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Exploring the potential utility of a single-item perceived diet quality measure

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ABSTRACT

BACKGROUND/OBJECTIVES: Perceived diet quality (PDQ) has been suggested as an easy-to-use dietary assessment tool. However, its practicality and efficiency are still questionable. This study aimed to gauge the utility of PDQ as an alternative dietary assessment tool among Korean adults by examining PDQ and its associated factors.
SUBJECTS/METHODS: An online survey was conducted on 514 Korean adults aged 19 to 64 years in October 2022. PDQ was assessed using a 5-point Likert scale, and participants were categorized into healthy, fair, or unhealthy PDQ groups. The participants were asked about the perceived importance of nutrients and food groups for health and the extent to which they considered these factors in their usual diets using a 5-point Likert scale. A multivariate linear regression model was used to identify the factors associated with PDQ.
RESULTS: About 26.7% of participants rated their diets as healthy, while 63.2% rated them as fair and 10.1% rated them as unhealthy. Participants with a healthy PDQ rated perceived importance and consideration of nutrients and food groups higher than the fair or unhealthy PDQ groups. A healthier PDQ was associated with the male gender, an older age, being normal or underweight, having better subjective health, lower use of alcohol, being physically active, having a high interest in healthy diets, and a higher perception of the importance of nutrients and food groups for health.
CONCLUSION: The PDQ could serve as a simple and rapid screening tool for identifying individuals at risk of poor diets.

Keywords: Diet surveys; screening; diet, food, and nutrition

INTRODUCTION

A healthy lifestyle is crucial to achieving optimal health. The diet plays a significant role in health as it is a well-known modifiable risk factor for most non-communicable diseases, including but not limited to type 2 diabetes, hypertension, and cardiovascular diseases [1-3]. Recognizing this, many countries have implemented various food and nutrition strategies, such as the development of dietary reference intakes and dietary guidelines and the provision of nutrition education programs, all aimed at improving the dietary practices of the population [4-6]. Despite these efforts, many individuals still have difficulties in having healthy diets.

Conflict of Interest
The authors declare no potential conflicts of interests.

Author Contributions
Conceptualization: Joung H; Formal analysis: Kim SH; Funding acquisition: Joung H; Investigation: Kim SH; Methodology: Joung H, Choi SK; Supervision: Joung H, Choi SK; Writing - original draft: Kim SH, Choi SK; Writing - review & editing: Joung H, Choi SK.

One of the challenges in the efforts to improve people's diets is the assessment of dietary intake [7]. Dietary assessments help identify individuals who are at risk of poor diets and evaluate the deficit or excessive intake of foods and nutrients [8]. However, most traditional dietary assessments often require substantial resources, including the expertise of professional dietitians, extensive time commitments, and financial costs, and a heavy burden on participants [9]. Thus, the application of detailed dietary assessments, such as 24-h recalls and food frequency questionnaires (FFQs), remains limited to specific settings [10]. Nevertheless, the understanding of an individual's diet is essential, even in contexts where detailed dietary assessments are not feasible, such as emergency rooms or the registration points of social welfare services [11]. In the Republic of Korea, several validated questionnaires in the form of checklists have been developed to assess the diet quality of individuals. For example, nutrition quotient checklists, comprising about 20 questions, have been developed for diverse age groups [12-15]. These checklists offer a more convenient and faster assessment compared to 24-h recalls or FFQs. However, these still have many items and require expertise for interpretation of the results.

Thus, an easy-to-use dietary assessment tool comprising a single-item asking about perceived diet quality (PDQ) has been suggested. Previous studies have reported that a healthy PDQ is positively associated with objective diet quality indexes such as the Healthy Eating Index [16,17], the Dietary Approaches to Stop Hypertension [18], the Food Nutrient Index, and the Diet Quality Score [19]. A healthy PDQ is also related to a higher degree of nutritional knowledge [20], reduced frequency of food consumption of away from home, higher availability of dark green vegetables and low-fat milk, and lower availability of sugar-sweetened soft drinks at home [21]. However, other studies have reported no association between PDQ and objective diet quality, the tendency for optimistic reporting of PDQ, and potential bias based on the specific sociodemographic characteristics of the subjects [17,22].

