

## Research Article

# Anxiety in Patients Undergoing Endoscopic Procedures: Identifying People at Risk

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**Abstract**

**Background:** Endoscopic examination, like colonoscopy and Esophagogastroduodenoscopy (EGDS), can have adverse psychological effects like anxiety. It is known that any examination can cause anxiety and worry, sometimes so much as to avoid the exam itself, and it is known that anxiety for one's own health can lead to continual recourse to the doctor and diagnostic examinations.

**Goals:** To assess the impact of endoscopic examination on anxiety levels of patients, and look for associations between levels of state and trait anxiety and different variables, in order to identify people most at risk of developing complications.

**Study:** We recruited 400 patients waiting to undergo endoscopic examination. Anxiety levels were obtained after administration of the test State-Trait Anxiety Inventory (STAI S and T form) for the evaluation of trait and state anxiety.

**Results:** Patients who undergo an invasive examination have higher anxiety levels than the general population, especially women and those who perform EGDS. The highest levels of anxiety can be seen in patients who undergo the examination in the presence of a specific symptom, rather than as a screening.

**Conclusion:** Endoscopic examinations cause a significant increase of anxiety. Moreover, the analysis of the different variables considered, suggests a typology of patients most at risk in the performance of the procedures. This will allow greater selectivity of preventive interventions for patients with an anxiety disorder. Also, the doctor should do a careful assessment of the patient before requiring an endoscopic examination, to determine if they belong to those subgroups most at risk for anxiety disorders and complications.

**Keywords:** Anxiety; Endoscopic examination; Colonoscopy; EGDS

## Introduction

Esophagogastroduodenoscopy (EGDS) and colonoscopy are frequently used to diagnose and treat many gastrointestinal diseases. However, these procedures may cause some difficulty for patients such as pain, tachycardia, and, in some cases, even a temporary desaturation [1,2]. All these difficulties may have a significant psychological impact on the patient and may cause an increase in anxiety levels [3-5].

The possibility of preventing or alleviating anxiety during the endoscopic examination is important, not only for the discomfort in itself, but also because the anxiety may prolong the time of examination and increase the likelihood of side effects [6]. In addition, high levels of anxiety in patients with gastrointestinal disorders may cause a refusal to accept medical care and result in a real phobia of examinations [7,8].

It was found that patients undergoing EGDS had significantly higher anxiety levels (34%) and used psychiatric drugs more frequently than those who underwent colonoscopy [9].

Moreover, some studies [10-15] reported that patients who

participate in screening programs, such as colonoscopy, have high levels of anxiety. For some people simply receiving an invitation to participate in a screening test that involves EGDS or colonoscopy can induce anxiety [16].

Many risk factors have been associated with high levels of anxiety [9-18]. Jones et al. identified different variables related to low levels of anxiety: male gender, having already performed endoscopic examinations, low education, low income and advanced age [17]. Miles [19] focuses on patients with a family history of gastrointestinal cancers. If family occurrence is low or intermediate patients often are not very disposed to do tests because they feel good and they are afraid of being "sick". Instead, those who have a strong family history, for example having a first-degree relative with a gastrointestinal cancer, are more inclined to do the screening exams [19].

Wardle confirmed that relatives of cancer patients have higher anxiety levels than controls when they have to do screening exams, which means that, on one hand they should do periodic and preventive instrumental investigations, on the other hand and their high anxiety levels may lead to avoidance of the examination [20].

All these studies highlight the importance of the psychological

reactions that an invasive examination such as the colonoscopy or EGDS may cause and try to identify factors associated with higher levels of anxiety to predict and avoid negative events for the patient.

Different approaches can be used to reduce anxiety during the endoscopy, ranging from the use of information material to relaxation techniques [21,22].

From these findings it's important to investigate the impact of endoscopic exams on the patients and help clinicians to better identify patients at risk of having complications.

The aims of this study were to assess the impact of endoscopic examination on anxiety levels of patients and looking for associations between levels of state and trait anxiety and different variables, such as gender, different symptoms presented, demographic data, medical history and the type and number of exams performed, in order to identify people most at risk to develop complications.

## Materials and Methods

### Sample

We recruited outpatients consecutively admitted to the ambulatory endoscopic surgery unit at the University Hospital "Policlinico-Vittorio Emanuele" of Catania. Patients were interviewed immediately before the start of EGDS or colonoscopy procedures.

