



DIET FACTOR
Journal of Nutritional & Food Sciences
<https://www.dietfactor.com.pk/index.php/df>
ISSN (E): 2789-8105, (P): 2789-8091
Volume 07, Issue 02 (April-June 2026)



Original Article



The Clean Eating Paradox: Investigating the Relationship Between Clean Eating Beliefs, Orthorexic Tendencies and Dietary Quality Among Young Adults

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ARTICLE INFO

Keywords:

Orthorexia Nervosa, Clean Eating, Dietary Quality, Social Media, Young Adults, Eating Practices

How to Cite:

Aslam, M., Javaid, M. H., Babar, N., Habib, H., Shahid, I., Zahra, S. I., Zahra, M., & Yousaf, H. (2026). The Clean Eating Paradox: Investigating the Relationship Between Clean Eating Beliefs, Orthorexic Tendencies and Dietary Quality Among Young Adults: Clean Eating Paradox Between Clean Eating Beliefs and Orthorexic Tendencies. *DIET FACTOR (Journal of Nutritional and Food Sciences)*, 7(2), 43-48. <https://doi.org/10.54393/df.v7i2.218>

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Received Date: 7th May, 2026

1st Revision Received: 29th May, 2026

Acceptance Date: 22nd June, 2026

Published Date: 30th June, 2026

ABSTRACT

Orthorexia nervosa is an unhealthy obsession with eating "pure" or "healthy" food. Obsessive adherence to clean eating can cause dietary rigidity, emotional distress, and poor nutritional balance, and young adults are especially vulnerable to social media wellness trends. **Objectives:** To examine the relationship between clean eating beliefs, orthorexic tendencies, and dietary quality among young adults, and to explore the influence of social media and psychological factors on eating behaviors. **Methods:** A pilot-tested, self-constructed online questionnaire was administered over four months to 200 young adults (18-30 years) via non-probability convenience sampling from the University of Lahore and Social Security Hospital, Lahore. Data on demographics, clean eating beliefs, orthorexic tendencies, dietary quality, social media influence, and psychological correlates were analyzed in SPSS v25.0 using descriptive statistics, Pearson correlation, and chi-square tests. **Results:** Clean eating beliefs correlated positively with dietary quality ($r=0.268$, $p=0.001$) and Orthorexic Psychological Experience domain scores ($r=0.246$, $p=0.001$), but not with orthorexic tendencies directly ($r=0.099$, $p=0.163$). Orthorexic tendencies correlated with dietary quality ($r=0.282$, $p=0.001$) and psychological correlates ($r=0.236$, $p=0.001$). Social media influence showed no significant associations, and no gender differences emerged. The paradox-in-practice variable was bimodally distributed, suggesting two distinct subgroups. **Conclusions:** Clean eating beliefs were not directly associated with orthorexic tendencies; psychological factors such as perfectionism and anxiety appeared more strongly related, consistent with an associative rather than predictive or causal interpretation given the cross-sectional design. Moderate clean eating supports dietary quality, but excessive rigidity may become pathological, highlighting the need for individualized psychological assessment.

INTRODUCTION

Orthorexia nervosa was first described in 1997 by Dr. Steven Bratman as an excessive focus on "pure" or "healthy" eating. Orthorexia differs from anorexia in that it is not a preoccupation with how much food is eaten, but rather with what types of foods are eaten, and the rigid and dysfunctional rules imposed on oneself about eating [1, 2]. This obsession has been expanded with the rise of wellness culture and social media advocacy of "clean eating", which refers to eating a diet of naturally grown, unprocessed foods that does not have a specific scientific definition [3].

The prevalence is higher among young adults and among college students, ranging from 41.9% in university students to 63% in medical students in Italy, which are exposed to conflicting nutrition messages, but comparisons across studies are difficult due to the lack of universal diagnostic criteria [4]. This age group is especially susceptible as they are just starting to make their own food decisions and are being bombarded with the messages of "good food" versus "bad food" through the Internet. People with high perfectionism scores are more likely to suffer from anxiety



and obsessive-compulsive traits and to feel guilt, shame, and social isolation when they fail to adhere to self-imposed dietary regulations [5, 6]. Social media like Instagram and TikTok, which encourage unrealistic body ideals and diets, also contribute to unhealthy comparisons and body dissatisfaction [7]. Moderate clean eating can help maintain health and diet quality, while overindulging in it can result in nutritional deficiencies, social isolation, and lower quality of life [3, 8].

