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Factors associated with teleconsultation by Brazilian nutritionists during the Covid-19 pandemic

Fatores associados à realização de consultas on-line por nutricionistas brasileiros durante a pandemia da Covid-19

Abstract

Introduction: There has been an increase in demand for teleconsultations in healthcare; however, nutritionists' perception regarding their preferences between online or in-person care and the factors that may be associated with this choice are still unclear. **Objective:** The objective of this study was to analyze the factors associated with the preference of Brazilian nutritionists regarding online consultations. **Methods:** This is a descriptive, cross-sectional observational study with nutritionists about teleconsultations during the pandemic. An electronic questionnaire was applied from March to May 2022. Binary logistic regression models were used to verify the association between the variables. **Results:** A total of 670 nutritionists responded, the majority of whom were female (90.9%), with a median age of 32 years. The highest academic level was a *lato sensu* postgraduate degree (53.3%), working in the area of Clinical Nutrition (55.5%), working in private clinics (89%), and residing in the Northeast (58.7%). Nutritionists intend to continue using teleconsultations (57.7%) and agree that the Federal Nutrition Council should continue to allow their use after the end of the pandemic (97.2%). An association was identified between being registered on the e-Nutricionista platform and preferring to provide online consultations (OR: 1.46; CI: 1.03-2.25), as well as a greater propensity to reduce the cost of online consultations (OR: 1.58; CI: 1.11-2.25), as these nutritionists perceive that their patients approve of this type of care (OR: 3.04; CI: 1.87-4.92). **Conclusion:** The study concluded that the preference for teleconsultations is associated with being registered on the e-Nutricionista platform, nutritionists' perception of patient acceptance, and the willingness to reduce the cost of their online consultations.

Keywords: Telenutrition. Teleconsultation. Information Technology. Telehealth. Nutritionists. Covid-19.

Resumo

Introdução: Houve aumento da demanda pela teleconsulta em saúde, no entanto, ainda não está clara a percepção dos nutricionistas quanto às preferências entre atendimento *on-line* ou presencial e os fatores que podem

estar associados a essa escolha. **Objetivo:** O objetivo deste estudo foi analisar os fatores associados à preferência dos nutricionistas brasileiros quanto à realização de consultas *on-line*. **Métodos:** Estudo observacional transversal descritivo com nutricionistas sobre teleconsulta durante a pandemia. Aplicou-se questionário eletrônico durante março a maio de 2022. Modelos de regressão logística binária foram utilizados para verificar a associação entre as variáveis. **Resultados:** Responderam 670 nutricionistas, a maioria do sexo feminino (90,9%), com mediana de idade de 32 anos. O maior nível acadêmico foi pós-graduação *lato sensu* (53,3%), atuantes na área de Nutrição Clínica (55,5%), trabalhando em clínicas particulares (89%), residentes no Nordeste (58,7%). Os nutricionistas pretendem continuar o uso da teleconsulta (57,7%) e concordam que o Conselho Federal de Nutrição deve manter a permissão de seu uso após o fim da pandemia (97,2%). Identificou-se associação entre estar cadastrado na plataforma e-Nutricionista e preferir realizar atendimentos *on-line* (OR: 1.46; IC: 1.03- 2.25), bem como maior propensão a reduzir o valor das consultas *on-line* (OR: 1.58; IC: 1.11- 2.25), inclusive, por esses nutricionistas terem a percepção de que seus pacientes aprovam esse tipo de atendimento (OR: 3.04; IC: 1.87-4.92). **Conclusão:** O estudo concluiu que a preferência pela teleconsulta está associada a possuir cadastro na plataforma e-Nutricionista, percepção dos nutricionistas quanto à aceitação dos pacientes e a disposição em reduzir o valor de suas consultas *on-line*.

Palavras-chave: Telenutrição. Teleconsulta. Tecnologia da Informação. Telessaúde. Nutricionistas. Covid-19.

