Original Article

The reporting quality of observational studies relevant to the STROBE-nut statement in journals of nutrition

Jingao Zhang MD, Xiaobin Zhou MD, Beibei Li MD, Jing Zhou MD, Yao Chen MD

Department of Epidemiology and Health Statistics, School of Public Health, Qingdao University, Qingdao, Shandong, PR. China

Background and Objectives: Observational studies play a vital role in nutrition journals, but no studies have assessed the reporting quality of observational studies after the publication of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)–nutritional epidemiology (STROBE-nut) statement in 2016. This study assessed the reporting quality of observational studies published in high-impact-factor nutrition journals by using the STROBE-nut statement and explored factors affecting the reporting quality. **Methods and Study Design:** All observational studies published in those journals were retrieved using the PubMed database from inception to May 1, 2019. The reporting quality of the included articles was assessed as per the STROBE-nut statement checklist. Compliance with each item of the statement and the total STROBE-nut score were calculated. Logistic regression analyses were used to identify potential factors associated with reporting quality. **Results:** Of the 964 observational studies identified, a random sample of 200 articles was considered for analysis. The median compliance with items was 74.0%. Seven items (12.07%) were reported in <10.0% of articles, with STROBE 10 (3.00%), nut-12.2 (2.50%), and nut-14 (2.00%) having the lowest reporting rates. The mean STROBE-nut score was 40.35, which was suboptimal. STROBE-nut scores were higher for cohort studies (p=0.04) and when statisticians or epidemiologists were involved in the study (p=0.004). **Conclusions:** Observational studies published in nutrition journals were found to have suboptimal reporting quality. Nutrition journals should endorse the STROBE-nut statement checklist for observational studies to improve reporting quality and provide readers with reliable evidence.

Key Words: reporting quality, observational studies, nutrition journals, STROBE-nut statement, medical publications

INTRODUCTION

As the number of observational studies in medical research rises, increasing attention is being paid to their reporting quality.[1] The reproducibility of primary results depends on high reporting quality. Inadequate reporting in medical publications has caused growing concerns. An adequate description of the crucial components of published papers may help prevent these issues in future studies.[2]

Transparent and clear reporting can not only reveal the strengths and limitations of a study but also facilitate data presentation and interpretation,[3] enabling readers to obtain adequate essential information and make critical judgments regarding the reliability of conclusions.[4] Poor reporting restricts the use of a study to secondary analyses, causing potentially valuable information to be lost if the results are not replicable.[5-12] Inadequate reporting also impairs the generalizability and credibility of results.[4,13,14] Unfortunately, poor reporting is widespread in the medical literature.[15,16] Agha et al found obvious deficiencies in the reporting quality of the following parts of observational studies published in plastic surgery: reporting the study design in the title or abstract (30%); describing the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection (24%); describing efforts to eliminate potential sources of bias (20%); reporting the number of participants studied at each stage of study (20%); and discussing study limitations (40%).[17] A survey of articles published in dermatology journals also indicated that crucial components were inadequately reported.[9]

To ensure the validity of evidence and improve the quality, transparency, and completeness of reporting in observational studies in nutrition, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)-nutritional epidemiology (STROBE-nut) statement, an extension of the STROBE statement, was released in 2016.[18] The STROBE-nut statement was established through the joint effort of 21 multidisciplinary experts and by asking for suggestions from 53 external experts (including methodological experts, journal editors, statisticians, and epidemiologists), and a consensus was reached to add 24 items based on the STROBE statement.[19]

Corresponding Author: Dr Xiaobin Zhou, Department of Epidemiology and Health Statistics, School of Public Health, Qingdao University, 308 Ningxia Road, Qingdao, Shandong 266071, PR. China.
Tel: +8653282991712
Email: xiaobin_zhou@126.com
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Although some studies have assessed the reporting quality of observational studies according to the STROBE statement, no study has critically assessed the nutritional literature by using the STROBE-nut statement.

The present study (1) assessed the reporting quality of observational studies published in high-impact-factor nutrition journals by using the STROBE-nut statement, (2) identified the potential factors associated with reporting quality, and (3) made recommendations to improve the reporting quality of observational studies published in high-impact-factor nutrition journals.