Despite these inconsistent findings, understanding PDQ is still important, given its practicality and efficiency. Therefore, this study aimed to gauge the utility of PDQ as an alternative dietary assessment tool among Korean adults by examining PDQ and its associated factors. We hypothesized that if PDQ could reflect individuals' diets, those with a healthy PDQ would be more likely to perceive certain dietary factors as important and would integrate them into their usual diets, as opposed to those with an unhealthy PDQ. Additionally, we examined factors associated with a healthy PDQ to determine if the PDQ can be a valuable means to identify targets for dietary interventions and assist in the development of effective nutrition strategies.

SUBJECTS AND METHODS

Participants

An online survey was conducted from October 17 to October 27, 2022. Based on Yamane's (1967) formula [23], the minimum required sample size was determined to be 475, considering the size of the Korean adult population, a 95% confidence interval, and a margin of error set at 4.5%. To recruit a representative sample of the Korean adult population, we set quotas for each category according to the proportion of genders, age groups (19–29, 30–49, 50–64 yrs), and residential areas of the Korean adult population as of 2022, based on the resident registration data from the Korean Ministry of the Interior and Safety [24].

Participants were recruited from an online panel of Hankook Research, a public opinion polling firm located in Seoul, Republic of Korea. Survey invitations were sent via email to 11,160 panel members. Of these, 1,850 individuals opened the email, and 930 of them initially participated in the survey. Eighty individuals attempted to respond to the survey after the predefined quota for their respective categories had already been met and hence they were termed ineligible to participate in the survey. As this study focused on the perceptions of the general public, individuals responsible for nutrition policy in governmental organizations, health professionals including dietitians, or those with doctoral degrees or working in the fields of food service, nutrition, health, or medicine (n = 27) were excluded from participation. Among the 823 eligible participants, 309 individuals did not complete the survey. Thus, a total of 514 survey participants were included in the analysis (response rate: 62.5%). Prior to participation in the survey, all the participants received a detailed explanation of the purpose of the study, and informed consent was obtained from all participants. The study received approval from the Institutional Review Board of Seoul National University (2209/003-001).

Measures

PDQ was assessed with the question "Do you think your usual diets are healthy?" We categorized the participants into 3 groups based on their responses to the question. Individuals who selected 'very healthy' or 'healthy' were classified as belonging to the 'healthy PDQ' group. Those who selected 'fair' were categorized into the 'fair PDQ' group, and those who selected 'very unhealthy', or 'unhealthy' were classified as belonging to the 'unhealthy PDQ' group.

To assess their awareness of the importance of healthy diets, participants were asked: "Please rate the importance of the following items with respect to your health", on a 5-point Likert scale, ranging from 'not at all important' (1) to 'very important' (5) for 16 food groups and 11 nutrients. The food groups included refined grains, whole grains, meats, processed meats, fish and shellfish, eggs, legumes, nuts, fruits, vegetables, dairy products, fats and oils, other processed foods, beverages, water, and alcohol. Nutrients included energy, carbohydrates, dietary fiber, sugar, protein, total fat/saturated fat/trans-fat, unsaturated fat, vitamins, minerals, sodium/salt, and calcium. For these food groups and nutrients, participants were also asked: "To what extent do you consider the following items in your usual diets?", on a 5-point Likert scale from 'not at all' (1) to 'extremely' (5). The scores for perceived importance (perceived importance score) and the levels of consideration of the food groups/nutrients in the usual diets (consideration score) were calculated for each food group and nutrient, and these scores were then further aggregated into summary scores for all food groups, all nutrients, and all food groups and nutrients combined.

Sociodemographic characteristics were categorized as follows: gender (men, women), age group (19–29, 30–49, 50–64 yrs), residential area (metropolitan, non-metropolitan), education level (≤ high school, ≥ some college), and monthly household income (less than 2 million KRW, 2 million–3.99 million KRW, 4 million–5.99 million KRW, over 6 million KRW). Information related to the participants' health status and health behaviors included subjective health status (poor, fair, good), alcohol consumption (did not drink alcohol in the last year, once a month or less, 2–4 times a month, twice a week or more), smoking status (never, former, current), physical activity (sedentary or low activity, moderate activity, high activity), and interest in healthy diets (low, high). Body mass index (BMI) was calculated based on self-reported height and weight and categorized into underweight or normal (< 23.0 kg/m^2), overweight (23.0–24.9 kg/m^2), and obese (≥ 25.0 kg/m^2) [25].