INTRODUCTION

The demand for Telehealth services has suddenly gained prominence in confronting the Covid-19 pandemic and the need for social distancing, despite having been implemented in Brazil in 2007 with the Telehealth Brazil Networks Program within the scope of Primary Care of the Unified Health System (*Sistema Único de Saúde- SUS*).¹⁻⁴ This strategy stands out in the context of the pandemic, motivating health services to implement infrastructure, care processes and remote guidance for patients, aiming to provide nutritional services online with similar quality to that of face-to-face care.^{5,6}

CFN Resolution No. 760, of October 22, 2023, defines Telenutrition as the use of electronic information and telecommunications technology to support remote clinical health care.^{7,8} This is a branch of Telehealth which is similar to Teleconsultation, given that both involve interactive care through a technological environment, permeated by information and communication technologies (ICTs).^{8,9}

Telenutrition enables nutritional care to be provided remotely and safely, and conducted in an ethical and empathetic manner, regardless of the geographic location of the actors involved.⁷⁻⁹

Due to the limitations imposed by this challenging period, the Federal Nutrition Council (*Conselho Federal de Nutrição - CFN*) published *CFN* Resolution No. 646 of March 18, 2020, which suspended in-person consultations until August 31, 2020. After the World Health Organization (WHO) declared the end of the COVID-19 pandemic, *CFN* Resolution No. 751 of May 22, 2023, came into effect, authorizing provision of non-face-to-face care until publication of *CFN* Resolution No. 760 of October 22, 2023, which defines and regulates Telenutrition as a way of providing nutritional care.^{7,10,11} As a result of these necessary changes, the *CFN* held a public consultation from June to July 2022 regarding the continuity of Telenutrition after the end of the pandemic. More than 17 thousand responses were obtained, corresponding to 9.3% of the total number of Brazilian nutritionists registered in that period. More than 97% were in favor of continuing the new service modality after the end of the pandemic, despite the various obstacles and possible imitations that these nutritionists may have encountered in the new modality.¹²

According to Bricarello & Poltronieri,⁶ a lack of physical assessments, technical and communication difficulties due to non-verbal language (gestures, facial expressions, way of sitting), resources, and work organization were observed among the difficulties and limitations in the scope of Telenutrition, including in other studies.¹³⁻²³

Choosing to maintain Telenutrition even after the end of the pandemic reduces the risk of exposure to potentially infected people,²² reduces the waiting time for consultations, allows for increased accessibility for individuals living in rural areas, also leading to a greater number of consultations, reducing costs for nutritionists in their travel, room rental, and less need to hire employees.^{6,13-22,23}

Telenutrition is directly integrated into the Clinical Nutrition field by providing remote and continuous care, enabling regular monitoring of patients with chronic diseases and adapting nutritional interventions to their specific needs. This is crucial to maintain the quality of nutritional care, even in contexts where in-person care is not feasible, thus ensuring therapeutic efficacy and preventing nutritional complications.²⁴⁻²⁸

However, nutritionists who provide this type of care must be registered in the National Registry of Nutritionists for Telenutrition (e-Nutritionist), as provided for in Resolution No. 760, of October 22, 2023, in force.⁷ Registration on this platform serves as both a control and security instrument for professionals and patients.²⁹

Although there are regulations governing the use of Telenutrition and guiding documents that detail and ethically guide the nutritionist's stance in online care, it is not known whether these professionals are

aware of their existence. It has not yet been identified how these nutritionists adopted the new modality, as well as their perceptions, preferences, whether for online or in-person care, their limitations and advantages, as already identified in other studies.^{6,13-23,29-31}

Given this scenario, the objective of this study was to analyze the factors associated with the preference of Brazilian nutritionists regarding online consultations during the Covid-19 pandemic.

METHODS

Study design

This is an exploratory cross-sectional observational study conducted from March to May, 2022, via an electronic questionnaire using the Google Forms[®] application.

Sample

Nutritionists of both sexes who provided Telenutrition services during the Covid-19 pandemic in Brazil were included in this study. An Informed Consent Form (ICF) was sent together with the electronic questionnaire and signed online, in accordance with CNS Resolution No. 466/2012 of the National Health Council.³² The study was approved by the Research Ethics Committee of the Federal University of Sergipe (Brazil), under opinion number 5,101,963.