The lack of research lies in the connection between beliefs about the association of clean eating, behavioral changes, and altering perceptions of what clean eating is, specifically in South Asian populations. A further issue is also the need to distinguish between healthy eating motivation and pathological restriction/obsession. This study aimed to examine the associations among clean eating beliefs, orthorexic symptoms, and dietary quality in young adults, and to evaluate the roles of psychological factors and social media.

METHODS

A cross-sectional design was used to explore the relationship among clean eating beliefs, orthorexic behaviors, and food quality in young adults. The study duration was from September 2025 to December 2025. The data collection lasted for four months, during which time was invested in site coordination, administering questionnaires, and cleaning the data, in two settings: University of Lahore, Sultan Town Campus, and Social Security Hospital, Lahore. Data were collected after obtaining written informed consent from all participants, in accordance with the ethical principles outlined in the Declaration of Helsinki. The settings were selected to represent a range of young adults, from university students to educated working adults, with diverse academic backgrounds and socioeconomic statuses. A minimum sample size of 200 was determined using Cochran's formula for cross-sectional surveys with an assumed prevalence of 50% (maximum variance), a 95% confidence level ($Z = 1.96$), and a margin of error of 7%. As this is a correlational study and not a group-comparison study, the above calculation wasn't based on a power calculation, but instead on Cochran's prevalence-based calculation [9]. As a post hoc check, a minimum sample size of approximately 194 participants was needed for a small to moderate correlation ($r = 0.20$) with a 2-tailed $\alpha = 0.05$ and a power = 0.80 using a Fisher's z transformation [10]. The achieved sample of 200 exceeded the minimum of 194 required to detect a correlation of $r = 0.20$ with 80% power (two-tailed $\alpha = 0.05$); the smallest observed significant correlation ($r = 0.178$) is interpreted via its confidence interval (Table 3)

rather than as the basis for the power calculation. The sample of 200 was achieved by non-probability convenience sampling. The participants comprised young people over the age of 18 who attended university or were educated young adults, were regular social media users, and gave informed consent. Responses that were incomplete, inconsistent, or uncooperative were not included. The age group was mainly 21 to 23 years (46.5%), with 54.5% females, and academic field of study was Nutrition/Dietetics (21.5%), Medical/Health Sciences (27.0%), Social Sciences (19.5%), and others (32.0%). Participants were predominantly female (75.6%) and single (78.0%), with a majority residing in urban areas (72.5%), and the majority (61.0%) calling their own home their primary place of residence. No one refused to take part, and informed consent was obtained in writing before taking part in the study. The participants were assured that their information would be kept confidential and anonymous, that there were no risks involved in participating, and that they could withdraw at any time without penalty. These procedures were based on the ethical principles of the WMA Declaration of Helsinki [11] about research involving human subjects. A self-constructed online questionnaire was used to collect data, which encompassed seven domains: definitions and dimensions of clean eating beliefs, relationship between clean eating beliefs and orthorexic tendencies, clean eating beliefs and dietary quality, psychological/emotional experience associated with orthorexic tendencies (descriptive label, not statistical mediator), information sources, social media influence, and psychological correlates/motivations, and the paradox in practice (dietary rules versus actual behavior). The questionnaire was pilot-tested with 20 participants who were not used in the analysis, but comments were made on wording, comprehension, and internal consistency of the questions; minor wording changes were made as a result of this, and the questionnaire was then fully deployed. To avoid confusion, four related terms are distinguished: orthorexia as a clinical and theoretical construct described in the literature, the subscale score used as the primary outcome of this study (Domain 2, "orthorexic tendencies") and the Orthorexic Psychological Experience domain (Domain 4, "orthorexia as mediator", which captures psychological and emotional correlates of these tendencies, and which is used here as a descriptive label, not as a variable in the regression model); and orthorexic behavior, which is used descriptively in the discussion as a pattern of rigid, health-focused eating behavior, not as a measured variable. Throughout the statistical analysis, the following