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Statistical analysis

To compare the sociodemographic characteristics, health status, health behaviors, perceived importance of each food group and nutrient for health, and the extent to which these factors were taken into consideration in their usual diets, between the three PDQ groups, we employed one-way analysis of variance (ANOVA) with Tukey's *post-hoc* analysis and χ^2 tests as appropriate. A stepwise variable selection method was applied with a criterion of $P < 0.05$ for both entry into and remaining in the model to identify the factors most related to PDQ. The association between PDQ as the continuous variable and the selected variables from stepwise regression was evaluated with a multivariate linear regression model. There was no multicollinearity among the potential confounding factors, as indicated by the variance inflation factor values, all of which were below 5. All statistical analyses were performed using the SPSS Statistics package (v.28.0; IBM Inc., Armonk, NY, USA). Statistical significance was set at a $P < 0.05$.

RESULTS

Sociodemographic characteristics, health status, and health behaviors by PDQ

The sociodemographic characteristics, health status, and health behaviors of the survey participants based on the PDQ are presented in **Table 1**. Of the 514 participants, 26.7% had healthy PDQ, 63.2% had fair PDQ, and 10.1% had unhealthy PDQ. Those with healthy PDQ were more likely to be older, had higher household income, had a lower body weight, reported better subjective health, consumed less alcohol, engaged in higher levels of physical activity, and demonstrated a higher interest in healthy diets compared to those with a fair or unhealthy PDQ.

Perceived importance of nutrients and food groups and consideration of these factors into usual diets by PDQ groups

The mean scores of the perceived importance of nutrients and food groups for health and the extent to which these items were considered by the participants in their usual diets based on the PDQ groups are presented in **Tables 2** and **3**. For both perceived importance and consideration scores, individuals with healthy PDQ tended to have higher scores for all nutrients, all food groups, and all nutrients and food items compared to those with fair or unhealthy PDQ. With regard to specific nutrients and food groups, participants in the three PDQ groups had significantly different perceived importance scores on average for six nutrients (carbohydrates, dietary fiber, protein, unsaturated fat, sodium/salt, and calcium) out of the 11 nutrients surveyed, and for 11 food groups (refined grains, whole grains, meats, fish and shellfish, legumes, nuts, fruits, vegetables, dairy products, fats and oils, and water) out of the 16 food groups surveyed. There were significant differences in consideration scores between the three PDQ groups for all the nutrients and most of the food groups (13 out of 16), except for processed meats, beverages, and alcohol.

Factors associated with PDQ

Table 4 presents the results of the multivariate linear regression model of selected covariates, using stepwise variable selection, to identify factors associated with PDQ. Gender, age, weight status, subjective health status, alcohol use, physical activity, interests in healthy diets, and the mean score for the perceived importance of nutrients and food groups for health explained 27.3% of the variance in PDQ (adjusted $R^2 = 0.273$, $P < 0.001$). Having a good subjective health status ($\beta = 0.37$, $P < 0.001$) was relatively strongly associated with a healthy

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Table 1. Characteristics of survey participants by perceived diet quality

