

AnsT-19: Development and Validation of a Scale to Assess the Anxiety of Family Physicians during Teleconsultation

AnsT-19: Desenvolvimento e Validação de uma Escala de Avaliação da Ansiedade dos Médicos de Família em Teleconsulta

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ABSTRACT

Introduction: Following the outbreak of the disease caused by the novel coronavirus it was necessary to increase the non-face-to-face care activity through alternative means such as teleconsultation in primary health care. The adjustment to a type of remote consultation could have generated anxiety among family physicians. The main aim of the present study was to develop and validate a scale to assess the anxiety of family physicians during teleconsultation.

Material and Methods: Observational, cross-sectional study involving a sample of family physicians working in Portugal. An online survey that evaluated anxiety in teleconsultation was developed.

Results: A total of 359 valid responses were included in an exploratory factor analysis, after determining the number of factors to retain. A four-factor structure was detected with loadings ranging overall, from 0.44 to 0.98. Correlations between factors ranged from 0.42 to 0.58. Exploratory factor analysis results varied between good and very good fit, with chi-square/df result = 2.448, root mean square error of approximation (RMSEA) = 0.062 [90% CI = (0.053, 0.073)], root mean square of the residuals (RMSR) = 0.030 and Tucker Lewis index (TLI) = 0.931. Composite reliability was higher than 0.7 for all factors and average variance extracted was close or above 0.5 for the extracted factors, confirming convergent validity. McDonald's omega (ω) = 0.95 suggested the presence of a second-order factor, and thus a global measure for assessing anxiety during teleconsultation. Concurrent validity results were good, with correlations ranging from $r = -0.277$ to $r = -0.393$ with General Self-Efficacy scale (GSE) and $r = 0.302$ to $r = 0.547$ with Depression Anxiety Stress scales (DASS). Moderate correlations found between DASS and the dimensions of AnsT-19 suggest that AnsT-19 is capturing anxiety from the teleconsultation point of view. AnsT-19 factors and total score were significantly associated with gender, experience as a family doctor, psychotropic medication during the pandemic period and pre-pandemic experience of teleconsultation, indicating good construct validity. The limitations of the study are related to the convenience process, the use of an online survey and self-reported measurements.

Conclusion: AnsT-19 is a valid instrument to assess the anxiety of family physicians during teleconsultation.

Keywords: Anxiety; Physicians, Family; Portugal; Remote Consultation; Surveys and Questionnaires

RESUMO

Introdução: A doença provocada pelo novo coronavírus, aumentou a atividade de atendimento não presencial através de teleconsulta nos cuidados de saúde primários, o que pode ter sido motivo de ansiedade nos médicos de família. O principal objetivo da presente investigação foi desenvolver e validar uma escala de avaliação da ansiedade dos médicos de família durante a realização de teleconsulta.

Material e Métodos: Estudo observacional, transversal, de carácter descritivo. Foi aplicado um questionário *online* para avaliar a ansiedade de médicos de família em Portugal durante a realização de teleconsulta.

Resultados: Foi conduzida uma análise fatorial exploratória com inclusão de 359 respostas válidas depois de determinado o número de fatores a reter. Foi detetada uma estrutura fatorial de quatro fatores, com cargas fatoriais a variar entre 0,44 e 0,98. As correlações entre fatores variaram entre 0,42 e 0,58. Os resultados da análise fatorial exploratória indicaram um ajustamento bom ou muito bom, com o teste qui-quadrado/gl = 2,448, raiz do erro médio quadrático de aproximação (RMSEA) = 0,062 [90% IC = (0,053, 0,073)], raiz do erro médio quadrático residual padronizado (RMSR) = 0,030 e índice Tucker Lewis (TLI) = 0,931. A fiabilidade compósita foi superior a 0,7 em todos os fatores extraídos e a variância média extraída próxima ou superior a 0,5, confirmando validade convergente. O ómega de McDonald (ω) = 0,95 sugeriu a presença de um fator de segunda ordem, e assim uma medida global de ansiedade na teleconsulta. A validade concorrente foi considerada adequada, com correlações entre $r = -0,277$ e $r = -0,393$ para com a *General Self-Efficacy scale* (GSE) e entre $r = 0,302$ e $r = 0,547$ para com a *Depression Anxiety Stress scales* (DASS). As correlações moderadas encontradas entre a DASS e as dimensões da AnsT-19 sugerem que a AnsT-19 está a captar a ansiedade sob o ponto de vista da teleconsulta. Os fatores da AnsT-19, bem como o *score* total associaram-se com o género, experiência como médico de família, medicação psicotrópica durante o período pandémico e experiência pré-pandémica de teleconsulta, indicando boa validade de construto. As limitações do estudo estão relacionadas com o processo de amostragem por conveniência e recurso a um questionário *online* de auto-reporte.

Conclusão: O AnsT-19 é um instrumento válido para avaliar a ansiedade dos médicos de família durante a realização de teleconsulta.

