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THE IMPACT OF ASTHMA ON QUALITY OF LIFE AND ANXIETY: A PILOT STUDY

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Keywords: Asthma. Respiratory disease. Control. Mental health. Quality of life. Anxiety. Questionnaires.

THE IMPACT OF ASTHMA ON QUALITY OF LIFE AND ANXIETY: A PILOT STUDY

Abstract

Introduction: Asthmatic patients are at risk for psychiatric symptoms. The objective of this study is to test the hypothesis that asthmatics have worse quality of life and anxiety scores in relation to a control group.

Methods: This study is a cross-sectional study in which quality of life and anxiety scores were compared in a sample of 102 individuals, 51 asthmatics and 51 non-asthmatics. Quality of life and anxiety scores were quantified using validated questionnaires. The differences between the averages and the correlations between the total score for quality of life and anxiety were

compared with t-tests and Pearson's correlation tests, respectively. The *odds ratio* compared the prevalence of moderate and severe anxiety between the groups.

Results: The asthma group had higher average anxiety ($p < 0.001$) and lower averages in all areas of quality of life: physical functioning, physical role functioning, bodily pain, general health, vitality, social functioning, emotional role functioning and mental health ($p < 0.05$ for all variables). There was a significant and inverse correlation between the total score for quality of life and anxiety scores, but only in the asthma group ($r = -0.71$).

Conclusion: Asthmatics have worse indicators of quality of life and anxiety, even though the symptoms of asthma are under clinical control. Moreover, the inverse correlation between the quality of life and the average anxiety scores in the asthma group suggest that the pulmonary inflammatory process of asthma may be related to the pathophysiology of emotional commitment in that group.

Keywords: Asthma. Respiratory disease. Control. Mental health. Quality of life. Anxiety. Questionnaires

Introduction

Asthma is a chronic inflammatory disease of the airways characterized by intermittent and reversible bronchial narrowing, which results from smooth muscle contraction, mucosal swelling and hypersecretion, **resulting in dyspnea, cough, wheezes, variable obstruction and hyperresponsiveness (1,2,3).** This continuous cycle of aggression and reparation can lead to irreversible structural alterations, with the final consequence being that the airways are remodeled (4). In Brazil, it is estimated that there are approximately 20 million asthmatics, placing Brazil globally ranked in eighth place (5-7).

This chronic disease can cause considerable physical, emotional and social restrictions (8). Among the negative repercussions related to asthma symptoms are emotional disorders, such as anxiety and depression (9,10). Therefore, asthma can significantly compromise the life quality of the patients (11, 12).

Quality of life and anxiety can be quantified through proper validated questionnaires (13). Among the quality of life quantitative scales is the Medical Outcomes Study 36-item Short-Form Health Survey, which was validated in Brazil by Ciconelli et al (14) and is significantly correlated with progression of the disease (15). Among the scales that measure

anxiety, the Hamilton anxiety scale is highlighted because it is among the most used worldwide, and it was validated in Brazil (16, 17, 18).

The objective of this study was to test the hypothesis that controlled asthmatic patients have inferior quality of life and anxiety scores when compared to healthy individuals.

Methods

This **pilot study** (protocol 1.081.617, in 04/13/2015), after approved by the local Ethics in Human Research Committee, was carried out in Ipatinga, Brazil. One hundred individuals participated and were divided into 2 samples: **a test sample with 51 controlled asthmatic patients from the reference public pneumology service of the city, and a control sample of 51 non-asthmatic, healthy individuals matched by age.**

The participants were chosen accordingly to the following inclusion and exclusion criteria.

Inclusion criteria:

- Test sample: **adult patients, both sexes, 18 to 60 years old with diagnosed controlled asthma according to the Global Strategy for Asthma Management and Prevention.**
- Control sample: Participants could be either sex, healthy and asymptomatic adult individuals 18 to 60 years old.

Exclusion criteria:

- Test sample: **chronic diseases, use of systemic corticoids, antidepressants and/or anxiolytic medications.**
- Control sample: Individuals being treated for chronic diseases such as diabetes, hypertension, bone-articular diseases, or chronic illnesses that can be related to anxiety were excluded.

The participants answered the demographic, quality of life (Short-Form Health Survey – SF 36) and anxiety (Hamilton) questionnaires.

The SF-36 quality of life questionnaire has its own calculation that generates scores (0 to 100) in 8 different domains: physical functioning, physical role functioning, bodily pain, general health, vitality, social functioning, emotional role functioning and mental health (15).

