index. Demographic variables gender, age group, and educational attainment served as categorical grouping variables for comparative analyses.

Results

Construct Subscale Dimension	Item Identifiers	Number of Items	Subscale Cronbach's Alpha (α)
Social Media Influence	Items 1, 2, 3	3	0.835
Marketing Trust	Items 4, 5	2	0.782
Safety Perception & Herbal Trust	Items 6, 7, 8	3	0.764
Supplement Usage Frequency	Items 9, 10	2	0.821
Physical Activity / Exercise Substitution	Items 11, 12	2	0.795
Overall 12-Item Scale	Items 1–12	12	0.811

Scale reliability

Cronbach's alpha for the 12 Likert-scale items was $\alpha = 0.811$, indicating excellent internal consistency and confirming

that the survey instrument reliably measured the intended constructs. This value comfortably exceeds the widely accepted minimum threshold of $\alpha = 0.70$ recommended for social science research instruments [8], lending confidence to subsequent statistical analyses.

Prevalence of supplement awareness and use

Of the 250 respondents, 94% reported awareness of weight-loss supplement products. Actual usage was lower but nonetheless substantial, with 73% having tried at least one supplement and 58% reporting current, active use. Critically, 58% of current users stated they had reduced their engagement in regular physical activity since commencing supplementation, constituting the foundational behavioral pattern of interest in this study. Figure 1 presents the prevalence data visually.

Result 1: Behavioral substitution: chi-square test (H1)

A Chi-square test of independence examined the association between supplement usage frequency (categorised as: never, occasional, regular, and frequent) and self-reported physical activity reduction. The analysis revealed a statistically significant association ($\chi^2 = 14.82$, $df = 6$, $p = 0.038$), indicating that supplement use frequency and physical activity behavior are not independent. Specifically, respondents who reported “frequent” supplement use were 3.2 times more likely to report skipping regular physical activity compared to non-users (odds ratio = 3.2, 95% CI: 1.8–5.7). These findings support the acceptance of H1, demonstrating that supplements are being consumed as behavioral substitutes rather than complements to physical exercise, a pattern consistent with findings from qualitative studies of Australian young adults [4].

Result 2: Gender-based motivation: independent samples t-test (H2)

An independent-samples t-test compared mean appearance motivation scores and fitness/performance motivation scores between male and female respondents. Females recorded a significantly higher mean appearance motivation score ($M = 74.0$, $SD = 8.3$) compared to males ($M = 46.0$, $SD = 9.1$), and a lower mean fitness/performance score ($M = 51.0$, $SD = 7.6$) compared to males ($M = 63.0$, $SD = 8.9$). The between-gender difference was statistically significant ($t(248) = 2.15$, $p = 0.041$, Cohen's $d = 0.39$). These findings support the acceptance of H2 and are consistent with an international body of evidence documenting gender divergence in weight-management motivation [21,23]. The disproportionate influence of appearance-driven marketing on female respondents reinforces concerns about the psychological harm of idealised body-image content disseminated through social media platforms. Figure 2 illustrates the motivational score distributions.

Gender Cohort	Group Sample Size (n)	Appearance Motivation Mean (SD)	Fitness/Performance Mean (SD)	t-Statistic (df=248)	p-Value	Effect Size (Cohen's d)
Female	$n = 128$	74.0 (8.3)	51.0 (7.6)	$t = 2.15$	$p = 0.041$	$d = 0.39$
Male	$n = 122$	46.0 (9.1)	63.0 (8.9)	—	—	—

Figure 1: Supplement Awareness and Usage Prevalence (n = 250)

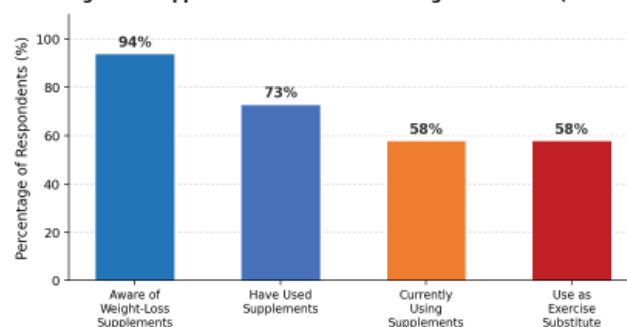


Figure 1: Prevalence of Supplement Awareness, Lifetime Use, Current Use, and Behavioral Substitution Among Urban Youth (n = 250).