Palavras-chave: Ansiedade; Consulta Remota; Inquéritos e Questionários; Médicos de Família; Portugal

INTRODUCTION

Following the outbreak of the disease caused by the new coronavirus, COVID-19, which led to a pandemic being declared on the 11th March 2020,¹ the Portuguese health-care system underwent considerable changes. As far as

primary health care (PHC) was concerned, it was essential to increase the non-face-to-face care activity, through alternative means, such as telemedicine (TM).²⁻⁴

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Telemedicine tools [teleconsultations (TC) and telemonitoring] support the remote provision of healthcare through the use of information and communication technologies.⁵ Telemedicine, within the scope of carrying out remote consultations, includes follow-up models ranging from telephone consultations (CT) to video consultations (VC).^{6,7}

The application of TC provides conditions to increase accessibility to consultations, minimizes the difficulty and increases equity in access to secondary care, thus reducing associated costs. It allows patients to remain in their homes as they receive care or manage their recovery/stable chronic diseases.⁸ Although the importance of TC in providing care in the context of the COVID-19 pandemic is not debatable, this type of consultation raises concerns among physicians who perform it.^{9,10} One of the most critical decisions that physicians must make in TC is the decision whether to carry out a subsequent face-to-face consultation. Other concerns are the absence of visual cues or lack of verbal communication on the CT and the inability to confirm the suspected diagnosis with physical examination.^{9,10} The awareness of the risk of failing to diagnose a potentially serious situation is also a major concern in TC, which sustains many of the fears in carrying them out.⁹

The deployment of TC in PHC has experienced exponential growth, precipitated by the challenges of confinement and social distancing, imposed by the COVID-19 pandemic.^{2,6,7} Physicians with experience in TC have less difficulty carrying out the physical examination and feel more confident and satisfied with the TC, but most family physicians had little or no experience in carrying out remote consultations before the pandemic.^{11,12}

The adjustment to a type of remote consultation, without the proximity of the user (a fundamental pillar of the doctor-patient relationship), in the middle of the pandemic (which causes an overload of work for healthcare professionals, to which the individual is not used to), can cause anxiety, which is an emotional state of heightened pressure, commonly characterized by physical symptoms.^{3,13-15} Anxiety related symptoms refer to functions of the cognitive, affective, behavioural and physiological systems, which generally act simultaneously.¹⁴ Hou *et al* investigated the gender differences associated with anxiety in situations of emotional stress.¹⁶ The authors concluded that biologically and socially, women are more susceptible to having higher levels of anxiety. Similar results were found in physicians.^{17,18} Higher levels of anxiety are related to short-term memory impairment and higher levels of distractibility during consultations.¹⁹⁻²¹

It seems that perceived self-efficacy (the belief or confidence that a person holds in his or her own ability to perform a particular task or solve a problem) predicts anxiety and behavior evicton.^{22,23} According to Bandura's Social

Cognitive Theory, in high social cognitive states, higher levels of self-efficacy correspond to lower levels of anxiety and greater capacity for coping, and this was later corroborated by other authors.²²

TC has become a vital piece in patient healthcare during the COVID-19 pandemic. This pandemic period represents the starting point for the acceptance of TC use as routine healthcare delivery, leading to important opportunities for progress.²⁴ Teleconsultation is essential for healthcare, not only during the pandemic but also afterwards.²⁵ The medical profession can generate high levels of anxiety, thus increasing the odds of medical errors.^{21,26} Therefore, it is important to identify factors that can increase the risk of developing anxiety among doctors. The available anxiety scales do not focus on TC as the process from which anxiety builds up, but rather on a more general approach. The aim of this study was to evaluate the anxiety in TC through the development and validation of a scale to assess the anxiety of family physicians during TC.

MATERIAL AND METHODS

We performed an observational, cross-sectional study. Our study involved a convenience sample of all family physicians (specialists and residents) working in mainland Portugal in Primary Health Care units and Local Health units (LHUs). The study protocol was approved by the Ethics Committee of Administração Regional de Saúde do Norte, I.P.

We created an online survey (developed by Google Docs Survey® technology), from September to November 2020, and sent it to the institutional email account of the coordinators of Primary Health Care units and Local Health units in Portugal. The survey data collection was performed between the 23rd July and the 6th August 2021. The participation was completely voluntary.

The survey consisted of 48 questions, 12 of which in the first section to evaluate sociodemographic characteristics (age, gender, workplace, years of work as a family doctor, years of work in the current workplace, frequency of use of telemedicine tools before and during the pandemic, use of psychotropic drugs before and the during the pandemic) and 36 questions, in the second section, concerning assessment of anxiety during the teleconsultation and general self-efficacy.

The second section was divided in three parts: assessment of anxiety in the teleconsultation, assessment of the respondent's anxiety using a validated scale [anxiety scale (AS) part of the Depression Anxiety Stress scale (DASS)] and assessment of the respondent's self-efficacy using a validated scale for the Portuguese population [General Self-Efficacy scale (GSE), adapted from the GSE, developed by Ralf Schwarzer and Matthias Jerusalem].²⁷⁻²⁹

The assessment of anxiety in the teleconsultation consists of 19 items, evaluated by the Likert scale, and integrates symptoms of the cognitive, affective, behavioural, and physiological systems. This question was developed based on a literature review and probed views of 13 family physicians, with between seven and 41 years of professional experience, about TC.