The Hamilton Anxiety Rating Scale (HAM-A) comprises 14 items distributed into two groups: the first group is related to anxious humor symptoms, and the second group is related to physical symptoms of anxiety. The total score is generated by the sum of the obtained values, which may range from 0 to 56. It is currently accepted that a score above 24 points characterizes a critically anxious patient, a score between 17 and 23 points indicates a moderately anxious patient, a score between 8 and 16 points indicates a patient with mild anxiety and a score between 0 and 7 indicates the absence of anxiety (10, 13).

For the quality of life and anxiety scores, the difference between the group averages was analyzed by Student's *t*-test for independent samples.

To estimate qualitative data differences, the Pearson chi-square test (χ^2) was used, which is a non-parametric significance test that deals with discrepancies among observed and expected frequencies, as described in Motta (19).

The inverse correlation between the total quality of life score and the anxiety average score was tested by the Pearson correlation test and was considered significant when less than or equal to $-0,3$.

The minimum required significance level to reject the null hypothesis (H_0) was $p < 0.05$.

Results were obtained by calculations performed in the Minitab software, version 15.1.1.0.

The present study presents some limitations, which includes the sample size with a relatively small number and non-randomization during the selection of the participants, therefore the sample choice was not random.

Results

The group distribution for gender is summarized in table 1. For age, the average/standard deviations for the asthma and control groups were, respectively, 38.6 +- 12 years old and 37.9 +-15.4 years old. T-tests did not reveal any differences between the means ($p=0,353$).

Table 2 shows the results for every quality of life area (SF-36). There was a significant difference between the groups in all areas ($p=0.05$).

For the anxiety scores **by HAM-A**, the mean and standard deviations were 12.79 +- 7.94 for the asthma group and 6.02 +- 4.98 for the control group. T-tests showed significant differences between the group means ($p<0.0001$). The results can be visualized in figure 1, where the scores were higher in the asthma group compared to the control group.

According to the relative frequency (%) of absence of anxiety in the asthma and control groups, the results were, respectively: 33.3% and 62.8%. For mild, moderate and severe levels of anxiety for the asthma and control groups, the results were, respectively: 39.2% and 33.3%; 17.7% and 3.9%; 9.8% and 0%. The odds ratio indicated that moderate and severe anxiety was 9.27 times more prevalent in the asthma group.

The anxiety frequencies by gender, whereby anxiety was more frequent in females in relation to males in both groups. **In female individuals, the total frequency of some level of anxiety (mild, moderate and severe) was 25 in the asthmatic group and 11 in the control group. This frequency in male individuals were 9 in the asthmatic group and 8 in the control group.** The odds ratio was not calculated for gender due to the small sample size of males in both groups.

Inverse correlations between the total quality of life score and the anxiety scores were significant in the asthma group ($r = -0,73$), while in control group, the correlations were not significant ($r = 0,23$). This result indicates that the higher the asthmatics anxiety score, the lower their quality of life.

Discussion

There is evidence that asthma, as a chronic disease, is associated with psychiatric symptoms and mental disorders. Although quality of life is more influenced by psychosocial factors than the physical severity of the disease (20), identifying the increased frequency of these disorders and how they may interfere with quality of life for asthmatic patients leads to better preventive strategies.

Adams et al. (21) demonstrated that patients with psychological difficulties, such as anxiety, had lower scores on quality of life, indicating the impact of psychological stress on the physical health of asthmatics.

The measure of life quality as a health marker has been increasingly used in scientific studies worldwide, mainly in the evaluation of chronic diseases such as asthma (22). The results of this study emphasized significantly lower mean scores in all areas of the SF-36: physical functioning, physical role functioning, bodily pain, general health, vitality, social functioning, emotional role functioning and mental health, which indicates that asthmatic individuals had low quality of life in relation to healthy individuals.

Although all health dimensions were impaired according to SF-36 scores, the areas most affected in the asthma group were “physical aspects”, “vitality”, “mental health” and “emotional aspects”, which could suggest that these variables are the most relevant among those that contribute to lowered life quality. Similar results were found by Pinto (23), who used the SF-36 in controlled and non-controlled asthmatics, highlighting low quality of life in both groups. The functional capability, vitality, emotional aspects and mental health were the areas that had the lower scores.

Similar findings were obtained by Nogueira (24), who evinced that no matter how severe the asthma, a decrease occurs in the physical, psychological and social areas. More recently, Reppold et al (7) demonstrated that patients with psychological and emotional difficulties had lower quality of life scores, indicating the impact of psychological distress on asthmatics’ physical health.