definitions are used: Each of the seven domains of the questionnaire was referenced to the literature on orthorexia and clean eating, and the pilot review above was performed to check the clarity and understanding of the items. The self-constructed instrument did not include formal internal-consistency reliability (Cronbach's α) or construct-validity statistics, nor did it undergo a confirmatory factor analysis: this is recognized as a limitation (see Limitations, Recommendations, and Future Implications), and further use of this questionnaire should involve formal psychometric validation, including internal-consistency and test-retest reliability estimates. There were 5 items in each of the 7 domains (scores from 1 to 5, with higher scores indicating endorsement of the corresponding construct, e.g., higher scores in the orthorexic domain representing endorsement of the construct of orthorexic beliefs, and higher scores in the dietary domain representing endorsement of the construct of self-reported diet quality). The same scoring method was used for all the seven domains and their sub-variables. Continuous domain scores (range 5–25) were coded as ordinal categories in three levels (tertiles) spanning approximately equal thirds and as four levels (quartiles) for the dietary-quality continuous domain, for the categorical analyses presented in Table 4 and the accompanying text (e.g., low/moderate/high orthorexic tendencies and clean eating beliefs; poor/fair/good/excellent dietary quality). These cut-points are based on a "standard" equal-range classification rather than on thresholds that are empirically derived or validated from external sources and should be viewed as descriptive cut-points, not thresholds for clinical diagnosis.

The SPSS 25.0 software was used to analyze the data. Data on demographic and quantitative variables were summarized using descriptive statistics, and associations were determined between continuous and categorical variables using Pearson correlation and chi-square tests. A level of $p < 0.050$ was used as the criterion of statistical significance, and p-values were given to three decimal places. The manuscript was edited to remove the assertion of mediation, moderation, prediction, and causation because the analyses were only at the bivariate level. These were stated as methodological limitations as there was no official assessment of the linearity or bivariate normality, nor of the assumptions of cell frequency in chi-square tests. A special focus was placed on the correlation coefficient and 95% confidence intervals to aid in interpretation of the size and the practical importance of the correlation rather than on the p-value as a measure of effect size or clinical significance.

RESULTS

This study examined the relationships among clean eating beliefs, orthorexic tendencies, and dietary quality in 200 young adults. The sample consisted mainly of young adults aged 21–23 years (46.5%), and females (54.5%) outnumbered males (45.5%). Most participants were single (78.0%), urban dwellers (72.5%), and had a normal BMI (47.5%). Nearly half were students (47.0%) with diverse educational backgrounds, representing a broadly educated young-adult sample (Table 1).

Table 1: Demographic Characteristics of Study Participants (n=200)

Demographic Variable	Category	n (%)
Age	18–20 Years	20 (10.0%)
	21–23 Years	93 (46.5%)
	24–26 Years	55 (27.5%)
	27–30 Years	32 (16.0%)
Gender	Male	91 (45.5%)
	Female	109 (54.5%)
BMI	Underweight	24 (12.0%)
	Normal	95 (47.5%)
	Overweight	62 (31.0%)
	Obese	19 (9.5%)
Marital Status	Single	156 (78.0%)
	Married	44 (22.0%)
Residence	Urban	145 (72.5%)
	Rural	55 (27.5%)

Mean scores for key variables indicated moderate levels of clean eating beliefs (16.40 ± 1.27), dietary quality (14.26 ± 1.68), orthorexic tendencies (19.65 ± 1.31), and psychological correlates (19.89 ± 0.56); social media influence showed the lowest mean score (13.13 ± 1.81), indicating moderate influence (Table 2).

Table 2: Descriptive Statistics of Key Study Variables

Variables	Mean $\pm$ SD
Clean Eating Beliefs	16.40 ± 1.27
Orthorexic Tendencies	19.65 ± 1.31
Dietary Quality	14.26 ± 1.68
Orthorexic Psychological Experience	19.89 ± 0.56
Social Media Influence	13.13 ± 1.81
Paradox in Practice	14.73 ± 1.75
Physical Activity	15.69 ± 2.61

The paradox-in-practice domain displayed a bimodal frequency distribution – 61.0% of participants scored 16 and 26.0% scored 12 – rather than the roughly unimodal pattern seen for the other domains. This pattern was identified via visual inspection of the frequency distribution rather than a formal statistical test for multimodality (e.g., Hartigan's dip test), which was not conducted and is noted as a limitation; it is interpreted

descriptively as suggesting two distinct subgroups rather than confirmed as bimodal by an inferential test. The correlation matrix showed a significant positive correlation between clean eating beliefs and dietary quality ($r=0.268$, $p=0.001$), suggesting that stronger clean eating beliefs were associated with better dietary practice. Notably, the relationship between clean eating beliefs and orthorexic tendencies was paradoxical: no direct significant correlation was found ($r=0.099$, $p=0.163$). Orthorexic tendencies, however, correlated significantly with dietary quality ($r=0.282$, $p=0.001$) and psychological correlates ($r=0.236$, $p=0.001$) (Table 3).