The AS part of DASS is a seven-item self-reported questionnaire that evaluates anxiety during the previous week on a 4-point scale (0: "It didn't apply to me"; 1: "It applied to me a few times"; 2: "It applied to me many times"; 3: "It applied to me most of the time"). The total score is calculated by the sum of the scores of the seven items. A higher score corresponds to a more negative anxiety state.

The GSE aims to assess the general feeling of personal competence to deal with stressful situations, and it's composed of 10 questions. For each item, the inquired person must assign a level of agreement, using a 4-point scale (1: "Not at all true"; 2: "Hardly true"; 3: "Moderately true" and 4: "Exactly true").

Statistical analysis

Statistical analyses were performed with R 4.4.1. The packages used included [psych] and [GPArotation]. For descriptive statistics we used frequencies (n) and percentages (%).

The decision regarding the number of factors to extract was based on the Kaiser-criterion (*eigenvalue* > 1), parallel analyses and very simple structure (VSS). Exploratory factor analysis (EFA) was used to determine the factorial structure of the AnsT-19 scale. Loadings were obtained with oblimin rotation, admissible when factors are expected to be correlated. Loading's criterion was higher than 0.45 and total explained variance was acceptable if higher than 50%. EFA fit was assessed following the recommendations of Hu and Bentler³⁰ with chi-square/degrees of freedom, acceptable when lower than 3, the root mean square error of approximation (RMSEA), acceptable when lower than 0.07 the root mean square of the residuals (RMSR) acceptable for lower than 0.05 and the Tucker Lewis index of factoring reliability (TLI), acceptable when higher than 0.9. Convergent validity was assessed with average variance extracted (AVE), acceptable when higher than 0.5 and composite reliability (CR) acceptable when higher than 0.7.³¹ McDonald's omega (ω) was calculated to assess the feasibility of a second order model, considering as acceptable results of $\omega > 0.8$.

Pearson correlations were calculated to assess concurrent validity. T-tests and ANOVAs were used to assess construct validity. For independent variables "gender" (male/female), "current consumption of psychotropic medication" (yes/no) and "pre-pandemic experience of teleconsultation"

Table 1 – Sample characteristics

	n	%
Sex		
Female	272	75.8%
Male	87	24.2%
Age		
≤ 30 years	66	18.4%
30 - 35 years	106	29.5%
36 - 45 years	93	25.9%
46 - 55 years	37	10.3%
≥ 56 years	57	15.9%
Place of work		
Unidade de Saúde Familiar (USF)	283	78.8%
Unidade de Cuidados de Saúde Personalizados (UCSP)	68	18.9%
Unidade Local de Saúde (ULS)	8	2.2%
Experience as a family doctor		
≤ 4 years	86	24.0%
5 - 10 years	122	34.0%
11 - 20 years	74	20.6%
21 - 30 years	28	7.8%
≥ 31 years	49	13.6%
Experience working at the same place		
≤ 4 years	182	50.7%
5 - 10 years	84	23.4%
11 - 20 years	60	16.7%
21 - 30 years	11	3.1%
≥ 31 years	22	6.1%
Pre-pandemic psychotropic medication		
No	317	88.3%
Yes	37	10.3%
Do not want to answer	5	1.4%
Previous psychotropic medication		
No	248	69.1%
Yes	105	29.2%
Do not want to answer	6	1.7%
Pre-pandemic teleconsultation experience		
No	308	85.8%
Yes	51	14.2%
Teleconsultation in the last week		
No	40	11.1%
Yes	319	88.9%
Teleconsultation using voice devices (e.g. telephone)		
Never	0	0.0%
Rarely	0	0.0%
Ocasionalmente	4	1.1%
Frequently	60	16.7%
Always	295	82.2%
Teleconsultation using video + voice devices (e.g. computer/tablet)		
Never	339	94.4%
Rarely	15	4.2%
Ocasionalmente	5	1.4%
Frequently	0	0.0%
Always	0	0.0%

(yes/no) *t*-tests were used to assess the statistical significance and Cohen's *d* to measure the effect size. For independent variable "experience as a family doctor", ANOVA tests were used to assess statistical significance and eta squared (η^2) to measure the effect size.

Significance was considered for $p < 0.05$.

RESULTS

A total of 381 family physicians answered the questionnaire, from which 22 were excluded because they had not performed TC during the pandemic. The total number of valid responses was 359 (94.2%). Most family physicians were females (75.8%) and worked at LHUs. Table 1 shows other sample characteristics.

First, we present the results regarding the assessment of the psychometric properties of AnsT-19.

Exploratory factor analysis (EFA) was performed to propose a factorial structure for AnsT-19. The number of factors to retain was determined by comparing results gathered from three different approaches: the Kaiser criterion, that includes all factors with eigenvalue greater than 1, parallel analysis, that uses random simulated data to compare with the eigenvalues of the original data and very simple structure (VSS) in which all loadings lower than the maximum loading (of an item to a factor) are suppressed to zero, forcing a particular factor model to become more interpretable and clearly distinguished.