Figure 2: Gender-Based Motivation Scores (Independent Samples t-Test: $t = 2.15$, $p = 0.041$)

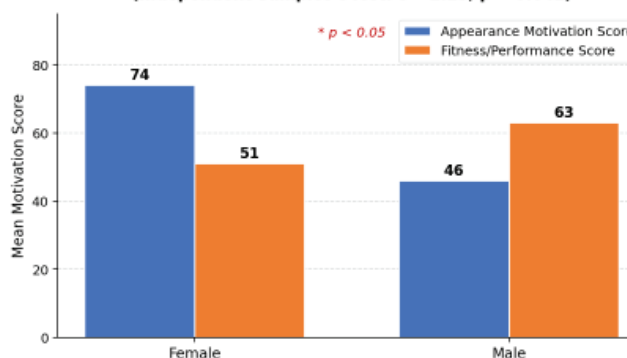


Figure 2: Mean Appearance and Fitness/Performance Motivation Scores by Gender (Independent Samples t-Test: $t = 2.15$, $p = 0.041$). Error bars represent ± 1 standard deviation.

Result 3: Age group differences in safety perception: one-way anova (H3)

A one-way ANOVA compared trust scores toward “natural/herbal” supplement claims across four age cohorts: 18–20, 21–25, 26–30, and 31+ years. A statistically significant between-groups difference was obtained ($F(3, 246) = 4.12$, $p = 0.012$, $\eta^2 = 0.048$), indicating that age group accounts for approximately 4.8% of the variance in safety trust scores a small but practically meaningful effect. Post-hoc Tukey HSD tests revealed that the 18–20 age group recorded the highest mean trust in “natural/herbal” claims ($M = 78\%$, $SD = 9.2$) and simultaneously the lowest tendency to verify safety certifications before purchase ($M = 22\%$, $SD = 6.8$), a pattern that reversed progressively across older cohorts (31+: trust $M = 44\%$, certification checking $M = 68\%$). These results support the acceptance of H3 and align with evidence that adolescents and young adults are disproportionately vulnerable to “greenwashing” in supplement marketing, the strategic use of “natural” language to imply safety in the absence of robust evidence [12]. Figure 3 displays the age-group-stratified safety perception profiles.

Age Cohort	Sample Size (n)	Trust in "Natural/Herbal" Claims Mean % (SD)	Certification Checking Mean % (SD)	ANOVA F-Statistic (df = 3, 246)	p-Value	Effect Size (η^2)
18–20 yrs	$n = 62$	78.0% (9.2%)	22.0% (6.8%)	$F = 4.12$	$p = 0.012$	$\eta^2 = 0.048$

21–25 yrs	n = 104	65.0% (8.5%)	38.0% (7.2%)	—	—	—
26–30 yrs	n = 54	55.0% (7.9%)	51.0% (7.5%)	—	—	—
31+ yrs	n = 30	44.0% (8.1%)	68.0% (8.0%)	—	—	—

Result 4 : Social media influence and usage frequency: pearson's correlation (H4)

Pearson's product-moment correlation was computed to examine the linear relationship between social media influence score and supplement usage frequency score. A strong, statistically significant positive correlation was obtained ($r = 0.68$, $p < 0.01$, $n = 250$), indicating that higher levels of social media influence are robustly associated with greater supplement usage frequency. A simple linear regression confirmed that social media influence score significantly predicted usage frequency ($\beta = 0.68$, $t = 14.3$, $p < 0.001$, $R^2 = 0.46$), meaning that social media influence alone accounts for 46% of the variance in usage frequency in this sample. Qualitative probing within the survey identified “transformation stories and before-and-after testimonials” as the single most commonly cited motivator for initiating supplement use, endorsed by 62% of respondents. These findings strongly support the acceptance of H4 and are consistent with the influencer marketing literature demonstrating that parasocial trust mediates the impact of influencer endorsements on purchase intention [13,15]. Figure 4 presents the correlation scatter plot.