METHODS

The study followed the STROBE statement for cross-sectional studies.

Journal selection

According to Web of Science in 2018, four nutrition journals with high impact factors were selected. Review journals, including Progress in Lipid Research, Progress in Lipid Research, Annual Review of Nutrition, Advances in Nutrition, Critical Reviews in Food Science and Nutrition, Nutrition Reviews, and Nutrition Research Reviews, were excluded. Moreover, International Journal of Behavioral Nutrition and Physical Activity, Food Chemistry, Proceedings of The Nutrition Society, and Journal of Nutritional Biochemistry were excluded because they had no eligible studies. Finally, the American Journal of Clinical Nutrition, Clinical Nutrition, International Journal of Obesity, and European Journal of Nutrition were included for analysis.

Study selection

The following search strategy was used for literature retrieval from the PubMed database (Figure 1) from inception to May 1, 2019. Titles, abstracts, and full text of retrieved articles were independently checked by two reviewers, and disagreements were resolved through discussion and arbitration by a third reviewer. A detailed record of the reasons for study exclusion was maintained (Figure 2).

Inclusion and exclusion criteria

The criteria for including studies were as follows: 1) original observational studies, including cross-sectional studies, case–control studies, and cohort studies; 2) human studies; 3) studies published in English; and 4) studies related to diet or nutrition. The exclusion criteria were the following: 1) non-observational studies, such as systematic reviews, meta-analysis, randomized controlled trials (RCTs), quasi-randomized trials, other interventional studies, case series analysis, case reports, meetings, guidelines, letters to the editor; 2) animal studies; and 3) studies not related to diet or nutrition. Gray literature, such as summaries of meetings and unpublished reports, was not included.

A total of 964 eligible articles were identified. A required sample size of 204 articles was obtained using PASS 11.0 software based on a prevalence of 50%, a precision of ±10%, an alpha level of 0.05, and a power of 0.90.[20]

Data collection

To improve assessment agreement and increase the accuracy of the study, the necessary information of included articles was extracted independently by two reviewers who received professional training before assessment. All

1. “American journal of clinical nutrition”[Journal]
2. “Clinical nutrition”[Journal]
3. “International journal of obesity”[Journal]
4. “European Journal of Nutrition”[Journal]
5. “cross-sectional studies”[Title/Abstract]
6. “cross-sectional study”[Title/Abstract]
7. “prevalence studies”[Title/Abstract]
8. “prevalence study”[Title/Abstract]
9. “case control studies”[Title/Abstract]
10. “case control study”[Title/Abstract]
11. “cohort studies”[Title/Abstract]
12. “cohort study”[Title/Abstract]
13. “prospective studies”[Title/Abstract]
14. “prospective study”[Title/Abstract]
15. “incidence studies”[Title/Abstract]
16. “incidence study”[Title/Abstract]
17. 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16
18. 1 AND 17
19. 2 AND 17
20. 3 AND 17
21. 4 AND 17

Figure 1. Search strategy in PubMed database.

