# ANXIETY OF PATIENTS AT MAGNETIC RESONANCE IMAGING SCREENING

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## SUMMARY

*Introduction: Anxiety is a state of feeling helpless and insecure, a state of anticipation and concern that something bad will happen. Fear of pain and the unknown, as well as fear of screening results can increase anxiety. Severe anxiety during magnetic resonance imaging (MRI)can cause patient's movement, leading to poorer imaging and reduction in the quality of the diagnostic test. To determine the anxiety of patients before and after magnetic resonance imaging and to investigate the relationship between the tested anxiety and the socio-demographic characteristics of the patients.*

*Methods: The study was conducted at the Department of Radiology of the University Clinical Hospital Mostar in the period from February 1st 2020 to March 31st 2020. The study included 100 subjects who were prescribed an MRI screening at the time of the study. A socio-demographic questionnaire specifically designed for this study was used to obtain data on subjects such as gender, age, place of residence, smoking, drinking alcohol, economic status, religiosity. The Anxiety Questionnaire as a State-Trait Anxiety Inventory (STAI) was used to examine anxiety.*

*Results: A statistically significantly higher degree of anxiety was determined after MRI screening (p<0.001). Male subjects achieved a statistically significantly higher degree of anxiety before (p=0.019) and after (p=0.034) MRI screening. There were no statistically significant correlations between the age of the subjects and the results achieved on the anxiety tests before and after the MRI screening.*

*Conclusion: Subjects who were prescribed an MRI screening have a statistically significantly higher degree of anxiety after the screening. Male subjects had a statistically significantly higher degree of anxiety on MRI screening.*

*Key words:* anxiety - magnetic resonance

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## INTRODUCTION

Anxiety is a state of feeling helpless and insecure, a state of anticipation and concern that something bad will happen. Anxiety is an unreasonable fear in which the danger is unrealistic (Babić et al. 2020). Anxiety represents one of a series of emotions that serves the positive function of alerting to things that a person might be concerned about. Fear, like anxiety, is a known emotion precisely because it represents a part of everyone's experience and is considered an essential component of our humanity, and yet it is also a psychological, physiological, and behavioural state. It increases arousal, expected duration, and neurobiological activity of the body and triggers specific behavioural patterns designed to help a person cope with an unfavourable or unexpected situation (Kaličanin 1996). Anxiety as a personality trait is a relatively permanent personality trait, i.e. the disposition to be anxious in many different situations. Anxious patients believe that in case of danger and risk it is adaptive to take care of something (anxiety preoccupation), that it is necessary to be competent and in control (personal control/perfectionism) and that it is adaptive to avoid problematic situations and challenges (Vulić-Prtorić 2006). There are a number of factors that contribute to the development of anxiety. The factors could be biological - genes, personality traits and brain chemistry - or these can be life events, such as trauma and long-term stress, or a combination of the mentioned factors (Davison & Neale 1999). Normal anxiety, which can have a motivational function for an individual, can and should exist in every person's life. Fear is an emotion that occurs in a being who has become aware that by some action he may endanger his life. The psychological problem occurs when fear becomes irrational and burdensome for the individual. If unconscious psychological mechanisms fail to channel fear/anxiety, the person will display general anxiety at the slightest occasion or will experience anxiety in the form of panic attacks (Štrkal-Ivezić & Vuković 2007). In anxiety, the object is unknown, lasts long after stress or danger and has a chronic course (Poljak & Begić 2016). Pathological anxiety is beyond the control of the individual and interferes with the normal functioning of the person (Martinac et al. 2015). Most anxiety disorders occur in comorbidity with other anxiety and mental disorders, with depression being the most common disorder (Davidson & Neale 1999).

Magnetic resonance imaging (MRI) is a non-invasive and precise diagnostic method, which gives a specific picture of the health of individual organs, organ systems, but also of the condition of the whole organism. It is an imaging diagnostic method that shows the layers of the human body in transverse section, as

well as in frontal and sagittal projection. MRI is painless and is considered harmless to patients. The further course of treatment and the most effective therapy are determined based on the results (Romans 2011). Magnetic resonance imaging is based on the principle of the interaction of radio waves and certain atomic nuclei in a body located in a strong magnetic field. The most common methods of magnetic resonance imaging are inversion and spin - echo techniques (Hebrang & Lovrenčić).