Nogueira, Silva and Lopes (24) evaluated the life quality of asthmatic teenagers and its association with asthma severity, chronic diseases and lifestyle. The quality of life was considered poor in half the asthmatic patients

from both sexes. This study observed a decline in life quality with every asthma severity level (mild, moderate and severe).

Additionally, with respect to the quality of life of asthmatics, Schatz et al. (25) quantified life quality in asthmatic pregnant women using an appropriate questionnaire, the Asthma Quality of Life Questionnaire (AQLQ). In this study, the patients who were classified as controlled asthmatics had significantly lower quality of life scores, which indicates that even under adequate clinical control, these pregnant women still had compromised quality of life.

As for emotional impairment, the present study results showed a high percentage of anxiety symptoms in the asthma group, demonstrating significant differences between the groups in both means (t-test) and clinical scores (chi-square test). The odds ratio demonstrated a positive association between asthma, anxiety and depression.

A high prevalence of anxiety among asthmatics was also found by Carvalho et al. (26), who emphasized a high anxiety level through the Spielberger Anxiety Inventory (IDATE) in approximately 90% of the controlled asthmatic patients from the Asthma Ambulatory Center in Hospital das Clínicas from São Paulo University. Vermeulen et al. (9) found anxiety disorders to be prevalent in 48% of asthmatics. Pinto (23) also demonstrated higher anxiety scores in asthmatics. For this author, 94% of the patients presented with anxiety symptoms and maintained the symptoms even after reaching control of asthma, indicating that pulmonary control does not necessarily indicate psychological control.

How do we explain such clear results in asthmatics? Some authors propose that the cerebral hypoxia resulting from hyperventilation in these patients would be involved in this process. This clinical scenario seems to be due to alterations that occur simultaneously in both cerebral and respiratory systems. However, it is still unknown where exactly this connection is or how it occurs (18).

Most of the studies conducted with asthmatics are cross-sectional or case-control studies, which prevents a realistic risk estimate of emotional disorders. Few studies are prospective studies on this issue.

Therefore, there is significant evidence in the medical literature to ascertain the relation between emotional disorders and asthma. What is the reason for this association?

The proposed pathophysiological mechanisms of anxiety in asthma are multiple and variable. Even when disease control is reached, the patients still present with anxiety for having to address the risk of future exacerbations, the fear of a crisis and the fear of reduced pulmonary function. Such characteristics could lead to a situation of continuous distress. It is possible that the chronic psychological distress could cause a pro-inflammatory condition and be associated with increased superoxide and cytokine and leukocyte production (27).

Additionally, it is likely that the neurokinins and P substance (asthma pulmonary neurogenic inflammation byproducts) have a direct action on the central nervous system, inducing anxiety states (11).

Anxious individuals have hypersensitive CO₂ chemoreceptors in the brainstem, particularly in the locus ceruleus, which is no different in asthmatics (28).

The results of this study also showed a higher proportion of anxiety (67.57%) in asthmatic women in relation to men with asthma, indicating that gender may also be a determinant factor. Vieira (27) also found higher levels of anxiety in asthmatic women. According to Carvalho et al. (26), the prevalence of depression and anxiety symptoms were more common among asthmatic women (78.6%). Therefore, gender can be a predictive factor for depression after the manifestation of anxiety disorders at any time in life.

In this study, it was evident that there was a significant and inverse relationship between the quality of life total score and the anxiety scores only in the asthma group ($r=-0.71$). The results indicate that the higher the anxiety scores, the lower the quality of life. Silva (6), when evaluating the variables that influence asthma quality of life, emphasized that anxiety constitutes the main predictor and that elevated stress levels are related to a poorer quality of life.

The present work has the intrinsic limitations of a pilot study, **with small sample size and non randomized selection of participants**. It is not prospective. Therefore, it does not quantify risks or allow us to determine whether anxiety was the cause or consequence of the asthma. Additionally, the patients were not submitted to a subsequent psychiatric evaluation after the scores were obtained. Consequently, it is not possible to know which of them became psychiatric patients.

Conclusion

In conclusion, the present study supports its hypothesis and shows that asthmatic individuals have lower quality of life and higher prevalence of emotional disorders, even if the asthma symptoms are under adequate clinical control. Moreover, the inverse correlation between quality of life and average anxiety scores in the asthma group suggests that the pulmonary inflammatory process of asthma may be related to the pathophysiology of emotional commitment but only in that group. These results create new perspectives regarding asthma management whereby emotional aspects should not be neglected.