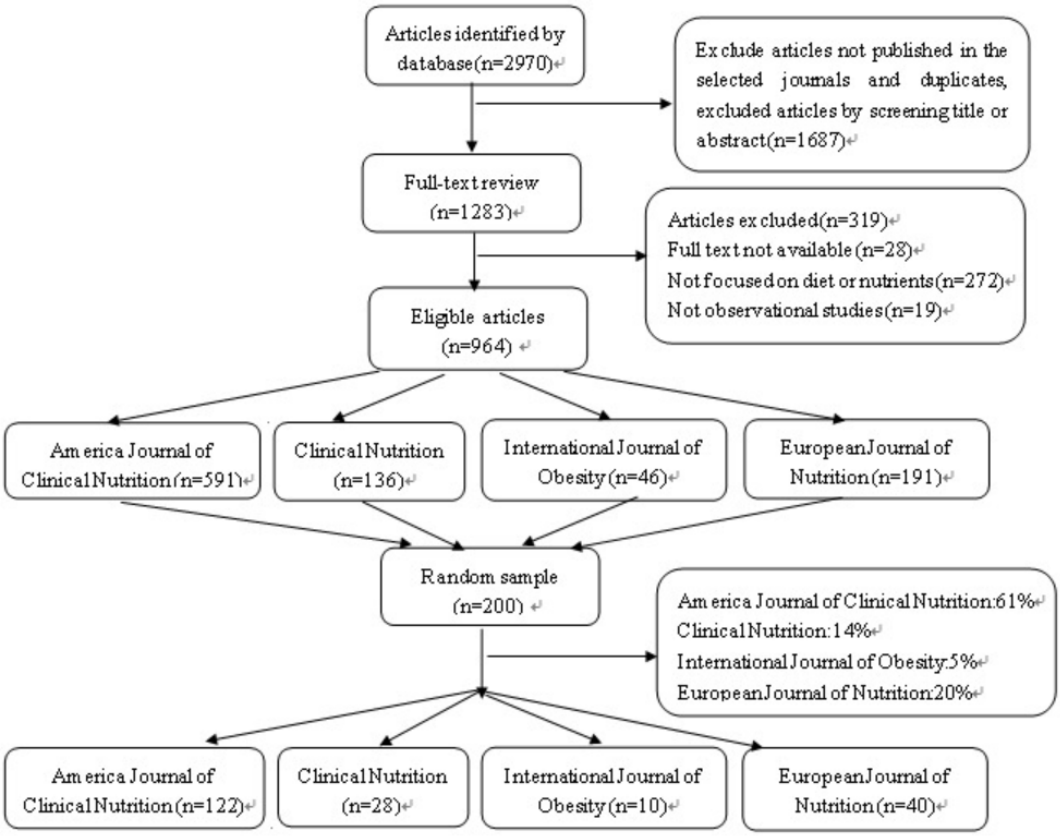

Figure 2. Flow chart of articles screening

differences were resolved through discussion in the presence of a third reviewer. The following study characteristics were collected: year of publication, study design (categorical variable, cross-sectional study/case–control study/cohort study), number of authors (categorical variable), number of affiliations (categorical variable), affiliation of the first author (categorical variable, university/hospital/institute), region of origin of the corresponding author (categorical variable, Asia/Europe/America/Oceania), international collaborative authorship (categorical variable, yes/no), participation of a statistician or epidemiologist (categorical variable, yes/no), and funding support (categorical variable, yes/no). The number of authors and the number of affiliations were divided into two groups according to their medians.

Assessment of the reporting quality

All selected articles were assessed independently by two reviewers according to the STROBE-nut statement, which includes a total of 58 items (including sub-items). All items were reviewed based on whether they were reported in the paper and not whether they were conducted in the study. Each item had four possible answers: "yes," "partly yes," "no," and "not applicable." "Yes" indicated that the item was reported in adequate detail, "partly yes" indicated that the item was reported inadequately, "no" indicated that the item was not reported at all, and "not applicable" indicated that the item did not need to be reported. A score of 1 was assigned for "yes" and "not applicable,"[21] 0.5 was assigned for "partly yes," and 0 was assigned for "no." The total STROBE-nut score of each article ranged from 0 to 58. In addition, compliance with each item in the STROBE-nut statement checklist was calculated using the number of articles yielding "yes" answers to an item as the numerator and the total number of included articles as the denominator.

Data analysis

According to the nature of each variable, mean (standard deviation, SD) was used for continuous variables with normal distributions, and numbers and percentages were used for categorical variables. Comparisons of means between dichotomous variables were performed using an independent Student t test and one-way analysis of variance (ANOVA). According to the 75% cutoff value of the STROBE-nut score, the included articles were divided into two groups of superior and inferior quality.[22] Univariate and multivariate logistic regression analyses were conducted to identify potential factors associated with reporting quality. Odds Ratios (ORs) with 95% Confidence Intervals (CIs) were calculated. Candidate variables with $p<0.10$ in univariate analyses were included in the multivariate logistic regression model.

The kappa index was used to measure interrater agreement. All the analyses were two-sided, and $p\leq0.05$ was considered statistically significant. All data were analyzed with SPSS v18.0.