Table 3: Pearson Correlation Matrix of Study Variables

Variables	1	2	3	4	5	6	7
1. Clean Eating Beliefs	1	—	—	—	—	—	—
2. Orthorexic Tendencies	0.099	1	—	—	—	—	—
3. Dietary Quality	0.268**	0.282**	1	—	—	—	—
4. Orthorexic Psychological Experience	0.246**	0.339**	0.311**	1	—	—	—
5. Psychological Correlates	0.192*	0.236**	0.242**	0.451**	1	—	—
6. Social Media Influence	0.049	0.027	0.127	0.082	0.072	1	—
7. Paradox in Practice	0.234**	0.188*	0.045	0.178*	0.225**	0.085	1

Note: ** $p<0.010$, * $p<0.050$; all exact p-values are reported to three decimal places in the text

The chi-square tests revealed no statistically significant gender differences in dietary quality ($\chi^2 = 2.184$, $df = 3$, $p=0.535$), orthorexic tendencies ($\chi^2 = 2.947$, $df = 2$, $p=0.229$), or clean eating beliefs ($\chi^2 = 3.618$, $df = 2$, $p=0.164$). Although females showed slightly higher proportions in the "high" clean eating beliefs category (43.1% vs. 33.0%) and "excellent" dietary quality (22.0% vs. 17.6%), these differences were not statistically significant. This suggests that gender does not significantly influence these eating-related variables in this sample, consistent with previous meta-analytic findings that orthorexia is not predominantly a female-specific concern (Table 4).

Table 4: Cross-Tabulation of Gender with Dietary Quality, Orthorexic Tendencies, and Clean Eating Beliefs

Variables	Category	Male, n (%)	Female, n (%)	Total, n (%)	χ^2	df	p-value
Dietary Quality	Poor	12 (13.2%)	10 (9.2%)	22 (11.0%)	2.184	3	0.535
	Fair	28 (30.8%)	29 (26.6%)	57 (28.5%)			
	Good	35 (38.5%)	46 (42.2%)	81 (40.5%)			
	Excellent	16 (17.6%)	24 (22.0%)	40 (20.0%)			
Orthorexic Tendencies	Low	30 (33.0%)	28 (25.7%)	58 (29.0%)	2.947	2	0.229
	Moderate	42 (46.2%)	50 (45.9%)	92 (46.0%)			
	High	19 (20.9%)	31 (28.4%)	50 (25.0%)			
Clean Eating Beliefs	Low	18 (19.8%)	16 (14.7%)	34 (17.0%)	3.618	2	0.164
	Moderate	43 (47.3%)	46 (42.2%)	89 (44.5%)			
	High	30 (33.0%)	47 (43.1%)	77 (38.5%)			

DISCUSSION

The present study focused on the relationships among CEB, OT, and DQ among 200 young adults, and the pattern found was similar to an extended from the previous studies. The results of this study corroborate Ambwani *et al.* who also observed a high positive correlation between clean eating beliefs and dietary quality ($r=0.268$, $p=0.001$) and no direct correlation between clean eating beliefs and orthorexic tendency ($r=0.099$, $p=0.163$), suggesting that the