These results provide new perspectives related to the management of asthma, for which emotional aspects should not be neglected. Systemic (biopsychosocial) and multidisciplinary approaches should be considered for the proper management of these patients.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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Declaration of Interest

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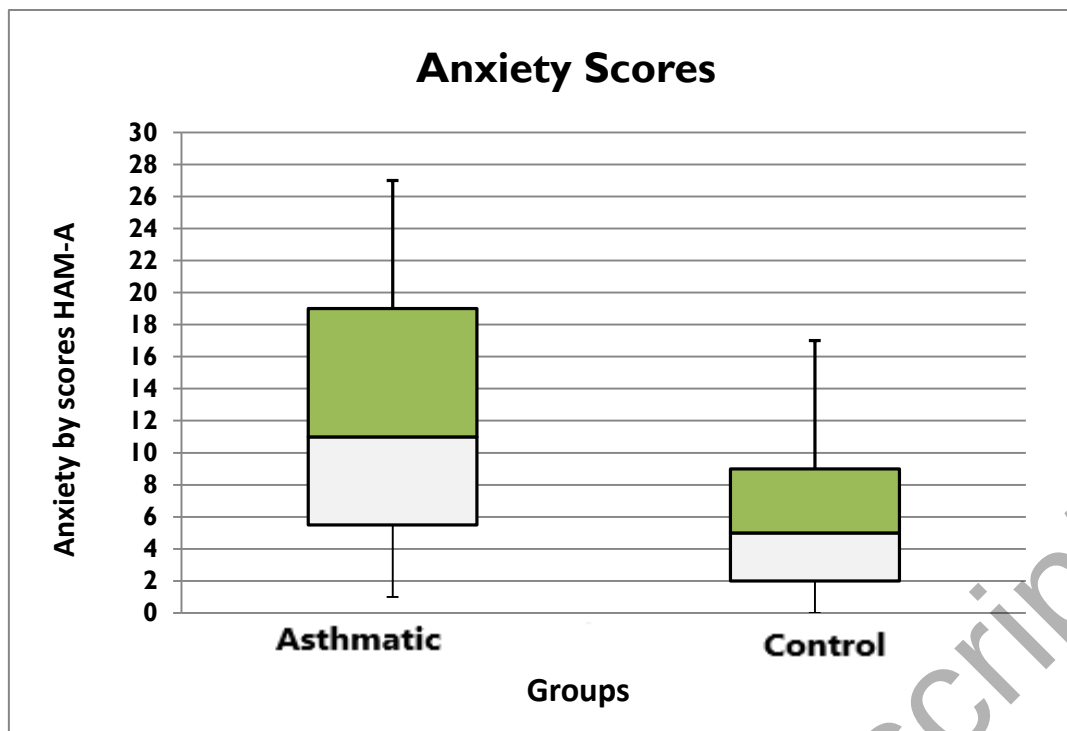


FIGURE 1 – Anxiety scores by The Hamilton Anxiety Rating Scale (HAM-A): division per groups

TABLE 1 – Group distribution by gender, age and education level.

Group	Asthma	Control
Gender		
• Female (n / %)	37 (72,5%)	29 (56,9%)
• Male (n / %)	14 (27,5%)	22 (43,1%)
Age: average / standard deviation	38,6 / 12,0	37,9 / 15,4
Educational level		
• Elementary school	15 (29,4%)	12 (23,5%)
• High school	27 (53,0%)	23 (45,1%)
• College	9 (17,6%)	16 (31,4%)

TABLE 2 – Quality of life scores according to sf-36 distribution

Area	Asthma group	Control group	P Value
	Mean / SD	Mean / SD	
Physical functioning	70,4 / 25,9	85,4 / 22,5	< 0,001
Role-Physical	60,9 / 34,8	88,7 / 23,1	< 0,001
Bodily Pain	63,0 / 25,9	74,8 / 21,6	0,019
General Health	61,0 / 19,4	77,2 / 18,0	< 0,001
Vitality	52,1 / 21,1	71,0 / 17,7	< 0,001
Social Functioning	67,3 / 23,4	86,0 / 19,6	< 0,001
Role Emotional	56,4 / 46,6	91,5 / 23,9	< 0,001
Mental health	60,0 / 21,7	82,0 / 15,1	< 0,001