RESULTS

A total of 2970 articles were identified in the initial search. After duplicate articles and unsuitable articles were removed based on title and abstract review and after the full text was reviewed, 964 articles (published from 1976 to 2019) were considered eligible. Of them, 591 (61.0%)

Table 1. Compliance with items of the STROBE-nut Statement checklist (n=200)

Item and item no.	Original STROBE-nut no.	STROBE-nut statement description	n (%) 'yes'	'partly yes'	'no'
Title and abstract					
Item 1	STROBE 1	(a) Indicate the study's design with a commonly used term in the title or the abstract.	181 (90.5)	-	19 (9.50)
Item 2		(b) Provide in the abstract an informative and balanced summary of what was done and what was found.	200 (100)	-	-
Item 3	nut-1	State the dietary/nutritional assessment method(s) used in the title, abstract, or keywords.	133 (66.5)	-	67 (33.5)
Introduction					
Background/rationale					
Item 4	STROBE 2	Explain the scientific background and rationale for the investigation being reported.	200 (100)	-	-
Objectives					
Item 5	STROBE 3	State specific objectives, including any pre-specified hypotheses.	199 (99.5)	-	1 (0.50)
Methods					
Study design					
Item 6	STROBE 4	Present key elements of study design early in the paper.	197 (98.5)	3 (1.50)	-
Settings					
Item 7	STROBE 5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	195 (97.5)	4 (2.00)	1 (0.50)
Item 8	nut-5	Describe any characteristics of the study settings that might affect the dietary intake or nutritional status of the participants, if applicable.	199 (99.5)	1 (0.50)	-
Participant					
Item 9	STROBE 6	(a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up. Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls. Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of participants.	191 (95.5)	8 (4.00)	1 (0.50)
Item 10		(b) Cohort study—For matched studies, give matching criteria and number of exposed and unexposed. Case-control study—For matched studies, give matching criteria and the number of controls per case.	193 (96.5)	3 (1.50)	4 (2.00)
Item 11	nut-6	Report particular dietary, physiological or nutritional characteristics that were considered when selecting the target population.	195 (97.5)	-	5 (2.50)
Variables					
Item 12	STROBE 7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	193 (96.5)	6 (3.00)	1 (0.50)
Item 13	nut-7.1	Clearly define foods, food groups, nutrients, or other food components.	133 (66.5)	-	67 (33.5)
Item 14	nut-7.2	When using dietary patterns or indices, describe the methods to obtain them and their nutritional properties.	194 (97.0)	6 (3.00)	-
Data sources/measurements					
Item 15	STROBE 8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	198 (99.0)	1 (0.50)	1 (0.50)
Item 16	nut-8.1	Describe the dietary assessment method(s), e.g., portion size estimation, number of days and items recorded, how it was developed and administered, and how quality was assured. Report if and how supplement intake was assessed.	74 (37.0)	125 (62.50)	1 (0.50)
Item 17	nut-8.2	Describe and justify food composition data used. Explain the procedure to match food composition with consumption data. Describe the use of conversion factors, if applicable.	20 (10.0)	123 (61.50)	57 (28.50)

Table 1. Compliance with items of the STROBE-nut Statement checklist (n=200) (cont.)