**Inclusion criteria:** Men and women aged between 18 and 75 years inclusive, no current or lifetime history of psychiatric disorder.

**Exclusion criteria:** Unable to communicate in Italian, taking anti-anxiety drugs in the last 72 hours, dementia, any history of psychiatric disorders, examination performed in emergency, previous endoscopy with conscious sedation.

All patients recruited were informed about the aim of the study by one of the investigators and then they provided written informed consent for participation in the study. The study protocol was approved by the ethical board of the University Hospital "Policlinico-Vittorio Emanuele" of Catania.

### Assessment tools

Patients were given, by one of the investigators, a questionnaire on demographic data, family history, use of psychotropic drugs, performance of previous endoscopies, there a son why the examination was performed: specific symptoms, screening, follow - up. The history of psychiatric disorder was evaluated with the Mini-International Neuropsychiatric Interview (M.I.N.I.) [23].

In addition, the State Trait Anxiety Inventory (STAI S and T) [24], were used to evaluate, respectively, state and trait anxiety. These tests began to be developed around 1964 and were initially designed as a single instrument to measure both anxiety trait and anxiety status. Through the years, the difficulties encountered in measuring the two types of anxiety in a single test, led to the development of two tests, one for each type of anxiety. This led to the two sub-scales STAIT-Anxiety Scale (Form X-2) and STAIS-Anxiety Scale (Form X-1). The two sub-scales are each composed of 20 items, of which only 5 meet the criteria of validity for both. The items are valued based on a 4-point scale (1 to 4) corresponding to the "Form X-1", to: Not at all, A little, somewhat and Very much, and, for the "X-2 Form" to: Hardly ever, Sometimes, Often and Almost always [25].

**Table 1:** Socio-demographic and clinical characteristics of the sample.

|                             | N (%)       |
|-----------------------------|-------------|
| N° Patient                  | 400 (100%)  |
| Males                       | 191 (47.7%) |
| Mean age                    | 53,9 ± 14,7 |
| N° Colonoscopies            | 253 (63.3%) |
| N° EGDS                     | 147 (36.7%) |
| History of anxiety disorder | 169 (42%)   |
| Use of psychotropic drugs   | 107 (26.7%) |
| Marital status              |             |
| Single                      | 68 (17%)    |
| Married                     | 315 (78.8%) |
| Separated/widowed           | 17 (4.2%)   |
| Education                   |             |
| Illiterate                  | 12 (3%)     |
| Primary school              | 69 (17.2%)  |
| Secondary school            | 102 (25.5%) |
| High school                 | 142 (35.5%) |
| Degree                      | 75 (18.7%)  |
| STAI - X1 ± DS              | 46,3 ± 11,9 |
| STAI - X2 ± DS              | 39,9 ± 10,7 |

**Table 2:** Colonoscopy vs EGDS.

|         | Colonoscopy (n=253) | EGDS (n=147)  | p      |
|---------|---------------------|---------------|--------|
| STAI-X1 | 45.49 ± 1.609       | 47.82 ± 2.017 | 0,3756 |
| STAI-X2 | 38.16 ± 1.337       | 43.00 ± 1.949 | 0,0380 |

**Table 3:** Anxiety and screening.

|         | As screening (n=76) | Not as screening (n=324) | p      |
|---------|---------------------|--------------------------|--------|
| STAI-X1 | 38.82 ± 2.460       | 48.10 ± 1.368            | 0,0034 |
| STAI-X2 | 33.00 ± 2.410       | 41.55 ± 1.204            | 0,0026 |

### Statistical analysis

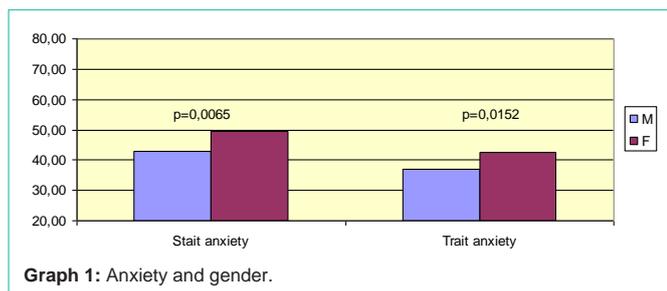
All statistical analyses were performed using the PASW Statistics 18 program. For the statistical analysis of data related to tests STAI-X1 and STAI-X2, which are parametric and have a Gaussian distribution, we used the t-test for unpaired data to determine if the differences in the various groups considered are significant or not.