Regardless of an increasing number of studies on patient anxiety in MRI screening, it is still not considered a problem in our country. Patients are often unaware that their anxiety is just coming from anticipation of the finding itself. If patients are sick and need to have an MRI, they should be introduced to the examination. Getting acquainted with the examination itself would be easier for them and the medical staff to perform the examination, and thus we would have a quality image. In this manner, their expectations would be alleviated and the findings mentally easier to handle. Some studies show that earlier life experiences such as stressful conditions, under certain conditions, contribute to psychological vulnerability and the occurrence of anxiety and negative affective states. Hence the assumption that it is important to study and understand stress since stress can affect health through behavioural changes or physiological changes (Fučkan 2016). Factors such as the proximity of the machine itself during screening, closed and small space can lead to loss of sense of control and a feeling of claustrophobia and fear of injury. Fear of pain and the unknown, as well as fear of findings, can increase anxiety. Severe anxiety during magnetic resonance screening can cause patient's movement, leading to poorer imaging and reduction in the quality of the diagnostic test (Wright et al. 2009).

The aim of this study was to determine the anxiety of patients before and after magnetic resonance imaging and to investigate the relationship of the examined anxiety with the socio-demographic characteristics of the subjects.

## PATIENTS AND METHODS

The study was conducted at the Department of Radiology of the University Clinical Hospital Mostar in the period from February 1st 2020 to March 31st 2020. All patients who underwent MRI screening at the time of the study were included in the study. The study included 100 subjects, 25 patients from two age groups (younger than 18-44 years, and patients older than 50 years), and 25 by gender. The necessary data on patient anxiety before and after were collected in this way. The subjects were introduced to the goal and purpose of the research, and they were provided with complete anonymity before filling out the questionnaire. The study excluded subjects with a known psychiatric illness, subjects who did not want to participate voluntarily in the study, subjects who incurrectly/incompletely completed the questionnaires, and subjects who were unable to complete the questionnaire on their own.

## Questionnaires

A socio-demographic questionnaire specifically designed for this study was used to obtain data on subjects such as gender, age, place of residence, smoking, drinking alcohol, economic status, religiosity.

Anxiety Questionnaire (STAI - State-Trait Anxiety Inventory). It consists of two separate self-assessment scales, designed to determine anxiety as a condition and trait. The anxiety state scale (S scale or Form 1-M) contains 20 statements that assess how the subject is feeling now, at this time. The anxiety scale as a trait (O scale or Form 2-M) contains 20 statements that measure how the subject generally feels (Spielberger 1989).

## Statistical methods

The obtained results were processed using descriptive and non-parametric and parametric statistical methods depending on the data distribution. Non-parametric variables are shown as frequency and percentage, and parametric variables, depending on the distribution, are shown as arithmetic mean and standard deviation or as median interquartile range. A chi-square test for nominal variables was used to test the difference between groups.

**Table 1.** Socio-demographic data of the subjects (N=100)

| Characteristic | N (%) | $\chi^2$ | p |
|---|---|---|---|
| Place of residence | | 291.760 | <0.001 |
|   Mostar | 59 (59) | | |
|   Posušje | 14 (14) | | |
|   Ljubuški | 20 (20) | | |
|   Široki Brijeg | 4 (4) | | |
|   Čitluk | 2 (2) | | |
|   Čapljina | 1 (1) | | |
| Employment | | 18.001 | <0.001 |
|   Yes | 35 (35) | | |
|   No | 65 (65) | | |
| Levelofeducation | | 0.320 | 0.572 |
|   HSE* | 48 (48) | | |
|   HE** | 52 (52) | | |
| Smoking | | 15.680 | <0.001 |
|   Yes | 36 (36) | | |
|   No | 64 (64) | | |
| Acoholconsumption | | 15.680 | <0.001 |
|   Yes | 36 (36) | | |
|   No | 64 (64) | | |

*High School Education;  **Higher Education

**Table 2.** Differences in results achieved on the STAI 1-M questionnaire

|                     | $\overline{X}$ | SD    | t     | p       |
|---------------------|-------|-------|-------|---------|
| STAI 1-M before MRI | 52.23 | 4.775 | 5.007 | *<0.001\** |
| STAI 1-M after MRI  | 54.53 | 4.396 |       |         |