Item and item no.	Original STROBE-nut no.	STROBE-nut statement description	n (%) 'yes'	'partly yes'	'no'
Data sources/ measurements					
Item 18	nut-8.3	Describe the nutrient requirements, recommendations, or dietary guidelines and the evaluation approach used to compare intake with the dietary reference values, if applicable.	194 (97.0)	4 (2.00)	2 (1.00)
Item 19	nut-8.4	When using nutritional biomarkers, additionally use the STROBE Extension for Molecular Epidemiology (STROBE-ME). Report the type of biomarkers used and their usefulness as dietary exposure markers.	152 (76.0)	41 (20.5)	7 (3.50)
Item 20	nut-8.5	Describe the assessment of nondietary data (e.g., nutritional status and influencing factors) and timing of the assessment of these variables in relation to dietary assessment.	192 (96.0)	6 (3.00)	2 (1.00)
Item 21	nut-8.6	Report on the validity of the dietary or nutritional assessment methods and any internal or external validation used in the study, if applicable.	144 (72.0)	1 (0.50)	55 (27.5)
Bias					
Item 22	STROBE 9	Describe any efforts to address potential sources of bias.	54 (27.0)	-	146 (73.0)
Item 23	nut-9	Report how bias in dietary or nutritional assessment was addressed, e.g., misreporting, changes in habits as a result of being measured, or data imputation from other sources	12 (6.00)	-	188 (94.0)
Study Size					
Item 24	STROBE 10	Explain how the study size was arrived at.	6 (3.00)	-	194 (97.0)
Quantitative variables					
Item 25	STROBE 11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why.	39 (19.50)	70 (35.0)	91 (45.50)
Item 26	nut-11	Explain categorization of dietary/nutritional data (e.g., use of N-tiles and handling of nonconsumers) and the choice of reference category, if applicable.	75 (37.50)	48 (24.0)	77 (38.50)
Statistical methods					
Item 27	STROBE 12	(a) Describe all statistical methods, including those used to control for confounding	188 (94.0)	9 (4.50)	3 (1.50)
Item 28		(b) Describe any methods used to examine subgroups and interactions.	95 (47.5)	23 (11.5)	82 (41.0)
Item 29		(c) Explain how missing data were addressed.	97 (48.5)	-	103 (51.5)
Statistical methods					
Item 30		(a) Cohort study—If applicable, explain how loss to follow-up was addressed. Case-control study—If applicable, explain how matching of cases and controls was addressed. Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy.	103 (51.5)	-	97 (48.5)
Item 31		(e) Describe any sensitivity analyses.	57 (28.5)	-	143 (71.5)
Item 32	nut-12.1	Describe any statistical method used to combine dietary or nutritional data, if applicable.	200 (100)	-	-
Item 33	nut-12.2	Describe and justify the method for energy adjustments, intake modeling, and use of weighting factors, if applicable.	5 (2.50)	150 (75.0)	45 (22.5)
Item 34	nut-12.3	Report any adjustments for measurement error, i.e,. from a validity or calibration study.	109 (54.5)	1 (0.50)	90 (45.0)

Table 1. Compliance with items of the STROBE-nut Statement checklist (n=200) (cont.)

Item and item no.	Original STROBE-nut no.	STROBE-nut statement description	n (%) 'yes'	'partly yes'	'no'
Interpretation					
Item 53	STROBE 20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	198 (99.0)	1 (0.50)	1 (0.50)
Item 54	nut-20	Report the nutritional relevance of the findings, given the complexity of diet or nutrition as an exposure.	200 (100)	-	-
Generalizability					
Item 55	STROBE 21	Discuss the generalizability (external validity) of the study results.	69 (34.5)	1 (0.50)	130 (65.00)
Other information					
Funding					
Item 56	STROBE 22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	121 (60.5)	78 (39.0)	1 (0.50)
Ethics					
Item 57	nut-22.1	Describe the procedure for consent and study approval from ethics committee(s).	194 (97.0)	-	6 (3.00)
Supplementary material					
Item 58	nut-22.2	Provide data collection tools and data as online material or explain how they can be accessed.	51 (25.5)	-	149 (74.5)