## Results

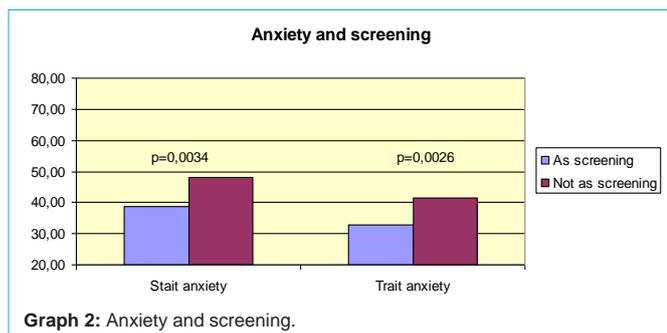
A total of 415 outpatients were interviewed, of which 21 were excluded: 8 for taking anti-anxiety medication in the 72 hours before, 2 for not speaking Italian well, 5 for history of previous endoscopy with conscious sedation. 400 patients were enrolled, 191 males and 209 females. The mean age was 53.9 (±14.7) years of the 400 endoscopic examinations performed, 253 (63.3%) were colonoscopies and 147 (36.7%) EGDS.

The mean values of the tests obtained are 46.3±11.9 for the STAI-X1 and 39.9±10.7 for the STAI-X2, indicating positivity for the state anxiety and values at the upper limits of normality for the trait anxiety (Table 1).

The STAI-X1 was positive in 62.2% of the subjects, and the



Graph 1: Anxiety and gender.



Graph 2: Anxiety and screening.

STAI-X2 in 45.5%. These values are above the expected average for the general Italian population according to ESEMeD [26], the life time and last twelve months prevalence for anxiety disorders are respectively 11.1% and 5.1%.

Regarding anxiety level, there was no significant difference for state anxiety in the colonoscopy and EGDS groups although the values are high in both (Table 2), but for trait anxiety the values are significantly higher among patients who undergo to EGDS.

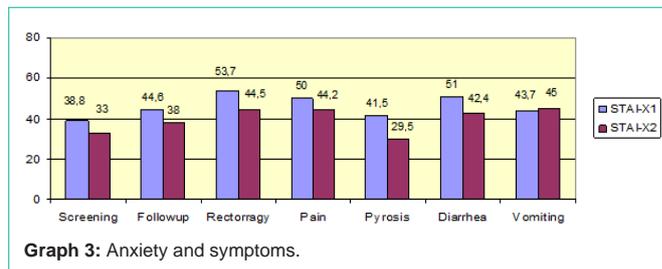
Looking at gender differences (Graph 1), in our group females had significantly higher levels of both state and trait anxiety than men, 70.2% of women in our group tested positive on the STAI-X1, and 53.1% on the STAI-X2, which were significantly higher than the corresponding male values (53.4% and 37.2%).

These percentages are higher than the epidemiological data provided by ESEMeD [26], according to which the prevalence of anxiety disorders in men is 5.5% and 16.2% in women.

Some studies [13,14] have found that having done endoscopy in the past could be a protective factor, but our study didn't confirm that finding as there weren't significant differences between who had done previous endoscopic examination or not.

The anxiety levels of asymptomatic participants undergoing screening were compared with those who were undergoing a disease related investigation. The average values of the tests were positive only for the latter, especially the values of state anxiety (Table 3) (Graph 2). Those who underwent the endoscopic examination as a screening test had significantly lower levels of anxiety.

In order to understand if there is any relation between levels of anxiety and gastrointestinal symptoms, patients were grouped according to different categories, namely pain, rectorrhagia, pyrosis, diarrhea, vomiting and follow-up plus a control group of asymptomatic patients who performed the examination as a screening. Subsequently we assessed the levels of anxiety in relationship to



Graph 3: Anxiety and symptoms.

each symptom. Remembering that all symptomatic patients have positive values stand out those with "rectorrhagia" (53.7) followed by "diarrhea" (51.0) and "pain" (50.0). Results at upper limit values of anxiety were asymptomatic patients who performed the exam as "screening" (38.8). For the anxiety as a personality trait, the most anxious patients are those with "vomiting" (45.0), followed by those with "rectorrhagia" (44.6), "diarrhea" (44.3) and "pain" (42.4), while negative values were obtained for all the other symptoms (Graph 3).