The sample calculation defined a minimum of 645 respondents in order to guarantee representativeness of the study, and was performed using OpenEpi (Open Source Epidemiologic Statistics for Public Health) version 3.01, considering a 99% confidence interval and 42.2% of preference for online care by nutritionists.^{14,33} A total number of 177,817 Brazilian nutritionists observed in the statistical table of the fourth quarter of 2021 was considered.³⁴

Evaluation form

All Regional Nutrition Councils (*Conselhos Regionais de Nutrição - CRN*) in Brazil were consulted between March and May 2022 about the possibility of publicizing the study, which was done by those who accepted. In turn, it was simultaneously disseminated through the Instagram[®], WhatsApp[®] and Telegram[®] social networks. The online evaluation form consisted of questions aimed at investigating the extent, quality, preferences and challenges of using Teleconsultation during the pandemic. The questionnaire contained 24 questions organized into sections, namely: Section 1 - Sociodemographic characteristics (8 questions); Section 2 - Perception regarding the provision of online consultations (4 questions); Section 3 - Normative and guiding knowledge of the nutritionist's practice (5 questions); Section 4 - Use of technological tools, difficulties and preferences regarding Telenutrition (7 questions). All questions were adapted from previously published questionnaires.^{13,14,16,18}

Section 3 is designed to measure professionals' knowledge of resolutions and guidelines for performing Telenutrition, and included questions prepared by our research group, such as: whether they are registered on the e-Nutritionist platform, whether they are familiar with Resolution No. 666/2020 of the *CFN* and whether they are aware of the *CFN/CRN* guidance documents for Telenutrition practice.

Statistical analysis

Data were analyzed using the SPSS version 27 software (IBM Corp., Armonk, NY, USA). Median, frequencies and interquartile ranges (IQR) were used for descriptive analysis. The Kolmogorov-Smirnov test was performed to detect data normality.

The reliability of the questions prepared by the authors obtained a Kappa coefficient with a substantial value (0.724).³⁵ Pearson’s Chi-squared test was used to assess the association between categorical variables.

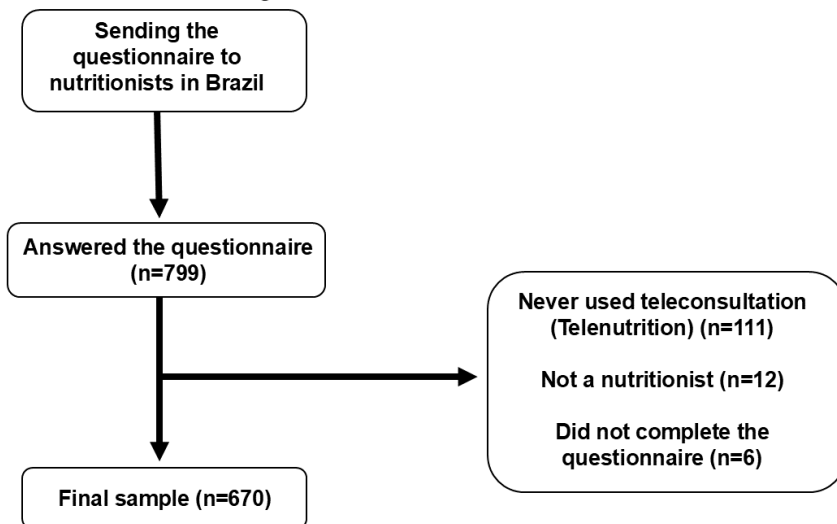
A binary logistic regression analysis was also performed to verify the association between the nutritionists’ preference for providing online care and the independent variables (having a registration on the e-Nutritionist platform; nutritionists’ perception of patients’ acceptance of this form of care; and nutritionists’ perception of their intention to continue or not using Telenutrition, even if it were necessary to reduce the consultation cost).

Univariate analyses were performed using simple logistic regression to calculate the odds ratio, 95% confidence interval and p-value, and all variables that presented significance of $p < 0.2$ were included in the multiple model using stepwise forward. Variables with p-values < 0.05 were maintained in the final model.

RESULTS

A total of 799 responses were obtained, and respondents who stated that they were not a nutritionist ($n=12$), had never used Telenutrition ($n=111$) or had not completed the questionnaire ($n=6$) were excluded from the analysis. Thus, a total of 670 valid responses from nutritionists who provided online care during the pandemic were considered (Figure 1).

Figure 1. Survey respondent flowchart.



The majority of nutritionists were female, with a median age of 32 years (14 IQR). The median time of professional activity was 48 months (108 IQR) (Table 1).