Characteristics	Total (n = 514)	Healthy PDQ (n = 137)	Fair PDQ (n = 325)	Unhealthy PDQ (n = 52)	*P*-value
Gender					0.317
Men	258 (50.2)	69 (50.4)	168 (51.7)	21 (40.4)	
Women	256 (49.8)	68 (49.6)	157 (48.3)	31 (59.6)	
Age (yrs)					< 0.001
19–29	103 (20.0)	26 (19.0)	56 (17.2)	21 (40.4)	
30–49	221 (43.0)	48 (35.0)	147 (45.2)	26 (50.0)	
50–64	190 (37.0)	63 (46.0)	122 (37.5)	5 (9.6)	
Residential area					0.636
Metropolitan	264 (51.4)	73 (53.3)	162 (49.9)	29 (55.8)	
Non-metropolitan	250 (48.6)	64 (46.7)	163 (50.2)	23 (44.2)	
Education level					0.790
≤ High school	83 (16.1)	24 (17.5)	52 (16.0)	7 (13.5)	
≥ Some college	431 (83.9)	113 (82.5)	273 (84.0)	45 (86.5)	
Monthly household income (KRW)[1)]					0.015
Less than 2 million	47 (9.1)	10 (7.3)	32 (9.9)	5 (9.6)	
2 million–3.99 million	129 (25.1)	30 (21.9)	76 (23.4)	23 (44.2)	
4 million–5.99 million	165 (32.1)	48 (35.0)	110 (33.9)	7 (13.5)	
Over 6 million	173 (33.7)	49 (35.8)	107 (32.9)	17 (32.7)	
Weight status[2)]					< 0.001
Underweight or normal	222 (43.2)	78 (56.9)	122 (37.5)	22 (42.3)	
Overweight	109 (21.2)	32 (23.4)	73 (22.5)	4 (7.7)	
Obesity	183 (35.6)	27 (19.7)	130 (40.0)	26 (50.0)	
Subjective health status					< 0.001
Poor	74 (14.4)	11 (8.0)	42 (12.9)	21 (40.4)	
Fair	249 (48.4)	45 (32.9)	180 (55.4)	24 (46.2)	
Good	191 (37.2)	81 (59.1)	103 (31.7)	7 (13.5)	
Alcohol use					< 0.001
Did not drink alcohol in the last year	116 (22.6)	38 (27.7)	69 (21.2)	9 (17.3)	
Once a month or less	187 (36.4)	64 (46.7)	112 (34.5)	11 (21.2)	
2–4 times a month	117 (22.8)	25 (18.3)	79 (24.3)	13 (25.0)	
Twice a week or more	94 (18.3)	10 (7.3)	65 (20.0)	19 (36.5)	
Smoking status					0.178
Never	316 (61.5)	90 (65.7)	198 (60.9)	28 (53.9)	
Former	97 (18.9)	29 (21.2)	56 (17.2)	12 (23.1)	
Current	101 (19.6)	18 (13.1)	71 (21.9)	12 (23.1)	
Physical activity					< 0.001
Sedentary or low-activity	217 (42.2)	36 (26.3)	147 (45.2)	34 (65.4)	
Moderate activity	234 (45.5)	77 (56.2)	145 (44.6)	12 (23.1)	
High activity	63 (12.3)	24 (17.5)	33 (10.2)	6 (11.5)	
Interests in healthy diets					< 0.001
Low	223 (43.4)	28 (20.4)	162 (49.9)	33 (63.5)	
High	291 (56.6)	109 (79.6)	163 (50.2)	19 (36.5)	

Values are presented as number (%).
PDQ, perceived diet quality.
[1)]One million KRW = 725 USD.
[2)]Underweight or normal, < 23.0 kg/m^2; Overweight, 23.0–24.9 kg/m^2; Obese, ≥ 25.0 kg/m^2.

PDQ. Age of 50–64 years (β = 0.18, P = 0.007), having a higher interest in a healthy diet (β = 0.17, P = 0.001), engagement in moderate physical activity (β = 0.14, P = 0.007), and a higher score for the perceived importance of nutrients and food groups (β = 0.13, P < 0.001) were also associated with an increased likelihood of having a healthier PDQ. Conversely, drinking alcohol twice a week or more (β = −0.30, P < 0.001), the female gender (β = −0.15, P = 0.003), and being obese (β = −0.19, P = 0.001) were associated with having an unhealthy PDQ.

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Table 2. Perceived importance of nutrients and consideration levels of nutrients in usual diets by perceived diet quality