Kaiser-criterion results suggested a three-factor extraction with *eigenvalues* of 8.64 (1st factor), 1.47 (2nd factor), 1.06 (3rd factor) and a potential 4th factor with *eigenvalue* equal to 0.96, parallel analysis suggested a two-factor solution and VSS a four-factor solution (Fig. 1).

Because the four-factor solution was theoretically more admissible and was supported both by the VSS analysis and the Kaiser criterion (*eigenvalue* of the 4th was very close from the criterion > 1) a four-factor model was selected as the best choice.

Figure 2 shows the structural diagram for AnsT-19, loadings and correlations obtained with EFA. Oblimin rotation was considered due to theoretical assumptions of moderate to strong correlations between factors. For details on each item see the questionnaire in Appendix 1 (Appendix 1: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/18175/15028>).

AnsT-19 was divided into four different factors. The first factor was labelled "cognitive and emotional interference" (CEI), because it included the perceptions of medical doctors about the cognitive and emotional interferences of preparing, executing, and coping with technical difficulties of the teleconsultation. The second factor was labelled "distractibility" because it was related with difficulties of concentration and distractions during teleconsultation. The third factor was labelled "difficulties of physical exploration" (DFE) and it included items that evoked the challenges of not being able to perform the patient's physical examination. Finally, "changes in sleep pattern" (CSP) was related with difficulties of maintaining adequate levels of sleep and rest during the period in which teleconsultation was being performed.

Cognitive and emotional interference (CEI) loadings of its 12 items ranged from 0.44 to 0.81. Distractibility was composed of three items and loadings ranged from 0.56 to 0.98. Difficulties of physical examination (DFE) comprised a two items factor and loadings were 0.76 and 0.86. Finally, changes in sleep pattern (CSP), also a two-item factor, had loadings of 0.58 and 0.86. Correlations between factors ranged from 0.42 to 0.58. Overall, loadings and correlations were considered as good psychometric indicators for this structure solution.

Appropriate fit measures for EFA were calculated. The chi-square/degrees of freedom result was 2.448 (< 3). The root mean square error of approximation (RMSEA) was 0.062 (< 0.7) with 90% CI = [0.053, 0.073], the root mean square of the residuals (RMSR) was 0.030 (< 0.05) and the Tucker Lewis Index of factoring reliability (TLI) was 0.931 ($>$

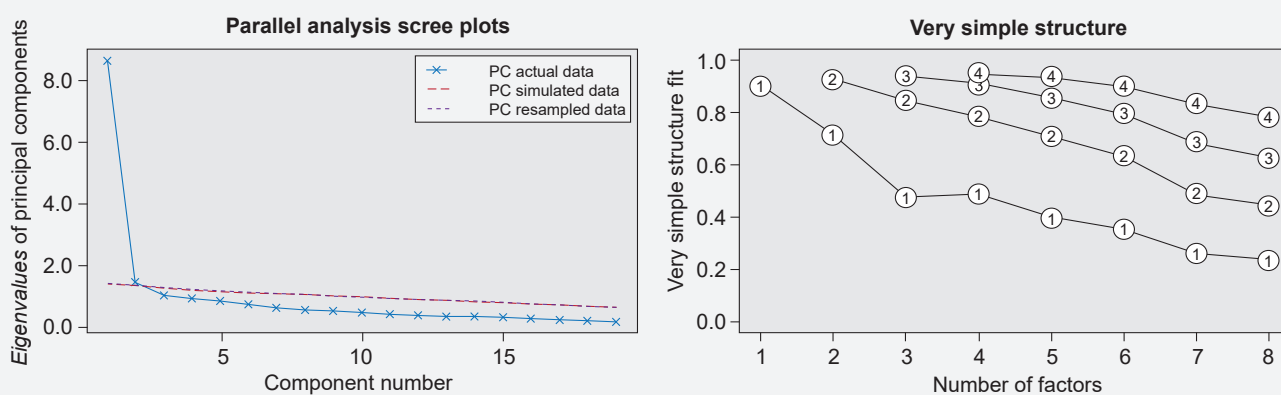


Figure 1 – Parallel analysis and VSS for factor extraction

0.9), all within the boundaries of good to very good fit.

Results of convergent validity showed composite reliability (CR) above 0.7 for all factors. Average variance ex-

tracted (AVE) was close or above 0.5 for the extracted factors. These results confirmed the existence of convergent validity for AnsT-19 (Table 2).