## Discussion

The study confirmed that the execution of colonoscopy and EGDS is associated with high levels of anxiety [12]. We noted a high prevalence of positive results for state anxiety (62.2%) related to examination. Also, the finding of high values for the trait anxiety (42.5%) indicates the high percentage, higher than the general population, of anxious pathologies in those who undergo examinations for gastrointestinal disorders. In fact, in the group of those who underwent the examination in the absence of symptoms, as a screening procedure, anxiety levels were much lower. Analysis of the data of our study showed that patients who performed colonoscopy and EGDS presented no significant differences of levels of state anxiety, in agreement with other studies [27]. Having performed the test several times does not reduce anxiety, not as suggested by another study [28]. In fact, in our sample there are no significant differences between those who had already performed the examination or not.

Significant differences are present rather for the trait anxiety among patients who perform the EGDS and those who undergo colonoscopy (STAI-X2: 43.00 and 38.16 respectively), this finding underlines the prevalence of high trait anxiety people who undergo EGDS and it could be the topic of further researches.

Also for the gender there are significant differences, in fact 70.2% of women had positive scores for state anxiety, compared with 53.4% of men, and the same is evident for trait anxiety (53, 1% F;37.2% M), this finding confirms that women are a high risk category of patients [28]. Regarding the age of the patients, we didn't find any significant association between patients aged less than 60 years old and higher anxiety levels as suggested by other author [29]. Another aspect that we examined in our sample was the relation between the anxiety levels and the complained symptoms. We observed significant high level of anxiety between who had rectorrhagia, diarrhea and pain, so we can state that patients with that symptomatology need more attention during the procedure.

## Conclusion

In conclusion, our data confirm that endoscopic examinations cause a significant increase of anxiety in relation to the execution of

the exam and that the level of trait anxiety is higher than the general population. This means that people undergoing an endoscopic exam need more care and attention to try to avoid any kind of discomfort.

Moreover the analysis of the different variables considered, suggests a typology of patients most at risk in the performance of the examination (women, performing the examination following a symptom, especially if it is “pain”, “rectorrhagia” or “diarrhea”). This would allow greater selectivity of preventive interventions on patients with anxiety related disorders by clinicians.

Our study had some limitations, especially regarding the use of medications other than psychiatric drugs and use of other substances, like tobacco or caffeine, which could have modified the anxiety levels. Furthermore, we excluded people that had been sedated previously, so we could not compare the effect of the sedation on the execution of the exam. Further studies are need to better investigate this issue.

In conclusion doctors should carefully assess the patient before ordering an endoscopic examination to determine if she/he belongs to those subgroups most at risk for anxiety disorders and in these cases have a more carefully evaluation.