Table 1. Sociodemographic characteristics with median and interquartile range (n=670). São Cristóvão, SE, Brazil, 2022.

Characteristics	Median	Interquartile Range
Age (years)	32	14 26;40
Professional experience (months)	48	108 8;20
Experience in Telenutrition (months)	12	18 24;132

These nutritionists had a postgraduate degree as their highest level of completion (53.3%), were mainly residents in the Northeast Region (58.7%) and worked in Clinical Nutrition (55.5%), with the majority working in private clinics (89%). Most nutritionists were not registered with e-Nutricionista (58.7%) (Table 2).

Table 2. Characterization data of the responding nutritionists (n=670). São Cristóvão, SE, Brazil, 2022.

Characteristics	N	%
<i>Sex</i>		
Female	609	90.9%
Male	61	9.1%
<i>Highest academic level</i>		
Undergraduate	188	28.1%
Postgraduate lato sensu	357	53.3%
Master's	91	13.6%
Doctorate	34	5.1%
<i>Location</i>		
Other city	319	47.6%
State capital city	351	52.4%
<i>Region</i>		
North	10	1.5%
Northeast	393	58.7%
Central-West	24	3.6%
Southeast	196	29.3%
South	47	7%
<i>Main activity area</i>		
Nutrition in collective feeding	7	1%
Clinical nutrition	372	55.5%
Nutrition in sports and physical exercise	42	6.3%
Nutrition in publichealth	14	2.1%
Nutrition in the production chain, in the food industry and commerce	3	0.4%
Nutrition in education, in research and extension	11	1.6%
More than one category	221	33%
<i>Online service is linked to:</i>		
Public hospital	14	2.1%
Private hospital	6	0.9%
Private clinic	596	89%
Primary Healthcare	12	1.8%
None of the above	42	6.3%
<i>Workload compared to the period before the pandemic</i>		
No change or decreased	351	52.4%
Increased	319	47.6%

Table 2. Characterization data of the responding nutritionists (n=670). São Cristóvão, SE, Brazil, 2022. Continues.

Characteristics	N	%
<i>Patients' assessment of Telenutrition according to nutritionists' perception</i>		
Dissatisfied	97	14.5%
Satisfied	573	85.5%
<i>Telenutrition was an important factor in preventing Covid-19</i>		
Disagree	26	3.9%
Agree	644	96.1%
<i>Have a registration with e-Nutritionists</i>		
Yes	277	41.3%
No	393	58.7%
<i>Knowledge of the existence of resolution no. 666/2020 of CFN¹</i>		
Yes	367	54.8%
No	303	45.2%
<i>Knowledge of the existence of guidance documents</i>		
Yes	343	51.2 %
No	327	48.8%
<i>Main modality used to provide nutritional care</i>		
Voice/Telephone	63	9.4%
Videoconferencing	575	85.8%
Messaging	32	4.8%
<i>Preferred method for providing nutritional care via Telenutrition</i>		
Voice/messaging	78	11.6%
Videoconferencing	592	88.4%
<i>How did you feel about the usability of technologies* for Telenutrition?</i>		
Note asy	302	45.1%
Easy	368	54.9%
<i>Have you experienced technical difficulties* that affected the quality of care provided via Telenutrition? *quality of connection, áudio and video</i>		
Some difficulty	424	63.3%
Never	246	36.7%
<i>You have experienced difficulties in organizing work or other issues that have affected the quality of care provided via Telenutrition?</i>		
Some difficulty	183	27.3%
Never	487	72.7%
<i>Would you continue using Telenutrition if it were necessary to reduce the value (in financial terms) of the service compared to the value of face-to-face consultations?</i>		
Yes	475	70.9%
No	195	29.1%
<i>Prefer to do online consultations rather than face-to-face consultations</i>		
Higher preference	316	47.2%
Less preference	354	52.8%
<i>CFN maintains Telenutrition post-pandemic</i>		
Supporters of maintaining Telenutrition	651	97.2%
Not in favor of maintaining Telenutrition	19	2.8%
<i>Will you continue using Telenutrition service?</i>		
No	283	42.2%
Yes	387	57.7%

CFN: Federal Council of Nutrition (*Conselho Federal de Nutrição*).