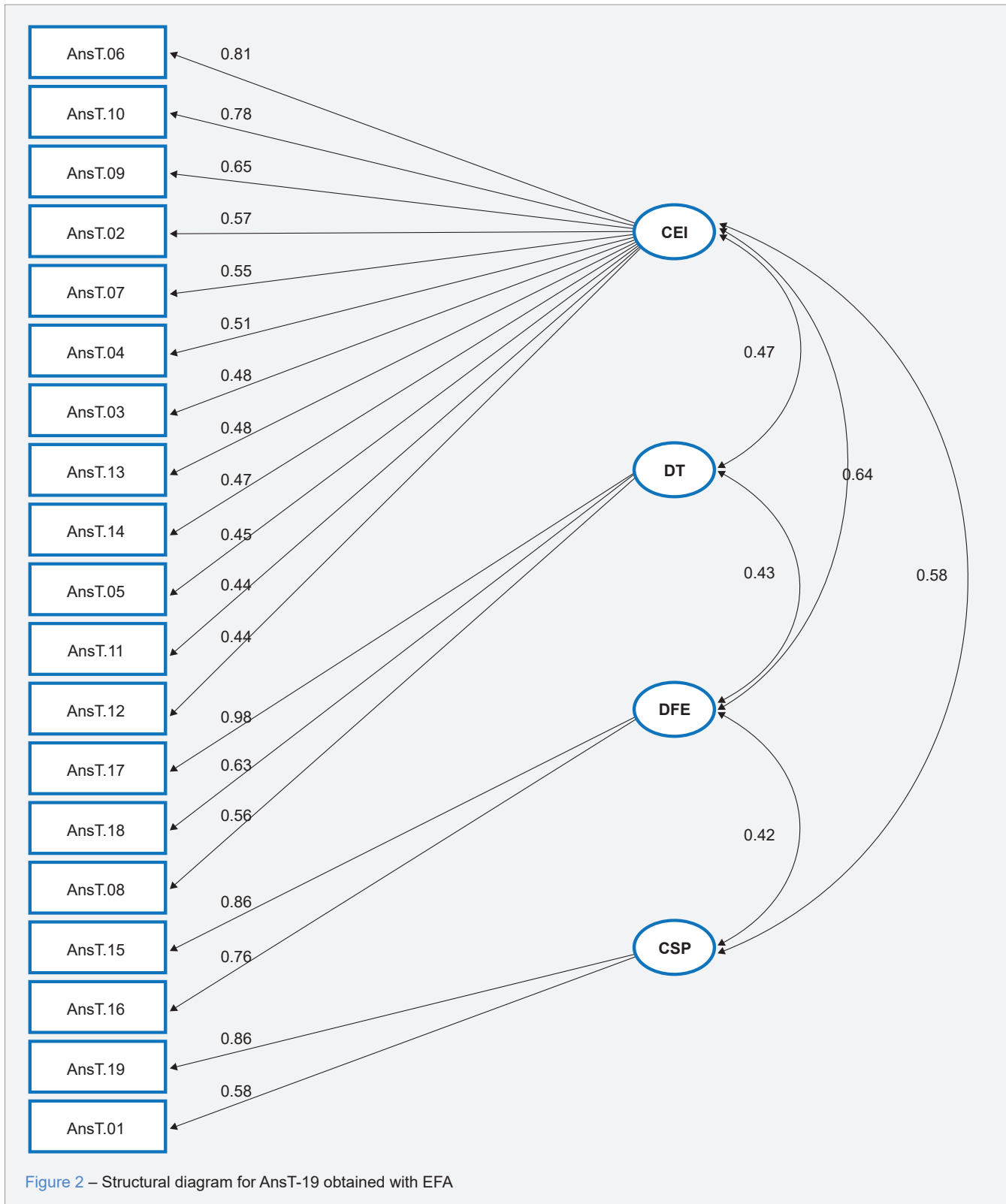


Figure 2 – Structural diagram for AnsT-19 obtained with EFA

Table 2 – Convergent validity

	Cumulative explained variance	Composite reliability	Average variance extracted
CEI	0.254	0.857	0.750
DT	0.363	0.909	0.457
DFE	0.477	0.853	0.660
CSP	0.561	0.747	0.597

Additionally, McDonald's omega (ω) was calculated to assess the feasibility of a second order model, considering the existence of a global factor labelled "anxiety in teleconsultation" (AnsT). McDonald's omega (ω) result of 0.95 (> 0.8) and loadings of each factor with the second-order factor AnsT were 0.968 (CEI), 0.712, 0.793 (DFE) and 0.711 (CSP) suggested excellent feasibility for considering AnsT-19 as a global measure for assessing anxiety in teleconsultation.

As for the results of concurrent validity, each factor of AnsT-19 and the global measure of anxiety in teleconsultation (AnsT) were computed as observed variables by calculating the mean of their items.

Two other scales were included for this analysis. The GSE and the DASS, that in this study only included the dimension of anxiety. Reliability results for these two scales, assessed with Cronbach's alpha, were 0.895 and 0.882, respectively, suggesting very good reliability.

Table 3 shows that correlations between AnsT-19 factors and AnsT-19 global score (AnsT) with the measure of GSE were negative as expected, ranging from $r = -0.277$ to $r = -0.393$. Correlations between AnsT-19 factors and AnsT-19 global score (AnsT) with the anxiety dimension of DASS were positive, ranging from $r = 0.302$ to $r = 0.547$.