*p<0.05

**Table 3.** Gender differences in the results achieved on the STAI questionnaire

|                     | Gender | | | | t | p |
|---------------------|--------|-------|--------|-------|-------|---------|
|                     | M | | F | | | |
|                     | $\overline{X}$ | SD | $\overline{X}$ | SD | | |
| STAI 1-M before MRI | 53.34 | 4.663 | 51.12 | 4.671 | 2.378 | *0.019\** |
| STAI 1-M after MRI  | 55.46 | 4.496 | 53.60 | 4.131 | 2.54  | *0.034\** |
| STAI 2-M            | 56.74 | 6.114 | 56.26 | 5.924 | 0.399 | 0.691 |

*p<0.05

The Student t-test or Mann-Whitney U test was used to test the difference between the examined groups, depending on the normality of the distribution of continuous variables. The level of probability p<0.05 is considered statistically significant. Statistical analysis was performed using SPSS for Windows software (version 17.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excel (version 12.0, MicrosoftCorporation, Redmond, WA, USA).

## RESULTS

Of the total number of subjects (N=100), most of them are unemployed, do not smoke or drink alcohol. Socio-demographic data of the subjects are shown in Table 1.

The results of this study show that a statistically significantly greater difference was observed between the level of anxiety level after the MRI screening (Table 2).

Male subjects achieved a statistically significantly higher degree of anxiety before and after MRI, while there were no statistically significant differences between the sexes in the results on the STAI 2-M questionnaire (Table 3).

The results of this study show that there were no statistically significant differences on the STAI questionnaire in relation to age, employment, level of education as well as in relation to smoking and alcohol consumption.

## DISCUSSION

The results of this study indicate the presence of a certain level of anxiety in patients who were prescribed an MRI screening, which is in accordance with numerous studies (Goyen et al. 1997, Selim 2001). Previous research indicates the influence of anxiety on the quality of the MRI screening itself, mostly on the quality of the imaging due to the movement of patients during the screening (Nguyen et al. 2020). Some authors state that there is little evidence that anxiety affects patient movement during the performance of the examination itself (Klaming et al. 2015). In some studies, it has been reported that patients who receive precise instructions on how to perform an MRI screening show a lower degree of anxiety compared to the control group (Selim 2001, Asante & Acheampong 2020). The results of systematic review work conducted on the relationship between anxiety and MRI screening show that on average 4% to 30% of patients show some degree of anxiety before and after MRI screening and that the level of education is related to the degree of anxiety in patients receiving MRI screening (Meléndez & McCrank 1993). These results partially coincide with the results of this study which also show the presence of anxiety in patients before and after MRI screening, however the level of education is not statistically significantly related to the degree of anxiety. The second systematic review stated that the approach of the patient by the medical radiology engineer during the preparation for the MRI screening is very important, as well as the patient's knowledge about the procedure itself. The authors of this systematic paper state that it is essential to devise interventions and strategies to prevent anxiety in patients before and after MRI screenings (Munn & Jordan 2013). Harris et al state that there was a significant increase in anxiety in patients during the MRI screening compared to the degree of anxiety before and after the screening. They conclude that the noise of MRI devices is a factor that significantly contributes to the increase in the degree of anxiety in patients (Harris et al. 2003). In contrast to the aforementioned paper, in this paper anxiety was measured only before and after MRI screening. In the mentioned paper, a scale for predicting anxiety or fear during MRI screening called Fear Survey Schedule (FSS) was used. A study by Dziuda et al., who measured the stability of respiration during MRI screening and thus determined the relationship between the mode of respiration during screening and the degree of anxiety in patients was conducted in a similar way. The Fiber-optic sensor system was used to measure respiratory stability (Dziuda et al. 2019). According to the methodology, the mentioned work differs from this work since the patient's anxiety was measured during