Using the Pearson's chi-squared test, it was possible to identify an association between nutritionists who preferred online care and an increase in their weekly workload, willingness to reduce the consultation price, the perception of acceptance by their patients, even without the patients themselves having been directly investigated, and having a registration on the e-Nutritionist platform. There was an association between those nutritionists who preferred face-to-face care and having experienced difficulties related to work organization during Telenutrition ($p < 0.05$) (Table 3).

Table 3. Association of nutritionists' preference for providing online or in-person nutrition services with different categorical variables (n=670). São Cristóvão, SE, Brazil, 2022.

Variables	Preference for online consultations		P-value
	Disagree n (%)	Agree n (%)	
<i>Age</i>			
Older (>32 years)	144 (45.6)	168 (47.5)	0.625
Younger (<32 years)	172 (54.4)	186 (52.5)	
<i>In your perception, up until the moment you used the Telenutrition service, did your workload increase or decrease compared to the period before the pandemic?</i>			
Decreased	182 (57.6)	169 (47.7)	0.011
Increased	134 (42.4)	185 (52.3)	
<i>Would you continue using Telenutrition if it were necessary to reduce the value (in financial terms) of its service compared to the value of face-to-face consultations?</i>			
Yes	205 (43.2)	270 (56.8)	0.001
No	111 (56.9)	84 (43.1)	
<i>In your opinion, what do your patients think of the Telenutrition service during the Covid-19 pandemic?</i>			
Dissatisfied	70 (72.2)	27 (27.8)	0.000
Satisfied	246 (42.9)	327 (57.1)	
<i>How did you feel about the usability of the technologies* used for Telenutrition? *(computer systems, software, áudio and vídeo conferencing platforms)</i>			
Not easy	142 (47)	160 (53)	0.946
Easy	174 (47.3)	194 (52.7)	
<i>Have you experienced technical difficulties which could affect the quality of care provided via Telenutrition?</i>			
Some difficulty	209 (49.3)	215 (50.7)	0.147
No difficulty	107 (43.5)	139 (56.5)	
<i>Have you experienced organizational difficulties at work or other difficulties that could affect the quality of care provided via Telenutrition?</i>			
Some difficulty	104 (56.8)	79 (43.2)	0.002
No difficulty	212 (43.5)	275 (56.5)	
<i>Are you registered on the e-Nutritionist platform (online system for national registration of nutritionists for Telenutrition-CFN)?</i>			
No	201 (51.1)	192 (48.9)	0.014
Yes	115 (41.5)	162 (58.5)	

Table 3. Association of nutritionists' preference for providing online or in-person nutrition services with different categorical variables (n=670). São Cristóvão, SE, Brazil, 2022. Continues.

Variables	Preference for online consultations		P-value
	Disagree n (%)	Agree n (%)	
<i>Are you aware of the existence of guidance documents for the practice of Telenutrition prepared by the CFN/CRN System?</i>			
No	162 (49.5)	165 (50.5)	0.229
Yes	154 (44.9)	189 (55.1)	

Variáveis analisadas pelo teste Qui-quadrado de Pearson. $p < 0,05$. CFN: Conselho Federal de Nutrição; CRN: Conselho Regional de Nutrição.

From the logistic regression analysis, it was observed that nutritionists registered on the e-Nutricionista platform (OR: 1.46; CI: 1.03-2.25), those who perceived their patients' preference for care through Telenutrition (OR: 3.04; CI: 1.87-4.92) and those who were willing to reduce the value of their online consultations (OR: 1.58; CI: 1.11-2.25) were associated with having preference for online consultations (Table 4).

Table 4. Factors which may influence Brazilian nutritionists to prefer to perform consultations online (n=670). São Cristóvão, SE, Brazil, 2022.

Independent variable	Preference for online consultations over face-to-face consultations			
	Crude model		Fitted model	
	OR	(95%CI)	OR	(95%CI)
Have a registration on the e-Nutritionist platform	1.47	1.08; 2.01	1.426	1.03; 2.25
Patients approve of the Telenutrition service, according to the perception of nutritionists	3.44	2.14; 5.53	3.04	1.87; 4.92
Continue using Telenutrition if it were necessary to reduce the value (in financial terms) of the service compared to the value of face-to-face consultations	1.74	1.24; 2.47	1.58	1.11; 2.25

OR: Odds Ratio; CI (95%): 95% confidence interval.