As for construct validity it was assessed by responding to four hypotheses: anxiety in TC is associated with gender (H1), anxiety in TC is associated with experience as a family doctor (H2), anxiety in TC is associated with psychotropic medication during the pandemic period (H3) and anxiety in TC is associated with pre-pandemic experience of telecon-

sultation (H4).

Fig. 3 shows the mean results of each factor and the corresponding p -value and effect size for the association with each independent variable.

Anxiety in TC was associated with the female gender, namely for cognitive and emotional interference (CEI), $p = 0.016$ ($d = 0.30$), difficulties of physical exploration (DFE), $p < 0.001$ ($d = 0.42$), changes in sleep pattern (CSP), $p = 0.003$ ($d = 0.38$) and the total score of anxiety in teleconsultation (AnsT), $p < 0.001$ ($d = 0.35$) (Fig. 3).

Anxiety in TC was associated with less experienced family physicians for factors of distractibility, $p < 0.001$ ($\eta^2 = 0.08$) and difficulties of physical examination (DFE), $p < 0.001$ ($\eta^2 = 0.07$). Associations were also found for cognitive and emotional interference (CEI), that peaks at 21 - 30 years of experience, and then drops for 30 years or more, $p < 0.001$ ($\eta^2 = 0.05$), changes in sleep pattern, that increase linearly until 21 - 30 years of experience and then decrease for the most experienced family physicians, $p < 0.001$ ($\eta^2 = 0.04$), and for the overall findings regarding anxiety in teleconsultation (AnsT), revealing an equilibrium among all age groups until 21 - 30 years of experience, and then a lower result for the most experienced family physicians, $p < 0.001$ ($\eta^2 = 0.06$) (Fig. 3).

Associations with psychotropic medication during the pandemic period showed that there was an association between family physicians that took this type of medication and higher levels of cognitive and emotional interference (CEI), $p < 0.001$ ($d = 0.49$), distractibility, $p < 0.001$ ($d = 0.24$), difficulties of physical examination (DFE), $p <$

Table 3 – Pearson correlations of AnsT-19 with EAG and EADS anxiety

Measures	M	SD	Pearson correlations						
			1	2	3	4	5	6	7
1 CEI	2.18	0.70	1	0.608***	0.675***	0.580***	0.968***	-0.364***	0.542***
2 DT	2.35	0.84		1	0.519***	0.372***	0.732***	-0.316***	0.302***
3 DFE	2.75	0.98			1	0.429***	0.764***	-0.323***	0.332***
4 CSP	2.28	1.01				1	0.676***	-0.277***	0.524***
5 AnsT	2.28	0.68					1	-0.393***	0.547***
6 EAG	29.94	4.12						1	-0.407***
7 EADS anxiety	2.98	3.57							1