the screening, which is not the case in this work. This fact represents one of the main limitations of the study. The authors of a study published in Sweden noted a difference in the degree of anxiety between sexes. Subjects were divided into two groups, those who had a heart examination, and another group that had a spine examination. Patients who underwent cardiac imaging achieved a significantly higher degree of anxiety compared with patients who underwent imaging of the spine. This difference can be explained by the time required for cardiac imaging, and the greater need for cooperation where the patient must hold his breath 40-50 times during the examination, while the duration of MRI screening of the spine is shorter (Ahlander et al. 2016). The results of the mentioned study are in accordance with the results of this study which shows that there is a statistically significant difference between sexes in the degree of anxiety before and after MRI screening. Research shows that anxiety caused by magnetic resonance imaging can be effectively reduced even just by providing patients with standard information about the course of the screening. A properly trained medical radiology engineer can stop the scanner, soothe the patient with relaxing conversation or breath control techniques, such as deep breathing exercises, and after a short pause the screening can continue (Eazegul et al. 2015, Norbash et al. 2006). Some studies state that in more complex cases, where the level of anxiety is too high and the patient cannot calm down quickly, a medical radiology engineer may recommend that the patient undergoes a relaxation training to reduce the effects of hyperventilation and anxiety, and make another attempt after that in order to successfully finish MRI screening (Rosenfield et al. 2011, Wollburg et al. 2011). The authors of previous studies most often measured the level of anxiety using the STAI questionnaire through a series of questions asked by a medical radiology engineer before and after MRI screenings, or a cyclical request to the subject to assess their psychological state on a scale of several points (Gray et al. 2000, Tazegul et al. 2015). The methodology of the mentioned papers is in accordance with the methodology of this paper. Tazegul et al. state that communication with patients by operators, ie medical radiology engineers, before the examination is a key factor in reducing the level of anxiety in patients who were prescribed an MRI screening (Tazegul et al. 2015). The relationship between providing information on how to perform MRI scans and the level of anxiety in patients, which should be explored in future papers on this topic, was not covered in this paper. In their study, Chapman et al. compared the levels of anxiety during the first and second MRI scans in 11 healthy volunteers. Their results show that a higher level of anxiety was recorded in patients during the first MRI scan compared to the second scan, which shows that fear of the unknown is an extremely important factor

compared to the level of anxiety in patients who underwent MRI screening (Chapman et al. 2010). A completely different approach in conducting the research was used in the mentioned study with regard to this study. The biggest difference was in the time of the anxiety testing, since in the mentioned study the anxiety was tested at the time of the examination, while in this study the level of anxiety was investigated before and after the MRI screening.

Previous research shows different results with regards to the gender of the subjects. The results of some studies show that men are more anxious than women (Katz et al. 2004, McIsaac et al. 1998). Other authors state that women are more anxious than men (Törnqvist et al. 2004). In relation to the gender of the subjects, the results of this study are in accordance with the results of research conducted by Katz et al. and McIsaac et al., i.e., male subjects were significantly more anxious than female subjects before and after MRI scans.

At our Faculty, some other research was conducted that dealt with anxiety and stressful events in various populations during radiological examinations, during different types of treatment in oncology patients (Hrkać et al. 2019), different kinds of disease and in different situations (Ledić et al. 2019). The authors of the paper who analysed the level of anxiety before and after the examination by a multilayer computed tomography state that the presence of anxiety in patients was statistically significantly higher before the examination rather than after the examination and that the level of anxiety as a personality condition proved to be statistically significantly lesser with regard to anxiety as a personality trait (Badrov et al. 2020). The authors of the study, which analysed the level of anxiety of students at the Faculty of Health Studies in Mostar before and after the exam, concluded that statistically significantly higher anxiety exists in students before the exam than after the exam. Furthermore, they concluded that the level of anxiety as a personality condition in subjects proved to be statistically significantly higher compared to anxiety as a personality trait (Ljubić & Babić 2017). The results of the research conducted by Badrov et al. and the results of the research conducted by Ljubić & Babić do not match the results of this study, which shows that a higher level of anxiety in the subjects was recorded after MRI screening, although the difference is not statistically significant. The same type of questionnaire was used to measure the degree of anxiety in this study and in the mentioned studies. A study which was conducted to investigate anxiety and depression in MRI patients showed that outpatients showed a significantly higher degree of anxiety and depression with regard to hospital patients (Bagarić et al. 2018). In contrast to the above study, the sample was not divided into outpatient and hospital patients but only by gender and age of the subjects in this study. Furthermore, another type

of measuring instrument was used in the mentioned study (Beck's anxiety questionnaire). Studies mainly differ in the research methodology, which is evident from the literature so far. The most common differences are in the application of measuring instruments and at the time of measuring anxiety in patients. Patients' awareness of possible complications that may occur during MRI examination as well as the relationship of anxiety with respiration rate and amplitude during MRI examination, patient movement and his cooperation during examination shouldbe analysed in future research.