Variables	Perceived importance[1]				Consideration level in usual diets[2]			
	Healthy PDQ (n = 137)	Fair PDQ (n = 325)	Unhealthy PDQ (n = 52)	*P*-value[3]	Healthy PDQ (n = 137)	Fair PDQ (n = 325)	Unhealthy PDQ (n = 52)	*P*-value[3]
Nutrient								
Energy	4.04 ± 0.92[a]	3.89 ± 0.91[a]	3.73 ± 1.07[a]	0.098	3.36 ± 1.22[b]	2.65 ± 1.20[a]	2.40 ± 1.12[a]	< 0.001
Carbohydrates	4.03 ± 0.87[b]	3.90 ± 0.88[ab]	3.67 ± 1.00[a]	0.046	3.80 ± 1.12[c]	3.29 ± 1.20[b]	2.71 ± 1.27[a]	< 0.001
Dietary fiber	4.13 ± 0.82[b]	3.97 ± 0.80[ab]	3.79 ± 1.07[a]	0.028	3.73 ± 1.10[b]	3.06 ± 1.18[a]	2.71 ± 1.33[a]	< 0.001
Sugar	3.93 ± 1.10[a]	3.89 ± 0.97[a]	3.67 ± 1.17[a]	0.288	3.79 ± 1.07[b]	3.30 ± 1.25[a]	2.90 ± 1.49[a]	< 0.001
Protein	4.43 ± 0.72[b]	4.17 ± 0.75[a]	3.98 ± 0.96[a]	< 0.001	4.28 ± 0.86[b]	3.60 ± 1.01[a]	3.29 ± 1.27[a]	< 0.001
Total fat, saturated fat, and trans fat	3.87 ± 1.14[ab]	3.75 ± 0.99[a]	3.46 ± 1.18[a]	0.061	3.65 ± 1.23[b]	3.12 ± 1.20[a]	2.71 ± 1.27[a]	< 0.001
Unsaturated fat	3.80 ± 1.08[b]	3.74 ± 0.90[b]	3.17 ± 1.08[a]	< 0.001	3.50 ± 1.18[c]	2.92 ± 1.18[b]	2.38 ± 1.24[a]	< 0.001
Vitamins	4.02 ± 0.87[a]	3.90 ± 0.89[a]	3.79 ± 1.11[a]	0.231	3.54 ± 1.16[c]	2.98 ± 1.22[b]	2.56 ± 1.19[a]	< 0.001
Minerals	3.82 ± 0.92[a]	3.78 ± 0.87[a]	3.60 ± 1.22[a]	0.321	3.22 ± 1.14[b]	2.71 ± 1.16[a]	2.54 ± 1.31[a]	< 0.001
Sodium/salt	4.11 ± 0.94[b]	3.88 ± 0.98[b]	3.52 ± 1.26[a]	0.001	3.88 ± 1.09[b]	3.47 ± 1.11[a]	3.13 ± 1.16[a]	< 0.001
Calcium	3.98 ± 0.89[b]	3.81 ± 0.89[b]	3.35 ± 1.10[a]	< 0.001	3.48 ± 1.15[c]	2.92 ± 1.20[b]	2.48 ± 1.26[a]	< 0.001
Mean score of nutrients	4.01 ± 0.59[b]	3.88 ± 0.57[b]	3.61 ± 0.72[a]	< 0.001	3.66 ± 0.77[c]	3.09 ± 0.86[b]	2.71 ± 0.94[a]	< 0.001

Values are presented as mean ± SD.
PDQ, perceived diet quality.
[1]Perceived importance of nutrients was measured on a 5-point Likert scale ranging from not at all important (1) to very important (5).
[2]Level of consideration of nutrients in usual diets was measured on a 5-point Likert scale ranging from not at all (1) to extremely (5).
[3]Comparison by perceived diet quality, analysis of variance.
[a-c]Different letters indicate significant differences between groups at $P < 0.05$. Groups that share the same letter are not significantly different from one another.

Table 3. Perceived importance of food groups and consideration levels of food groups in usual diets by perceived diet quality