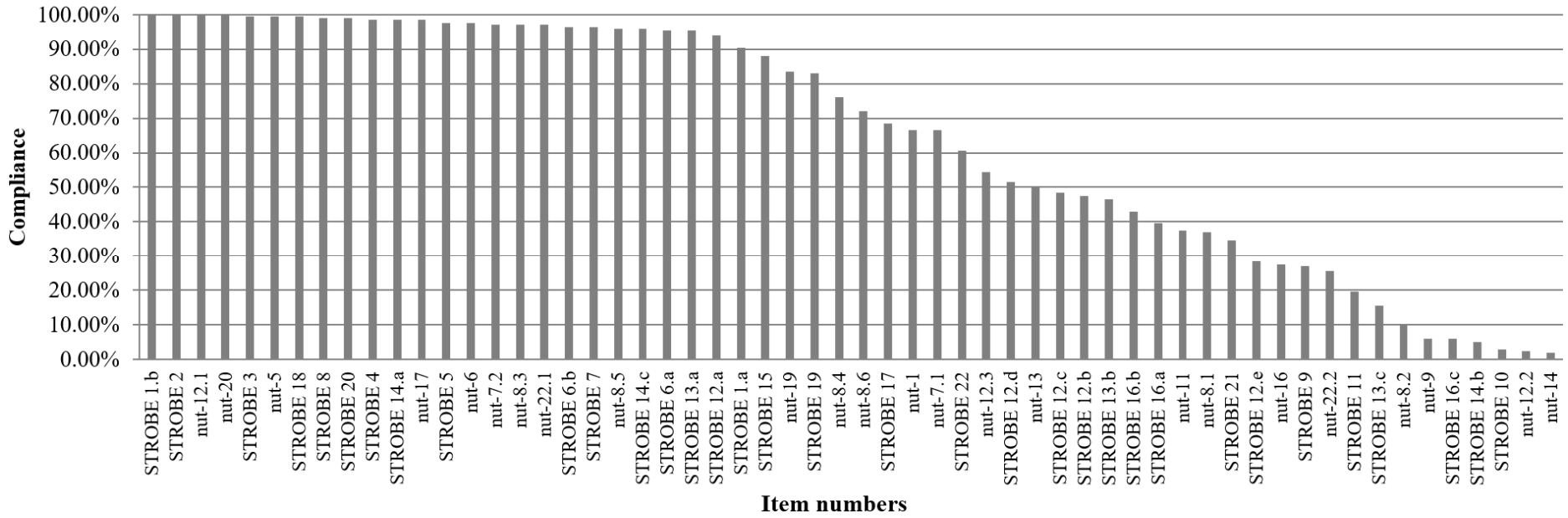

Figure 3. Compliance with items that answer 'yes'.

Table 2. The mean of STROBE-nut score of main characteristics of included articles

Characteristic	STROBE-nut score			
	n (%)	Mean (SD)	*F* / *t*	*p*
Journals				
American Journal of Clinical Nutrition	122 (61.0)	40.2 (3.73)	0.64	0.59
Clinical Nutrition	28 (14.0)	41.1 (3.59)		
International Journal of Obesity	10 (5.00)	41.1 (3.19)		
European Journal of Nutrition	40 (20.0)	40.0 (4.68)		
Type of design				
Cross-sectional study	51 (25.5)	39.5 (3.63)	3.37	0.04
Case control study	31 (15.5)	39.6 (3.64)		
Cohort study	118 (59.0)	40.9 (3.98)		
No. of authors				
1 – 7	96 (48.0)	40.0 (4.16)	-1.13	0.26
≥7†	104 (52.0)	40.6 (3.61)		
No. of affiliations of authors				
1 – 4	92 (46.0)	39.8 (3.74)	-1.79	0.08
≥4‡	108 (54.0)	40.8 (3.97)		
Affiliation of the first author				
University	136 (68.0)	40.3 (3.86)	0.32	0.73
Hospital	22 (11.0)	39.8 (3.38)		
Institute	42 (21.0)	40.7 (4.27)		
Origin region of the corresponding author				
Asia	41 (20.5)	41.2 (2.50)	1.56	0.20
Europe	82 (41.0)	39.7 (4.72)		
America	68 (34.0)	40.4 (3.43)		
Oceania	9 (4.50)	41.4 (3.57)		
International collaborative authorship				
No	113 (56.5)	40.0 (3.79)	-1.47	0.14
Yes	87 (43.5)	40.8 (3.98)		
Participation of statistician or epidemiologist				
No	73 (36.5)	39.3 (3.38)	-2.95	0.004
Yes	127 (63.5)	40.9 (4.04)		
Funding support				
No	31 (15.5)	40.9 (5.13)	0.63	0.54
Yes	169 (84.5)	40.2 (3.63)		
Mean score	200	40.4 (3.89)		

†The median of the number of authors is 7.
‡The median of the number of affiliations of authors is 4.

were published in the American Journal of Clinical Nutrition, 136 (14.0%) in Clinical Nutrition, 46 (5.00%) in the International Journal of Obesity, and 191 (20.0%) in the European Journal of Nutrition. According to these proportions, a sample of 200 articles was randomly selected and included 122, 28, 10, and 40 articles from each of the four journals, respectively.