clean eating messaging is generally perceived favorably by young adults regardless of its association with functional impairment and emotional distress [12]. This indicates that the concept of clean eating is not necessarily pathological but rather one's ideology and behaviour regarding eating. There is a significant correlation between orthorexic tendencies and psychological correlates ($r=0.236$, $p=0.001$), suggesting that psychological factors are concurrently associated with both clean eating beliefs and orthorexic tendencies, rather than operating as a causal intermediate pathway. This is in line with Mahfoud *et al.* who identified three separate psychological profiles among young adults with orthorexic tendencies related to obsessive-compulsive traits, perfectionism, and self-esteem, respectively [13]. This contradicts some previous studies, as social media influence was not significantly associated with any eating-related variable ($p>0.050$). Both Gonçalves and Thayuman *et al.* found that higher engagement with social media and Instagram was correlated with higher orthorexia symptoms [14, 15]. This difference may be because our measure assessed perceived, not actual, engagement with clean eating content; a relatively homogeneous sample, which limited variability in exposure; or the possibility that the relationship between social media and orthorexia is moderated by platform type, content, and personal characteristics like health literacy and body dissatisfaction, as suggested by Awad *et al.* [7]. To that end, Vintró-Alcaraz *et al.* indicated that visual platforms have higher associations with the symptoms of orthorexia than others, suggesting the influence of appearance-based content in particular [16]. There were no gender differences in the categorical outcomes tested (dietary quality, orthorexic tendencies, and clean eating beliefs), as reported in the meta-analytical study by López-Gil *et al.* which suggests that orthorexia is not a women's-only issue,

as it was found in 34.6% of females and 32.1% of males across 30,476 participants in 18 countries [17]. Small gender differences, however, have been reported in some studies: McComb and Mills found that women were more likely to report 'pathological eating styles,' and without significant difference in effect size [18]. Yöyen et al. reported eating attitudes, emotion regulation, and anxiety as predictor variables of orthorexia specifically for women [19]. There were no gender comparisons found in our sample, which could be due to the increased focus in this culture on wellness for all, particularly in fitness and social media marketing. In line with this, Unal and Kocatepe Avcı discovered that compulsive social media use mediated orthorexia symptoms through maladaptive eating attitudes, further highlighting the clinical significance of addressing both of these at the same time [20]. Indeed, the bimodal distribution of the paradox-in-practice scores (61.0% at score 16, 26.0% at score 12) indicates that the clean eating paradox is not a uniform experience, but rather occurs in two unique subgroups broadly representing the conceptual separation between flexible "healthy orthorexia" and rigid, pathological orthorexia nervosa. The moderate scores on dietary quality (14.26 ± 1.68) were comparable to those observed by Kaźmierczak-Wojtaś and Drozd, who found that people with orthorexic tendencies had less varied and potentially less nutritious diets [21], but consumed less processed food, indicating that a high level of motivation towards health is not synonymous with a healthy diet.

The sample was not randomly or stratified sampled, so it should not be considered as representative of the larger population of young adults, and results should only be generalized to similarly defined samples. The cross-sectional design does not allow for causal conclusions to be drawn; longitudinal research is necessary to better understand the temporal association between the development of clean eating beliefs, psychological factors, and the onset of orthorexic tendencies. The questionnaire was self-designed; although it was comprehensive and pre-tested, it may have been biased in its measurement, and future studies might use validated questionnaires like the ORTO-15 or ORTO-R, which enable comparison between studies. Future studies should use longitudinal study designs, include validated diagnostic tools, and use cognitive-behavioral interventions focused on perfectionism and health anxiety; health education campaigns should focus on eating patterns that are flexible, rather than on strict diets.

CONCLUSIONS

This study supports the view that clean eating is positively associated with dietary quality, but that psychological traits perfectionism, anxiety, and obsessive-compulsive tendencies—were more strongly associated with

orthorexic tendencies than clean eating beliefs themselves, although the cross-sectional design precludes causal or predictive claims. This bimodal distribution in the variable, which is a measure of the paradox in practice, suggests that the clean eating paradox is experienced differently by different individuals, with some having flexible health-enhancing eating habits while others have rigid and pathological eating habits. No gender differences were found on the categorical measures formally tested (Dietary quality, Orthorexic tendencies, Clean eating beliefs), and no associations were found between the eating behaviors and social media influence; these results may not be generalized to eating variables that were not formally tested for gender differences. The results lend further support for the need to identify young adults with strict eating beliefs for psychological screening and/or intervention to distinguish flexible from pathological eating patterns, as a means to prevent psychological risk factors such as perfectionism and health anxiety.

Authors' Contribution

Conceptualization: MA

Methodology: MA, MHJ, NB, HH, IS, SIZ, MZ, HY

Formal analysis: MA

Writing and Drafting: MA, HH, IS, SIZ, MZ, HY

Review and Editing: MA, MHJ, NB, HH, IS, SIZ, MZ, HY

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

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