Variables	Perceived importance[1]				Consideration level in usual diets[2]			
	Healthy PDQ (n = 137)	Fair PDQ (n = 325)	Unhealthy PDQ (n = 52)	*P*-value[3]	Healthy PDQ (n = 137)	Fair PDQ (n = 325)	Unhealthy PDQ (n = 52)	*P*-value[3]
Food group								
Refined grains	3.66 ± 1.02[b]	3.52 ± 0.98[ab]	3.21 ± 1.24[a]	0.028	3.45 ± 1.16[c]	3.08 ± 1.16[b]	2.58 ± 1.43[a]	< 0.001
Whole grains	3.94 ± 0.97[b]	3.71 ± 0.97[ab]	3.37 ± 1.27[a]	0.002	3.51 ± 1.11[c]	3.17 ± 1.22[b]	2.52 ± 1.26[a]	< 0.001
Meats	4.15 ± 0.87[b]	3.85 ± 0.85[a]	3.62 ± 0.99[a]	< 0.001	3.90 ± 1.05[b]	3.45 ± 1.04[a]	3.42 ± 1.09[a]	< 0.001
Processed meats	3.19 ± 1.26[a]	3.08 ± 1.10[a]	2.92 ± 1.28[a]	0.347	3.26 ± 1.31[a]	3.10 ± 1.25[a]	3.17 ± 1.25[a]	0.503
Fish and shellfish	4.01 ± 0.88[b]	3.81 ± 0.89[ab]	3.65 ± 1.14[a]	0.025	3.72 ± 1.11[b]	3.26 ± 1.16[a]	3.10 ± 1.24[a]	< 0.001
Eggs	4.12 ± 0.87[a]	4.00 ± 0.81[a]	3.87 ± 1.01[a]	0.143	3.91 ± 1.10[b]	3.60 ± 1.08[a]	3.37 ± 1.14[a]	0.003
Legumes	4.12 ± 0.83[c]	3.87 ± 0.87[b]	3.40 ± 1.27[a]	< 0.001	3.77 ± 1.17[c]	3.23 ± 1.23[b]	2.63 ± 1.31[a]	< 0.001
Nuts	4.00 ± 0.90[b]	3.70 ± 1.00[a]	3.42 ± 1.26[a]	< 0.001	3.75 ± 1.19[c]	3.08 ± 1.22[b]	2.52 ± 1.26[a]	< 0.001
Fruits	4.15 ± 0.93[b]	3.94 ± 0.87[ab]	3.69 ± 1.13[a]	0.005	3.90 ± 1.21[b]	3.46 ± 1.17[a]	3.19 ± 1.21[a]	< 0.001
Vegetables	4.34 ± 0.81[b]	4.23 ± 0.73[ab]	3.98 ± 1.09[a]	0.024	4.19 ± 1.02[b]	3.71 ± 1.13[a]	3.48 ± 1.29[a]	< 0.001
Dairy products	3.99 ± 0.94[c]	3.71 ± 0.93[b]	3.37 ± 1.27[a]	< 0.001	3.74 ± 1.19[c]	3.33 ± 1.18[b]	2.83 ± 1.42[a]	< 0.001
Fats and oils	3.23 ± 0.96[b]	3.14 ± 1.02[b]	2.60 ± 1.14[a]	< 0.001	3.36 ± 1.23[b]	2.98 ± 1.17[a]	2.58 ± 1.23[a]	< 0.001
Other processed foods	3.04 ± 1.10[a]	2.94 ± 1.13[a]	2.67 ± 1.12[a]	0.128	3.19 ± 1.27[b]	2.76 ± 1.16[a]	2.83 ± 1.28[a]	0.002
Beverages	2.91 ± 1.16[a]	2.94 ± 1.18[a]	2.83 ± 1.26[a]	0.806	3.00 ± 1.32[a]	2.99 ± 1.24[a]	2.96 ± 1.33[a]	0.983
Water	4.49 ± 0.76[b]	4.27 ± 0.85[a]	4.04 ± 1.20[a]	0.003	4.31 ± 0.96[b]	3.94 ± 1.02[a]	3.77 ± 1.29[a]	0.001
Alcohol	2.73 ± 1.50[a]	2.74 ± 1.47[a]	2.50 ± 1.46[a]	0.545	2.86 ± 1.51[a]	2.82 ± 1.40[a]	2.63 ± 1.39[a]	0.614
Mean score of food groups	3.76 ± 0.54[c]	3.59 ± 0.55[b]	3.32 ± 0.70[a]	< 0.001	3.61 ± 0.78[b]	3.25 ± 0.80[a]	2.97 ± 0.81[a]	< 0.001
Mean score of all food and nutrient items	3.86 ± 0.50[c]	3.72 ± 0.51[b]	3.40 ± 0.62[a]	< 0.001	3.63 ± 0.72[c]	3.19 ± 0.79[b]	2.86 ± 0.77[a]	< 0.001

Values are presented as mean ± SD.
PDQ, perceived diet quality.
[1]Perceived importance of food groups was measured on a 5-point Likert scale ranging from not at all important (1) to very important (5).
[2]Level of consideration of food groups in usual diets was measured on a 5-point Likert scale ranging from not at all (1) to extremely (5).
[3]Comparison by perceived diet quality, analysis of variance.
[a-c]Different letters indicate significant differences between groups at $P < 0.05$. Groups that share the same letter are not significantly different from one another.

DISCUSSION

We examined PDQ, the perceived importance of nutrients and food groups for health, the extent to which these dietary factors were taken into consideration in their usual diets, and the factors associated with PDQ among Korean adults. We found that individuals with a healthy PDQ had a higher perception of the importance of nutrients and food groups for health, and they also accorded a higher level of consideration to these factors in their usual

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Table 4. Multivariate linear regression analysis to identify the factors associated with perceived diet quality