The interrater agreement was good (kappa index=0.927).

Description of compliance for each item

Compliance with each item in the STROBE-nut statement is presented in Table 1. The median compliance with items was 74.00%. Twenty-five items (43.1%) were reported adequately in 90.00% or more of the articles. Compliance with the following four items reached 100%: STROBE 1.b, relating to the description of the study's design with a commonly used term in the title or the abstract; STROBE 2, relating to explanations of the scientific background and rationale of the research; nut-12.1, pertaining to the description of statistical methods; and nut-20, pertaining to the reporting of nutritional relevance (Figure 3). However, seven items (12.07%) were reported in less than 10.00% of the articles (nut-8.2, relating to the description and validation of food composition data used; nut-9, pertaining to the handling of bias in dietary or nutritional evaluation; STROBE 10, pertaining to the estimation of sample size; nut-12.2, relating to the description of the method of energy adjustment or intake modeling; STROBE 14.b, relating to the number of missing values per variable; nut-14; and STROBE 16.c, relating to the conversion of relative risk), with compliance for three items (STROBE 10, nut-12.2, nut-14) being less than 5.00% (Table 1).

Description of the STROBE-nut score

Of the 200 articles, 51 (25.5%) were cross-sectional studies, 31 (15.5%) were case–control studies, and 118 (59.00%) were cohort studies. The mean of the STROBE-nut score of 200 articles was 40.35 (SD=3.89). STROBE-nut scores were higher for cohort studies (mean (SD): 40.93 (3.98)) and for statistician or epidemiologist participation (mean (SD): 40.95 (4.04)) ($p<0.05$). The mean STROBE-nut scores for the general characteristics of these articles are presented in Table 2.

Univariate and multivariate logistic regression analyses

The 75% cutoff value of the STROBE-nut score is 43.50; based on this cutoff, a score of ≥43.50 was considered to indicate superior quality and that of <43.50 indicated inferior quality. Univariate logistic regression analyses revealed that the participation of statisticians or epidemic-

Table 3. Univariate and multivariate logistic regression analyses of predictive factor associated with reporting quality

Characteristics	Univariate		Multivariate	
	OR (95% CI)	*p*	OR (95% CI)	*p*
Journals				
American Journal of Clinical Nutrition	1.14 (0.47, 2.75)	0.78	-	-
Clinical Nutrition	1.09 (0.33, 3.58)	0.89	-	-
International Journal of Obesity	0.44 (0.05, 4.04)	0.47	-	-
European Journal of Nutrition	Reference			
Type of design				
Cross-sectional study	Reference		Reference	
Case control study	0.67 (0.16, 2.82)	0.59	0.66 (0.15, 2.88)	0.58
Cohort study	2.34 (0.96, 5.72)	0.06	2.05 (0.80, 5.25)	0.14
No. of authors				
1 – 7†	Reference			
≥ 7	1.30 (0.66, 2.58)	0.45	-	-
No. of affiliations of authors				
1 – 4‡	Reference			
≥4	1.51 (0.75, 3.02)	0.25	-	-
Affiliation of first author				
University	Reference			
Hospital	0.90 (0.28, 2.87)	0.86	-	-
Institute	1.43 (0.64, 3.21)	0.38	-	-
Origin region of the corresponding author				
Asia	Reference			
Europe	1.57 (0.60, 4.08)	0.36	-	-
America	1.15 (0.42, 3.16)	0.79	-	-
Oceania	1.39 (0.24, 8.14)	0.72	-	-
International collaborative authorship				
No	Reference		Reference	
Yes	1.78 (0.90, 3.53)	0.10	1.65 (0.80, 3.39)	0.18
Participation of statistician or epidemiologist				
No	Reference		Reference	
Yes	2.50 (1.12, 5.57)	0.03	2.22 (0.93, 5.29)	0.07
Funding support				
No	Reference		Reference	
Yes	0.49 (0.21, 1.14)	0.10	0.38 (0.15, 0.94)	0.04

†The median of the number of authors is 7.
‡The median of the number of affiliations of authors is 4.

ologists (OR=2.50, 95% CI: 1.12–5.57) was associated with high reporting quality. After adjustment for the type of design, international collaborative authorship, and statistician or epidemiologist participation, funding support was associated with low reporting quality (OR=0.38, 95% CI: 0.15–0.94; Table 3).