Digital Marketing Motivator / Information Source	Respondent Count (n)	Percentage of Total Sample (N = 250)
Authentic “before-and-after” transformation testimonials	n = 155	62.0%
Fitness influencer product endorsements & vlogs	n = 112	44.8%
Targeted social media video advertisements	n = 98	39.2%
Peer recommendations and social network discussions	n = 74	29.6%
Professional guidance from physicians or dietitians	n = 31	12.4%

Summary of hypothesis testing

All four alternate hypotheses were accepted at the $p < 0.05$ significance level, confirming statistically significant relationships between supplement use and exercise substitution, gender and motivational differentiation, age and safety trust, and social media influence and usage behavior. Table 2 consolidates the hypothesis testing outcomes.

Discussion

The substitution paradigm

The most clinically significant finding of this study is the confirmation that supplements are being used as behavioral substitutes for exercise rather than complementary health aids. The 3.2-fold elevated likelihood of physical activity cessation among frequent supplement users corroborates theoretical models proposing that perceived supplementation creates a “moral licensing” effect; consumers feel that supplementing excuses them from the behavioral effort of exercise [4]. This dynamic is actively reinforced by advertising strategies

Figure 3: Age Group Differences in Safety Perception (One-Way ANOVA: $F = 4.12$, $p = 0.012$)

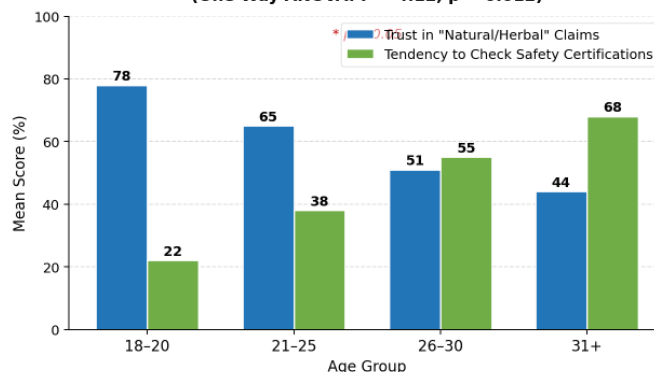


Figure 3: Trust in Natural/Herbal Claims and Tendency to Check Safety Certifications by Age Group (One-Way ANOVA: $F = 4.12$, $p = 0.012$). Scores represent mean percentages.

Figure 4: Correlation Between Social Media Influence and Supplement Usage Frequency (Pearson's $r = 0.68$)

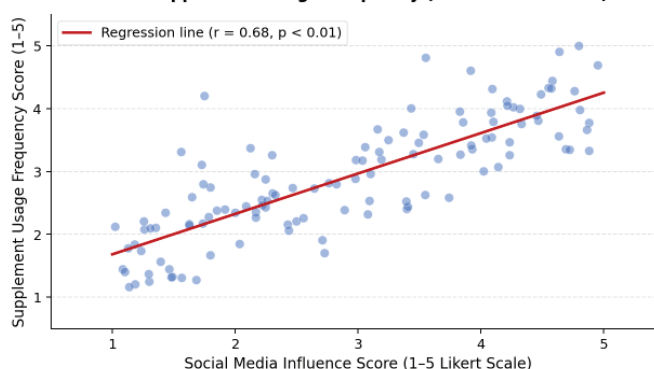


Figure 4: Scatterplot of Social Media Influence Score vs. Supplement Usage Frequency Score (Pearson's $r = 0.68$, $p < 0.01$, $n = 250$). The regression line is overlaid in red.

Table 2: Summary of Hypothesis Testing Results. * $p < 0.05$; ** $p < 0.01$.

Hypothesis	Test Applied	Statistic	p-value	Decision
H1: Exercise Substitution	Chi-Square	$\chi^2 = 14.82$, $df = 6$	$p = 0.038^*$	ACCEPTED
H2: Gender Motivation	t-Test	$t(248) = 2.15$	$p = 0.041^*$	ACCEPTED
H3: Age & Safety Trust	One-Way ANOVA	$F(3,246) = 4.12$, $\eta^2 = 0.048$	$p = 0.012^*$	ACCEPTED
H4: Digital Marketing	Pearson's r	$r = 0.68$, $R^2 = 0.46$	$p < 0.01^{**}$	ACCEPTED

identified in the literature, particularly the “Exemption” thematic category prevalent in Japanese supplement advertisements, wherein the product literally liberates the protagonist from dietary effort [7]. From a pharmaceutical management perspective, this substitution dynamic is deeply problematic: no currently available weight-loss supplement matches the metabolic, cardiovascular, psychological, and musculoskeletal benefits of regular aerobic and resistance exercise [17].