Variables	β	SE	*P*-value
Gender			0.003
Women vs. Men	−0.15	0.05	
Age			
30–49 yrs vs. 19–29 yrs	0.11	0.06	0.097
50–64 yrs vs. 19–29 yrs	0.18	0.07	0.007
Weight status[1)]			
Overweight vs. Underweight or normal	0.02	0.06	0.737
Obese vs. Underweight or normal	−0.19	0.06	0.001
Subjective health status			
Fair vs. Poor	0.11	0.07	0.120
Good vs. Poor	0.37	0.08	< 0.001
Alcohol use			
Once a month or less vs. Did not drink in the last year	0.04	0.06	0.514
2 to 4 times a month vs. Did not drink in the last year	−0.13	0.07	0.062
Twice a week or more vs. Did not drink in the last year	−0.30	0.08	< 0.001
Physical activity			
Moderate activity vs. Sedentary or low activity	0.14	0.05	0.007
High activity vs. Sedentary or low activity	0.09	0.08	0.236
Interests in healthy diets			0.001
High vs. Low	0.17	0.05	
Mean score of perceived importance of nutrients and food groups for health	0.13	0.03	< 0.001
R^2 = 0.292, Adjusted R^2 = 0.273			

β, coefficient estimates.
[1)]Underweight or normal, < 23.0 kg/m^2; Overweight, 23.0–24.9 kg/m^2; Obese, ≥ 25.0 kg/m^2.

diets compared to those with a fair or unhealthy PDQ. A healthy PDQ was associated with the male gender, being older, being normal or underweight, having better subjective health, consuming less alcohol, being physically active, having a high interest in consuming healthy diets, and a higher perception of the importance of nutrients and food groups for health.

Significantly higher scores of perceived importance and consideration of food groups and nutrients among individuals with a healthy PDQ than those with a fair or unhealthy PDQ suggest that the PDQ, measured by a single-item, could serve as an indicator of actual diet quality. Individuals who score higher on perceived importance and consideration are not only knowledgeable but also attentive to the importance of nutrients and food groups for health. They could implement their knowledge when they choose, prepare, and eat healthier meals. Thus, they perceive their diets to be healthy. On the other hand, individuals with an unhealthy PDQ may not have enough knowledge and capacity to manage their diets, leading them to consume unhealthy actual and perceived diets. While previous studies have reported mixed findings on the relationship between the PDQ and actual diet quality [16-20,22], it is widely agreed that PDQ can effectively identify individuals having very poor diets [17,19,20,22]. Despite the tendency for optimistic reporting of PDQ [21], some individuals still reported a poor PDQ. They may represent a particularly vulnerable group at risk of poor dietary habits. Comprehensive dietary assessments, such as 24-h recalls or food frequency questionnaires, could identify individuals consuming poor diets. However, these can be resource intensive and time-consuming. Thus, a single-item PDQ measure could be a valuable tool for quickly identifying such individuals, especially in resource-constrained settings, such as low-income countries and non-healthcare settings, including social service offices.

For most nutrients and food groups, the scores for the perceived importance and consideration had a positive association with PDQ. However, some food items, such as processed meats, beverages, and alcohol, did not have such a relationship. The scores for

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perceived importance and consideration of these specific items were lower, even among respondents with a healthier PDQ. The consumption of processed meats, beverages, and alcohol among Koreans has been on the rise [26-28]. Yet, less attention has been given to these food items in nutrition education and policies. The most recent Korean Dietary Guideline has included guidance on moderate alcohol drinking [29]; however, the intake of processed meats and beverages has not been addressed. This highlights the need for a revision of the dietary guidelines and policies to align with changing consumption patterns and address the health implications of these food groups. Moreover, the existing alcohol policies in the Republic of Korea may require strengthening, given the limited impact of the current restrictions on alcohol marketing and the increased portrayal of alcohol consumption in media and entertainment [30].

On average, the survey respondents recognized the importance of nutrients and food groups for health well. However, they did not take these factors into much consideration in their usual diets. It is important to note that the consideration score was not associated with PDQ when other confounding factors were adjusted, indicating that, while respondents demonstrated awareness of the importance of dietary factors, this awareness did not necessarily translate into healthy diets. Additionally, significant discrepancies existed between the perceived importance and consideration scores for all PDQ groups (data not shown). Even among individuals with a healthy PDQ, there were significant discrepancies between their perceived importance and consideration scores for most nutrients and food groups. This finding implies that applying one's knowledge to usual diets remains challenging, regardless of the level of knowledge about foods and nutrients. This discordance was especially higher in nutrients than in food groups. The high discordance may reflect an individual's challenges in understanding nutrients in relation to their diets. People eat foods, not a single nutrient, thus making it inherently easier to understand foods rather than nutrients. The wide variability of nutrients in foods makes it challenging to grasp their nutritional content accurately [31]. Previous research has reported the benefits of dietary education using food-based approaches in helping people make healthy food choices and improving diet quality compared to education using nutrient-based approaches [32]. Other studies have also highlighted the effectiveness of food-based guidelines and policies for better comprehension and adherence, as opposed to nutrient-based approaches [33-35]. Education primarily emphasizing the roles of individual nutrients may succeed in raising awareness regarding nutrients. However, it might not help individuals to understand the link between foods and nutrients and to have the practical skills needed to choose and prepare foods for healthy diets. Thus, nutrition education and policies need to prioritize food-based approaches to facilitate better comprehension and compliance among the general population.