## References

1. Yilmaz M, Aydin A, Karasu Z, Gunsar F, Ozutemiz O. Risk factors associated with changes in oxygenation and pulse rate during colonoscopy. *Turk J Gastroenterol.* 2002; 13: 203-208.
2. Mahajan RJ, Johnson JC, Marshall JB. Predictors of patient cooperation during gastrointestinal endoscopy. *J Clin Gastroenterol.* 1997; 24: 220-223.
3. ErsAz F, Toros AB, AydoAYan G, BektaAYH, Ozcan O, Arikan S. Assessment of anxiety levels in patients during elective upper gastrointestinal endoscopy and colonoscopy. *Turk J Gastroenterol.* 2010; 21: 29-33.
4. Williams GL, Clarke P, Vellacott KD. Anxieties should not be forgotten when screening relatives of colorectal cancer patients by colonoscopy. *Colorectal Dis.* 2006; 8: 781-784.
5. Berzin TM, Blanco PG, Lamont JT, Sawhney MS. Persistent psychological or physical symptoms following endoscopic procedures: an unrecognized post-endoscopy adverse event. *Dig Dis Sci.* 2010; 55: 2869-2873.
6. Campo R, Brullet E, Montserrat A, Calvet X, Moix J, Rue M, et al. Identification of factors that influence tolerance of upper gastrointestinal endoscopy. *Eur J Gastroenterol Hepatol.* 1999; 11: 201-204.
7. Koloski NA, Talley NJ, Boyce PM. Epidemiology and health care seeking in the functional GI disorders: a population-based study. *Am J Gastroenterol.* 2002; 97: 2290-2299.
8. Locke GR, Weaver AL, Melton LJ, Talley NJ. Psychosocial factors are linked to functional gastrointestinal disorders: a population based nested case-control study. *Am J Gastroenterol.* 2004; 99: 350-357.
9. Van Kerkhoven LA, van Rossum LG, van Oijen MG, Witteman EM, Jansen JB, Laheij RJ, et al. Anxiety, depression and psychotropic medication use in patients with persistent upper and lower gastrointestinal symptoms. *Aliment Pharmacol Ther.* 2005; 21: 1001-1006.
10. Condon A, Graff L, Elliot L, Illynyk A. Acceptance of colonoscopy requires more than test tolerance. *Can J Gastroenterol.* 2008; 22: 41-47.
11. Khaira HS, Herbert LM, Crowson MC. Screening for abdominal aortic aneurysms does not increase psychological morbidity. *Ann R Coll Surg Engl.* 1998; 80: 341-342.
12. Parker J, Kennedy P. Factors predictive of distress in people awaiting a lower gastro-intestinal endoscopy. *Psychol Health Med.* 2010; 15: 26-33.
13. Miles A, Atkin WS, Kralj-Hans I, Wardle J. The psychological impact of being offered surveillance colonoscopy following attendance at colorectal screening using flexible sigmoidoscopy. *J Med Screen.* 2009; 16: 124-130.
14. Stoate HG. Can health screening damage your health? *J R Coll Gen Pract.* 1989; 39: 193-195.
15. Gilbert FJ, Cordiner CM, Affleck IR, Hood DB, Mathieson D, Walker LG. Breast screening: the psychological sequelae of false-positive recall in women with and without a family history of breast cancer. *Eur J Cancer.* 1998; 34: 2010-2014.
16. Nathoo V. Investigation of non-responders at a cervical cancer screening clinic in Manchester. *Br Med J (Clin Res Ed).* 1988; 296: 1041-1042.
17. Jones MP, Ebert, CC, Sloan T, Spanier J, Bansal A, Howden CW, et al. Patient anxiety and elective gastrointestinal endoscopy. *J Clin Gastroenterol.* 2004; 38: 35-40.
18. Parker MA, Robinson MH, Scholefield JH, Hardcastle JD. Psychiatric morbidity and screening for colorectal cancer. *J Med Screen.* 2002; 9: 7-10.
19. Miles A, Wardle J. Adverse psychological outcomes in colorectal cancer screening: does health anxiety play a role? *Behav Res Ther.* 2006; 44: 1117-1127.
20. Wardle J, Williamson S, Sutton S, Biran A, McCaffery K, Cuzick J, et al. Psychological impact of colorectal cancer screening. *Health Psychol.* 2003; 22: 54-59.
21. Rudin D. Frequently overlooked and rarely listened to: music therapy in gastrointestinal endoscopic procedures. *World J Gastroenterol.* 2007; 13: 4533.
22. Salmore RG, Nelson JP. The effect of preprocedure teaching, relaxation instruction, and music on anxiety as measured by blood pressures in an outpatient gastrointestinal endoscopy laboratory. *Gastroenterol Nurs.* 2000; 23: 102-110.
23. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry.* 1998; 59: 22-33.
24. Spielberger C. *State-Trait Anxiety Inventory (Form Y)*. Palo Alto, California: Mind Garden. 1983.
25. Conti L. *Repertorio delle scale di valutazione in psichiatria*. SEE EDITORE, Firenze. 1999.
26. Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, et al. Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl.* 2004; 21-27.
27. Trevisani L, Sartori S, Putinati S, Gaudenzi P, Chiamenti CM, Gilli G, et al. [Assessment of anxiety levels in patients during diagnostic endoscopy]. *Recenti Prog Med.* 2002; 93: 240-244.
28. Abuksis G, Mor M, Segal N, Shemesh I, Morad I, Plaut S, et al. A patient education program is cost-effective for preventing failure of endoscopic procedures in a gastroenterology department. *Am J Gastroenterol.* 2001; 96: 1786-1790.
29. Lee JY, Anhn M, Kim E, Kim DH, Kweon HJ, Cho DY, et al. The Effect of Preparatory Education Program on Discomfort and Retching of Examinees during Upper Gastrointestinal Endoscopy Korean. *J Fam Med.* 2012; 33: 219-228.