DISCUSSION

Based on a representative sample of Brazilian nutritionists, this study demonstrated that the preference for conducting online consultations during the Covid-19 pandemic was significantly associated with being registered on the e-Nutricionista platform, with the perception of these nutritionists regarding the acceptance of their patients in relation to Telenutrition, and with a willingness of these professionals to reduce the cost of consultations to maintain the online modality. These findings provide important information on the adaptation and acceptance of Telenutrition in the Brazilian context, and present relevant implications for clinical practice and for formulating new policies.

The association between the preference for online consultations and registration on the e-Nutritionist platform highlights the awareness and commitment of nutritionists to comply with the regulatory guidelines

established by the *CFN*.⁷ This behavior highlights the importance and need for a regulated environment for the practice of Telenutrition, which can be interpreted as a search for safety for both the professional and the patient, in addition to ethical action, since professionals who are not registered on this platform but perform this type of service in the event of complaints will be subject to the penalties provided for in the regulations of the *CFN/CRN* System.^{6,7,29,36,37}

Our results regarding nutritionists' perception of patient acceptance suggest that nutritionists observed a positive receptiveness towards Telenutrition. However, it is important to emphasize that although the present study identified such perception, it was not based on a direct investigation with patients. This may limit the validity of this observation, although the objective here was only to assess nutritionists' perception. Previous studies corroborate this perception, indicating that patients appreciate the convenience, accessibility and flexibility provided by online consultations, including during the pandemic.^{8,13,20,21,38-41}

The willingness of nutritionists in this study to reduce the cost of online consultations highlights an aspect that deserves special attention. However, when asked about the subject, physicians did not agree with reducing the costs,¹⁶ despite the potential advantages, such as reduced infrastructure and travel expenses, increased number of consultations and reduced consultation time.^{6,13,16,21,37,41-44} This may reflect an understanding of the cost differences between in-person and remote consultations, but due to the high demand for their services, physicians may be somewhat resistant to flexibility and reducing costs in remote consultations.

It is crucial that the reduction in fees does not compromise the financial support of professionals or the care quality provided. To this end, it is necessary to seek ways to provide fair remuneration and develop sustainable strategies to expand the use of Telenutrition in providing health services, and if possible counting on the support of public policies and health institutions.

This study is the first to evaluate the factors associated with care through Telenutrition in a representative sample of Brazilian nutritionists. However, as a limitation, it is understood that there is no possibility of establishing causal relationships between the associations of the variables analyzed because it is a cross-sectional study. In addition, although nutritionists perceive that patients accept online nutritional care well, this perception was not based on a direct investigation with patients in this study, which opens up the possibility of future studies broadly evaluating patients' opinions about Telenutrition.

Another limitation may be raised in relation to the large number of respondents residing in the Northeast Region. However, it is understood that online care brings some challenges, such as accessibility, technical difficulties and others that are common and that exist in different locations, regions, and even other countries.^{13,16-19,21,42-45}

In practical terms, the findings of this study are very relevant to guide entities linked to Nutrition, with a view to taking directions such as broad dissemination of the e-Nutritionist platform, guidelines associated with the practice of Telenutrition and training on guiding, ethical and management documents for the nutritionist's work, aiming at growth and usability of Telenutrition as a tool for providing health services.

CONCLUSION

It is concluded that the preference for providing services via Telenutrition among Brazilian nutritionists was associated with having a registration on the e-Nutritionist platform, with the nutritionists' perception of

good patient acceptance of online nutritional care, and with a willingness to reduce the cost of remote consultations compared to face-to-face consultations.

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Teles ACSJ was responsible for the article conception, planning and design, project, review, data collection, analysis, interpretation, and development of the entire manuscript until its final review; Costa MGO contributed to the conception of the article, review, collection, analysis, interpretation, discussion of the data and critical review of the final manuscript; Santos PS contributed to the conception of the article and data collection; Costa ML and Poltronieri F contributed to the data collection, analysis, and interpretation, and critical review of the final manuscript; Netto RSM research advisor, participated in the idealization, conception and planning of the article, work supervision, data collection, analysis and interpretation, critical review of the final manuscript. All authors read and approved the final version.

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