***: $p < 0.001$

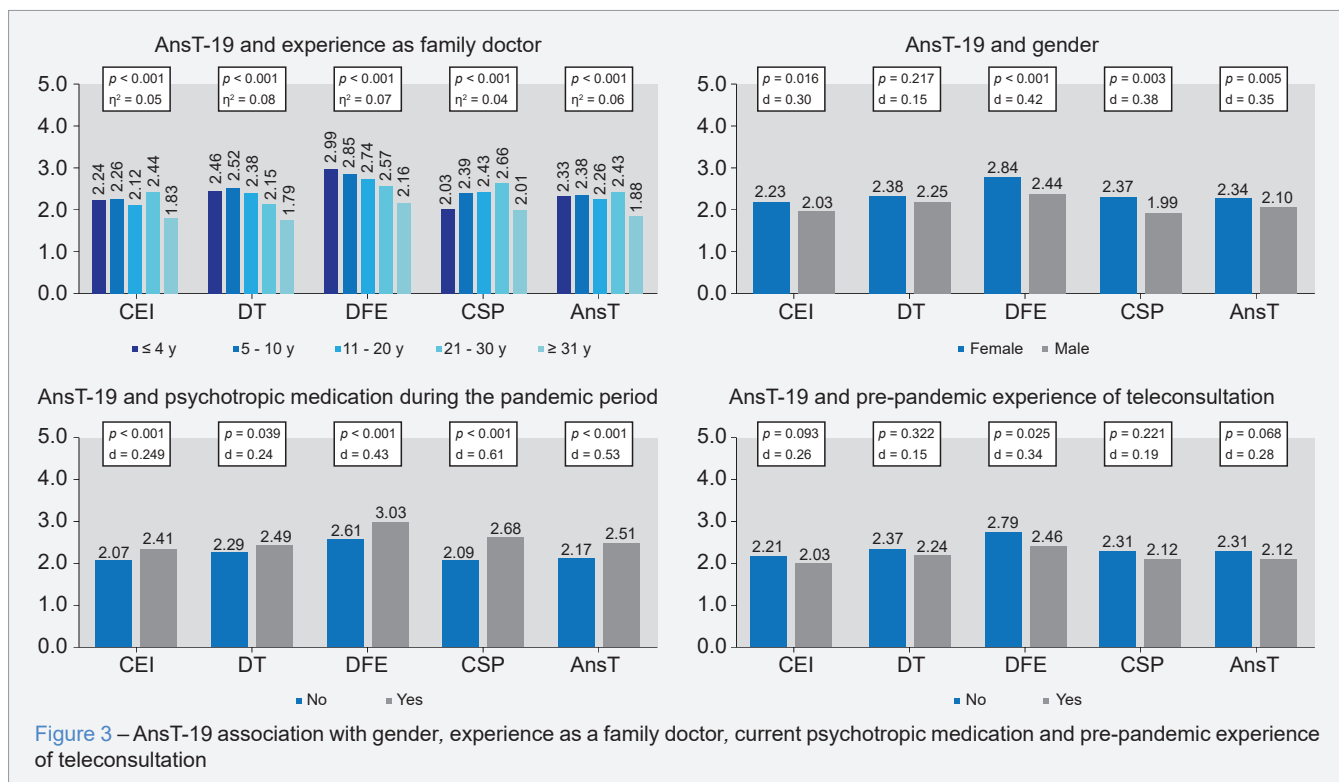


Figure 3 – AnsT-19 association with gender, experience as a family doctor, current psychotropic medication and pre-pandemic experience of teleconsultation

0.001 ($d = 0.43$), changes in sleep pattern (CSP), $p < 0.001$ ($d = 0.61$) and global anxiety in teleconsultation (AnsT), $p < 0.001$ ($d = 0.53$) (Fig. 3). We also checked for associations with pre-pandemic psychotropic medication, with no statistically significant results. Finally, associations with pre-pandemic experience in TC showed that family physicians with this type of experience were less prone to perceiving difficulties of physical exploration (DFE), $p = 0.025$ ($d = 0.34$); no differences were found for the other factors or for the total score (Fig. 3).

Considering the results obtained for hypothesis H1, H2, H3 and H4, AnsT-19 proved to be a discriminative measure, confirming construct validity.

DISCUSSION

Before the pandemic period most family physicians were not experienced in performing TC.^{2,6,7} Our study corroborates this finding, with most family physicians having no experience in TC in the pre-pandemic period. During the pandemic period, the need to use TC increased very rapidly, and TC became an important tool in clinical practice. In our sample, 359 (94.2%) of the 381 doctors had performed TC in the previous week.

Adjusting to TC involves reducing the proximity to the patient, a basic pillar of the doctor-patient relationship, which can cause difficulties and anxiety.^{3,15,32} The main purpose of the present study was to develop and validate a scale to assess the anxiety of family physicians in performing TC using a sample of family physicians from Portugal. In our sample, findings from EFA indicated that AnsT-19 was divided into four different factors: cognitive and emotional interference (CEI), distractibility, difficulties of physical ex-

amination (DFE), and changes in sleep pattern (CSP).

Cognitive processes influence the quality of the clinical decision-making process.³³ Hence, cognitive interference can have an impact in the decision making process, and ultimately influence clinical outcomes.³³ Moreover, clinical decisions are often made in contexts of emotionally challenging situations and require the ability to control emotions (own and others') and thus have an impact in the quality and safety of patient care.³⁴ Because cognitive processing can be influenced by emotions, especially when decisions involve conflict or anger, both emotion and cognition are engaged in clinical decision making and can influence clinical outcomes.^{35,36} In this way, the first identified factor refers to the anxiety component associated with cognitive and emotional interference felt by family physicians in the context of TC.

The difficulty to ignore task-irrelevant stimuli, in other words, distractibility, causes longer medical appointments and increases diagnostic errors.³⁷ Distractibility and diagnostic errors are associated with having less clinical experience and increased degree of clinical complexity.²¹ In the context of TC there are many distracting factors, such as patient environment, interruptions caused by calls, text messages, e-mails and app notifications associated with the use of smartphones. These sources of distraction increase the distractibility of physicians and potentially lead to patient care errors.³⁸ Therefore, the second identified factor concerns the anxiety component associated with distractibility of physicians during TC.

The inability to confirm a suspected diagnosis with physical examination is one of the main concerns about teleconsultation.¹⁰ Visual messages and non-verbal

communication contribute more than 50% to an adequate clinical history, and facilitate physical examination.^{10,39} The absence of a physical examination is a threat to patient safety as the probability of diagnostic errors is increased. The emphasis on history and eventually some point of care tests in TM without physical examination decreases the odds of reaching a clinical diagnosis.^{40,41} Hence, the third identified factor was the anxiety component related with difficulties that physicians experienced regarding physical examination of patients during TC.

The COVID-19 epidemic increased the prevalence of psychological symptoms, such as anxiety, depression, fear, anger, and stress.⁴² It is well established that stress is one of the major causes of sleep disturbances in doctors.^{43,44} An increase of 23.6% in the prevalence of sleep disorders was reported in COVID-19 medical staff, a higher prevalence than in other community groups.⁴⁴ Therefore, the fourth and last factor identified refers to the anxiety component associated with changes in sleep pattern felt by family physicians in the context of TC.