DISCUSSION

Two hundred observational studies from four high-impact-factor nutrition journals were evaluated using the STROBE-nut statement checklist. We found that the median compliance for adequately reported STROBE-nut items was 74.0%; 25 items had a compliance of >90.0%, whereas 7 items had a compliance of <10.0%. In particular, the compliance with the following three items was dismal: item 24, related to sample size determination (3.00%); item 33, related to the method of energy adjustments and intake modeling (2.50%); and item 42, related to the distribution of participant characteristics (2.00%). Additionally, the overall quality of the included articles was suboptimal, with a mean score of 40.35 out of 58. These results underscore the need to improve the reporting quality and compliance with items of observational studies in nutrition journals.

Item 17 requires a detailed description of the food composition data and its reliability, food conversion, and conversion coefficients. Compliance with item 17 was only 10.0% in this study. Dietary intake is a complex issue, and misreporting can lead to bias.[19] Handling of these biases should be explained in articles so that readers can correctly understand the research results. Item 23 had an unsatisfactory reporting rate of 6.00%. Energy adjustment can prevent the drawing of incorrect conclusions regarding nutrition intake and related diseases (item 33).[18] However, only 2.50% of the included articles described their methods of energy adjustment or intake modeling and demonstrated their reliability. Sample size determination may be limited by limited time and resources as well as qualified patients (item 24).[9] The sample size should be estimated in articles so that readers can judge whether the conclusions obtained on the basis of the sample size can be used for reference.[3] Missing data (item 40) is vital in any research design; the power of studies and the reliability and generalizability of results may be affected due to lack of information.[5] However, few articles provided a detailed description of these two problems. Improper handling of missing data can bias the results. Readers cannot accurately judge whether the method of dealing with missing values is appropriate, thereby affecting the credibility of the results. Study limitations, as a critical part of scientific reporting, should be discussed in articles (items 51 and 52). The included studies reported their limitations relatively well, with a compli-

ance of 83.00% (item 51) and 83.50% (item 52).

Our analysis revealed that funding support may impair reporting quality. This result can be explained by the fact that journals are more likely to publish studies with funding support than those without funding support. Thus, the reporting quality may not be the first factor that journal editors consider for publication, which is concerning. This conjecture is based on only the results of this study.

Our study strength is its use of the STROBE-nut statement for the first time to evaluate the reporting quality and compliance with STROBE-nut items of observational studies in nutrition journals. In addition, the screening and evaluation of articles were conducted by two reviewers independently, and training and pre-evaluation were performed before evaluation to minimize bias. The analysis indicated that agreement between reviewers was good (kappa index=0.927).

This study has some limitations. First, we included only four nutrition journals with a high impact factor, and not all were nutrition journals. However, journals with high impact factors are generally considered more readable and visible. Second, subjective differences and selective bias may have occurred in the screening and evaluation of the articles. However, potential bias was controlled as much as possible through professional training and pre-evaluation. Third, the literature evaluated in this study was limited to articles published in English, leading to language bias. Fourth, the findings of this study were based on a random sample, which may limit the generalizability of our results.

Although preparing an article with clear and transparent reporting is the primary responsibility of authors, journal editors and reviewers play a vital role in the publication and review process. To improve the reporting quality of observational studies in the field of nutrition, journals must actively endorse the STROBE-nut statement and require authors to provide a STROBE-nut statement checklist when submitting a nutrition-related observational study. Our findings may help raise researchers' concerns for the reporting quality of observational studies in nutrition journals and increase the overall quality of observational studies for public health and clinical decision-making.

In conclusion, the reporting quality and compliance of observational studies in nutrition journals were found to be generally unsatisfactory, and measures must be taken to improve them, such as endorsing the STROBE-nut statement. Researchers and reviewers should be trained to understand and follow the STROBE-nut statement better when preparing and reviewing articles.

AUTHOR DISCLOSURES

The authors declared that there is no conflict of interest regarding the publication of this study.

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