## CONCLUSION

In relation to socio-demographic characteristics, statistically significant were the majority of subjects from Mostar, the unemployed, non-smokers and those who do not drink alcohol. Subjects achieved a statistically significantly higher degree of anxiety after MRI examination compared to the level of anxiety before MRI examination. Male subjects achieved a statistically significantly higher degree of anxiety before and after MRI. There was no statistically significant difference with regard to other socio-demographic characteristics.

### *Contribution of individual authors:*

Danijela Delić is the project coordinator, participated in the study concept data interpretation, literature appraisal, and also critically drafted and revised the final appearance of the paper.

Dragan Babić participated in the study concept, paper composition, theoretical explanations, dana interpretation, literature appraisal and English language proofreading.

Darjan Franjić and Berina Hasanefendić was responsible for the paper composition, theoretical explanations, data interpretation, literature appraisal and English language proofreading.

All authors provided their approval for the final version of the manuscript.

## References

1. *AhlanderBM, Arestedt K, Engvall J, Maret E & Ericsson E: Development and validation of a questionnaire evaluating patient anxiety during Magnetic Resonance Imaging: the Magnetic Resonance Imaging-Anxiety Questionnaire (MRI-AQ). J Adv Nurs 2016; 72:1368–80*
2. *Asante S & Acheampong F: Patients' knowledge, perception, and experience during magnetic resonance imagingin Ghana: A single centre study. Radiography 2020; S1078–8174:30249–2*
3. *Babić D et al.: Psihologija u medicini i zdravstvu. Sveučilište u Mostaru. Mostar, 2020*
4. *Badrov S, Babić D, Franjić D, Martinac M & Miljko M: Anksioznost pacijenata kodpregleda višeslojnom kompjutoriziranom tomografijom u Županijskoj bolnici Livno. Zdravstveni glasnik 2020; 6:13–22*
5. *Bagarić M, Babić D & Pavlović M: Anksioznost i depresivnost pacijenata kojima je ordinirana pretraga magnetnom rezonancom. Zdravstveni glasnik 2018; 1:33–39*
6. *Blanchard TK, Bearcroft PW, Dixon AK, Lomas DJ, Teale A, Constant CR et al.: Magnetic resonance imaging or arthrography of the shoulder: which do patients prefer? Br J Radiol 1997; 70:786–90*
7. *Chapman HA, Bernier D & Rusak B: MRI-related anxiety levels change within and between repeated scanning sessions. Neuroimaging 2010; 182:160–164*
8. *Dziuda Ł, Zieliński P, Baran P, Krej M & Kopka L: A study of the relationship between the level of anxiety declared by MRI patients in the STAI questionnaire and their respiratory rate acquired by a fibre-opticsensor system. Sci Rep 2019; 9:4341*
9. *Davison DC & Neale JM: Psihologija abnormalnog doživljavanja i ponašanja. Naklada Slap, Zagreb, 1999*
10. *Eazegul G, Etcioglu E, Yildiz F, Yildiz R & Tuney D: Can MRI related patient anxiety be prevented? Magn Reson Imaging 2015; 33:180–183*
11. *Fučkan I: Magnetska rezonancija: Priprema i planiranje pregleda. Tko zna zna. Zagreb, 2016*
12. *Goyen M, Rothschild PA & Heuser L: Angstbedingte Reaktionenim Zusammenhang mit Magnetresonanztomographie (MRT) - Unterschungen [Anxiety - induced reactions in connection with magnetic resonance tomography (MRI) examinations]. Rontgenpraxis 1997; 50:63–6*
13. *Grey SJ, Price G & Mathews A: Reduction of anxiety during MR imaging: a controlled trial. Magn Reson Imaging 2000; 18:351-355*
14. *Harris LM, Cumming SR & Menzies RG: Predicting anxiety in magnetic resonance imaging scans. Int J Behav Med 2004; 11:1–7*
15. *Hebrang A & Lovrenčić M: Radiologija. Medicinska naklada. Zagreb, 2001*
16. *Hrkać I, Pavlović M, Haxhibeqiri S, Babić R, Martinac M & Babić D: Usporedba anksioznosti i depresivnosti u onkoloških pacijenata liječenih kemoterapijom i zračenjem. Zdravstveni glasnik 2019; 5:40-47*
17. *Kaličanin P: Anksiozni poremećaji. Velarta. Beograd, 1996*
18. *Katz RC, Wilson L & Frazer N: Anxiety and its determinants in patients undergoing magnetic resonance imaging. J Behav Ther Exp Psychiatry 1994; 25:131–4*
19. *Klaming L, van Minde D, Weda H, Nielsen T & Duijm LE. The relation between anticipatory anxiety and movement during an MR examination. Acad Radiol 2015; 22:1571–8*
20. *Ledić L, Šušac A, Ledić S, Babić R & Babić D: Depresija u djece i adolescenata. Zdravstveni glasnik 2019; 5:75–85*
21. *Ljubić O & Babić D: Anksioznost studenata Fakulteta zdravstvenih studija u Mostaru prije i nakon ispita. Zdravsteniglasnik 2017; 1:36–44*
22. *McIsaac HK, Thordarson DS, Shafran R, Rachman S & Poole G. Claustrophobia and the magnetic resonance imaging procedure. J Behav Med 1998; 21:255–68*
23. *Meléndez JC &McCrank E: Anxiety-related reactions associated with magnetic resonance imaging examinations. JAMA 1993; 270:745–7*