Regarding concurrent validity, AnsT-19 factors and total score were positively correlated with the anxiety dimension of DASS and negatively associated with the measure of GSE suggesting good concurrent validity. Correlations of DASS with other anxiety measures have shown similar results, namely the Beck Anxiety inventory (BAI) and the State-Trait Anxiety inventory (STAI).^{45,46} Correlations of GSE with other anxiety measures have also shown similar results, i.e. Hospital Anxiety and Depression scale (HADS) and slightly higher results with DASS in the study of Hussien.^{20,47} Moderate correlations found between DASS and the dimensions of AnsT-19 lead us to believe that AnsT-19 is capturing anxiety from the teleconsultation point of view. Therefore, AnsT-19 seems to have good concurrent validity which corroborates previous studies that showed that AnsT-19 is an instrument with good psychometric properties to assess anxiety in TC.

Construct validity was assessed by responding to four hypotheses. Regarding the association with gender (H1), female physicians had increased scores of anxiety in TC, namely for cognitive and emotional interference (CEI), difficulties of physical examination (DFE), changes in sleep pattern (CSP), and for the total score of anxiety in teleconsultation (AnsT). This result is consistent with previous studies in physicians namely McLean, Baptista *et al* and Pandey *et al*.¹⁷⁻¹⁹

Considering the experience as a family doctor (H2), our data showed that anxiety was higher in less experienced family physicians, as suggested by previous studies.^{17,18,48} On the other hand, our results did not support the findings of the study by Demirgan *et al*¹¹ that suggested the anxiety level of physicians is not influenced by working experience.

In our study, less experienced family physicians had higher scores of anxiety related with distractibility and difficulties of physical examination (DFE). Regarding cognitive and emotional interference (CEI), our results showed that this score reaches its highest within the 21 - 30 years of experience, decreasing afterwards. Similarly, anxiety in teleconsultation overall results (AnsT) had a lower result for the most experienced family physicians. These results can be justified by the increased workload of young doctors, that undergo strenuous medical training and to their lack of experience regarding the use of coping strategies.^{17,18,48}

Associations with psychotropic medication (H3) showed that family physicians that took psychotropic medication during the pandemic period had higher levels of cognitive and emotional interference (CEI), distractibility, difficulties of physical examination (DFE), changes in sleep pattern (CSP), and global anxiety in teleconsultation (AnsT). No associations were found for psychotropic medication in the pre-pandemic period. Our results corroborate previous findings showing that essential workers faced higher rates of stress during the pandemic period and were more likely to increase the use of psychotropic medication.⁴⁹ To our knowledge our study was the first to demonstrate this association in the context of TC.

Finally, pre-pandemic experience of TC (H4) was associated with less perceived difficulties regarding physical examination (DFE). No differences were found for the other factors or for the total score. Previous research indicates that doctors with pre-pandemic experience in TC had a more positive perspective on TC.¹¹ Training in TC has been previously associated with higher confidence on performing a limited physical examination via telephone and with satisfaction towards TC.¹² Hence, our results and previous reports suggest that training in TC is an important tool to overcome assessment difficulties with physical examination.

AnsT-19 factors and total score associations with gender, experience as a family doctor, psychotropic medication, and pre-pandemic experience of TC support construct validity.

All fit measures were, at the very least, accomplishing the necessary criteria. In particular, McDonald's omega (ω) suggested the feasibility of a global measure of anxiety in TC. Every result obtained in this study suggested that AnsT-19 is a good instrument to assess anxiety in TC for family physicians.

The limitations of the study are related to the convenience process that reduces generalisability. Including doctors from other specialties besides family physicians and repeating the study in a post-pandemic period could reveal additional anxiety responses to TC.

Being a cross-sectional study, it was not possible to

establish causality between variables, namely between the use of psychotropic drugs and anxiety related to consultation. The use of an online survey for data-collection and self-reported measurements can have an impact on obtaining the true scores of the assessed variables.

The results in this scale would always need to be compared with anxiety results in face-to-face consultations during the peak pandemic periods to allow for any type of comparison of face-to-face *versus* TC.

Future studies should also compare AnsT-19 and other COVID-19 related anxiety measures (e.g., Taylora, Landryb, Paluszkeb, Fergusc, McKayd and Asmundsonb).⁵⁰

In terms of clinical implications, the detection of high anxiety levels among family doctors during TC can contribute to the reduction of the sources of anxiety assessed with AnsT-19, namely technical difficulties, reduction of distractibility, reduction of physical examination and sleeping disorders. This is, to the best of our knowledge, the first assessment of anxiety in family physicians during TC in Portugal.

CONCLUSION

AnsT-19 is valid instrument to assess the anxiety of family physicians during teleconsultation. The development of a validated scale for the evaluation of family physicians' anxiety in performing teleconsultation (AnsT-19) can help identify anxiety in physicians both during the pandemic period and in the post-pandemic period, and it could become an important resource in planning teleconsultations.

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AUTHOR CONTRIBUTIONS

ACB: Writing of the manuscript, conception of questionnaires, data collection, final review.

AIC: Writing of the manuscript, conception of questionnaires, data collection.

SG: Writing of the manuscript, conception of questionnaires.

RD: Conception of questionnaires, final review.

EM: Writing of the manuscript, statistical analysis.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

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