Our study results showed that individuals with a healthy lifestyle, such as non-drinkers, physically active individuals, and those with a normal body weight, have a healthier PDQ than those who do not. In consideration of the clustering effects of health behaviors, individuals with a healthier lifestyle are more likely to eat healthy diets and therefore have a healthier PDQ [22,36]. On the other hand, those with an unhealthy PDQ are likely to have unhealthy lifestyles. In this respect, integrating nutrition education within a comprehensive health education framework may yield more significant positive health outcomes compared to standalone nutrition education programs.

One of the noteworthy findings in this study was that being a woman was a predictor of an unhealthy PDQ. We expected women to have a healthier PDQ than men, as previous

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research has reported that the dietary quality of women is better than that of men [37-42]. These unexpected results might be due in part to the different standards for determining the healthfulness of diets between men and women. Women generally have a higher awareness and better knowledge of nutrition and are more proactive in seeking nutrition information [43,44]. A previous study showing a positive relationship between the perceived and actual quality reported that there were no differences in the PDQ by gender, although the actual dietary quality of women was higher than that of men [16]. The women participants in our study also showed a higher perceived importance of nutrients and foods in comparison to men (data not shown). Women, who often place a higher value on nutrition and healthy eating and are more engaged in controlling body weight [45], might apply stricter criteria while assessing their diets, leading them to rate their diets less favorably than men, regardless of the actual diet quality. These gender differences in the PDQ emphasize the need to consider sociocultural and psychological factors in dietary interventions tailored to specific gender groups [46].

This study has several limitations. First, the use of data from an online survey may have resulted in the exclusion of individuals with limited digital accessibility from this study. Consequently, the results of the study may not be applicable to the entire Korean population. Second, the cross-sectional design of this study limits our ability to understand the causal relationships between PDQ and other variables. Third, the PDQ measure used in this study was not validated to determine if it could objectively reflect the measured diet quality. Fourth, the tendency of women to assess their diets with stricter criteria than men may have resulted in an overrepresentation of unhealthy PDQ among women. Last, this study relied solely on self-reported PDQ and perceived importance and consideration scores. Hence, there could be response biases.

This study provides practical implications for community- and national-level initiatives aimed at improving diet quality. Given the significant disease burden associated with unhealthy diets [1-3], the demands for dietary assessment are expected to increase. Notwithstanding the introduction of advanced technologies, dietary assessment remains a complex task, especially in low-resource settings. This study highlights the potential utility of a single-item PDQ measure as a simple and rapid tool for screening individuals at a higher risk of poor diets. The PDQ measure can be employed as a screening tool to identify those in need of more in-depth dietary assessment and intervention. In environments like social service offices, where nutrition expertise is often lacking, the PDQ measure could be a valuable tool for connecting individuals with unhealthy PDQ to food assistance programs. Future research needs to identify appropriate target populations and settings in which the PDQ measure can be effectively employed instead of traditional assessment tools. While we propose that the PDQ could serve as a preliminary screening tool in resource-constrained settings, actual dietary quality assessment remains crucial.

Our analysis also highlights the fact that individuals encounter challenges in applying knowledge about nutrients to their dietary practices. Strategies to improve diet quality should apply food-based approaches rather than nutrient-based approaches to ensure enhanced public comprehension and adherence. One of the examples of such an approach is the implementation of food-based dietary guidelines. Despite the recognized need for developing these guidelines, many low-income countries have not yet established them [47]. These countries often face a double burden of undernutrition and non-communicable diseases, both of which require dietary interventions at the national level [48]. Adopting food-based

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approaches, such as food-based dietary guidelines, is imperative for raising public awareness about healthy diets and encouraging their adoption. Food-based strategies should also consider the participants' sociodemographic and psychological factors and integrate nutrition education into comprehensive health education. This holistic approach could empower people to have healthier diets, ultimately contributing to an improved health status.

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