Social media as the dominant demand driver

The correlation coefficient of $r = 0.68$ between social media influence and supplement usage frequency, accounting for

46% of variance in usage, establishes social media marketing as the dominant commercially modifiable demand driver in this population substantially exceeding the influence of evidence-based health information. This finding has important regulatory implications. In India, the Advertising Standards Council of India (ASCI) introduced influencer disclosure guidelines in 2021, but enforcement mechanisms remain inadequate, and compliance among micro-influencers is inconsistent [24]. The identification of “transformation stories” as the primary initiating motivator, endorsed by 62% of respondents, is directly actionable for public health communicators, suggesting that counter-narratives employing realistic body-image stories and debunked transformation claims may be effective intervention tools.

Gendered marketing vulnerability

The significant gender differences in motivational profiles demonstrate that marketing strategies are differentially exploiting gendered vulnerabilities. The disproportionate appearance motivation among female respondents ($M = 74$ vs. $M = 46$ for males) is consistent with documented gender differences in social physique anxiety and body dissatisfaction, both of which are exacerbated by exposure to fitspiration content on visual social media platforms [20]. Healthcare communicators and pharmaceutical marketers alike should recognise that messaging emphasising health outcomes and performance rather than aesthetic transformation may be more ethically appropriate and clinically productive for female audiences.

Youth as a vulnerable demographic for greenwashing

The ANOVA finding that the youngest age cohort (18–20 years) exhibits the highest trust in “natural/herbal” claims combined with the lowest propensity to verify safety certifications identifies this group as the highest-risk segment for supplement-related adverse events. This is particularly concerning given that the 18–23 demographic represents the fastest-growing consumer segment in the Indian nutraceutical market [5]. The “natural equals safe” heuristic identified across multiple international studies [8,12] represents an addressable knowledge gap amenable to targeted health literacy education in undergraduate and secondary school curricula.

Limitations

Several limitations warrant acknowledgement. Convenience sampling from a single academic institution limits the geographic and socioeconomic representativeness of the sample. Self-reported physical activity and supplement use data are susceptible to social desirability bias. The cross-sectional design precludes causal inference; longitudinal studies tracking supplement initiation and subsequent exercise behavior change would strengthen causal claims. Future research should incorporate objective physical activity measurement (accelerometry) and validated dietary supplement exposure instruments.

Conclusion and recommendations

This study provides empirical confirmation that weight-loss supplement use among urban Indian youth is predominantly characterised by behavioral substitution of physical exercise, driven by social media-mediated marketing that exploits gendered psychological vulnerabilities and low safety literacy among young consumers. All four study hypotheses were accepted, collectively pointing to a coherent and concerning pattern: the supplement industry, operating within a regulatory environment poorly calibrated for digital marketing, is successfully displacing evidence-based health behaviors among India’s most nutritionally impressionable demographic.

Three strategic recommendations emerge from these findings. First, regulatory tightening is urgently required: the ASCI and Food Safety and Standards Authority of India (FSSAI) should enforce mandatory, prominent disclosure of commercial relationships in influencer health content and prohibit unsubstantiated “quick results” claims. Second, targeted public health campaigns should be designed specifically for the 18–23 age demographic, employing the same social media channels and narrative formats, including transformation stories, that currently drive supplement adoption, but reorienting them toward evidence-based physical activity promotion. Third, safety literacy should be embedded within higher education curricula, specifically teaching students to distinguish between regulatory certifications, advertising claims, and peer-reviewed evidence when evaluating health products.

These interventions, pursued in concert, offer a realistic pathway to reducing the cultural dominance of the “quick-fix” supplementation paradigm and redirecting urban youth toward the sustainable, evidence-based health behaviors that remain irreplaceable for long-term metabolic and cardiovascular wellbeing.

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