24. *Martinac M, Vranić A, Zarevski P & Zarevski Z: Psihologija za liječnike. Naklada Slap. Zagreb, 2015*

25. *Munn Z & Jordan Z: Interventions to reduce anxiety, distress and the need for sedation in adult patients undergoing magnetic resonance imaging: a systematic review. Int J Evid Based Healthc 2013; 11:265–74*

26. *Nguyen XV, Tahir S, Bresnahan BW, Andre JB, Lang EV, Mossa-Basha M et al.: Prevalence and financial impact of claustrophobia, anxiety, patient motion, and other patient events in magnetic resonance imaging. Top Magn Reson Imaging 2020; 29:125–130*

27. *Norbash A, Yucel K, Yuh W, Doros G, Ajam A, Lang E et al.: Effect of team training on improving MRI study completion rates and no-show rates. J Magn Reson Imaging 2016; 44:1040–7*

28. *Poljak M & Begić D: Anksiozni poremećaji u djece I adolescenata. Socijalna psihijatrija 2016; 44:310–329*

29. *Romans L: Computed tomography for technologists: a comprehensive text. Williams & Wilkins. Philadelphia, 2011*

30. *Rosenfield D, Seidel A, Bhaskara L &Hofmann S: New breathing therapy reduces panic and anxiety by reversing hyperventilation. J Med Sci 2011; 11:327–328*

31. *Selim MA: Effect of pre-instruction on anxiety levels of patients undergoing magnetic resonance imaging examination. East Mediterr Health J 2001; 7:519–25*

32. *Spielberger CD: State-Trait Anxiety Inventory: Bibliography (2nd ed.). CA: Consulting Psychologists Press. Palo Alto, 1989*

33. *Štrkalj Ivezić S & Vuković A: Nemedikamentozno liječenje anksioznih poremećaja. Medix 2007; 13:88–93*

34. *Tazegul G, Etcioglu E, Yildiz F, Yildiz R &Tuney D: Can MRI related patient anxiety be prevented? Magn Reson Imaging 2015; 33:180–183*

35. *Törnqvist E, Månsson, A, Larsson EM & Hallström I: Impact of extended written information on patient anxiety and image motion artifacts during magnetic resonance imaging. Acta Radiologica 2006; 47:474–480*

36. *Van Minde D, Klaming L & Weda H:Pinpointing moments of high anxiety during an MRI examination. Int J Behav Med 2014; 21:487–495*

37. *Vulić-Prtorić A: Anksiozna osjetljivost: fenomenologija i teorije. Suvremena psihologija 2006; 9:171–194*

38. *Walker JA: Emotional and psychological preoperative preparation in adults. Br J Nurs 2002; 11:567–75*

39. *Wollburg E, Roth WT & Kim S: Effects of breathing training on voluntary hypo- and hyperventilation in patients with panic disorder and episodic anxiety. Appl Psychophysiol Biofeedback 2011; 36:81–91*

40. *Wright S, Yelland M, Heathcote K, Ng SK & Wright G: Fear of needles-nature and prevalence in general practice. Aust Fam Physician 2009; 38:172–176*

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