American Journal of Biomedical and Life Sciences
2021; 9(6): 298-301
http://www.sciencepublishinggroup.com/j/ajbls
doi: 10.11648/j.ajbls.20210906.15
ISSN: 2330-8818 (Print); ISSN: 2330-880X (Online)

Beware of Dog: Practical Consideration in Asthmatic Patients with Poor Perception of Respiratory Symptoms

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To cite this article:
Giuseppe Madonia, Ursula Madonia. Beware of Dog: Practical Consideration in Asthmatic Patients with Poor Perception of Respiratory Symptoms. *American Journal of Biomedical and Life Sciences*. Vol. 9, No. 6, 2021, pp. 298-301. doi: 10.11648/j.ajbls.20210906.15

Received: May 7, 2021; **Accepted**: May 24, 2021; **Published**: November 23, 2021

Abstract: Symptoms are often difficult to quantify, represent and depict for the patients and sometime also for the attending physicians**.** Anyway their role is crucial in influencing the relationship patient/physician in many ways. Respiratory symptoms (cough, thoracic pain, dispnoea) are not free of this challenging drawback**.** In asthmatic patients the subjective awareness of their disease condition, expecially their insight in the quality of breathing pattern, is critical to assess severity and control of their disease: under-perception of respiratory symptoms make this task problematic for patients and physicians. To estimate the magnitude of problem two set of reports have been examined: one on "real life" patients with chronic stable asthma and secondly studies evaluating the level of perception in selected asthmatic patients in a laboratory setting using bronchial provocation tests tool. Cumulatively a rough percentage of 20% asthmatic patients showed a reduced ability to be aware of their low level of pulmonary function. This impaired ability to perceive and report symptoms could also be a harbinger of undesirable and sometimes dangerous consequences. These data show that poor perception in asthma is a challenging problem affecting a large proportion of patients, with the potential of severe outcomes that need to be accurately addressed.

Keywords: Asthma, Poor Perception, Dyspnoea, Bronchial Provocation Test (BPT), Visual Analogue Scale (VAS)

1. Introduction

It is commonly accepted that perception, for reasons not entirely known, is a symptom very complex in its mechanisms and, moreover, is characterized by a remarkable variability within groups with the same condition. Sensing of pain, awareness of gastro-oesophageal reflux [1] or atrial fibrillation [2] are, among many others conditions, frequently underreported/overperceived by patients.

Several studies consistently demonstrate that a significant portion of asthmatic patients is substantially less aware of their level of airways obstruction with consistent consequences on the management and outcomes of their disease [3-6].

A consensus statement of the American Thoracic Society (ATS) has defined dyspnoea as "*a term used to characterize a subjective experience of breathing discomfort that comprises qualitatively distinct sensations that vary in intensity. The experience derives from interactions among multiple physiological, psychological, social, and environmental factors, and may induce secondary physiological and behavioural responses*" [7].

The recent ATS statement has emphasized the multidimensional nature of the symptom in the sensory-perceptual (intensity and quality), affective distress, and impact domains. Therefore, dyspnoea in asthma comprises several different "uncomfortable/ unpleasant" respiratory feeling that patients describe differently because these sensations arise from a series of complex sensory mechanisms. Moreover a significant portion of patients does not understand the symptom and is not able to describe it.

However the blunted perception of dyspnoea in patients with asthma is still poorly understood given that a patchwork of different pathways are involved including psychological factors [8, 9], habituation processes [10], or reduced chemosensitivity [11] and seems to be linked to disease duration [8].

However, from a pragmatic point of view, in an ambulatory setting, the evaluation and quantification of dyspnoea in asthma is usually obtained matching a subjective rating scale with an objective pulmonary function test. Various rating scales have been employed and between them

the most widely used are the visual analogue scale (VAS) and the modified Borg Scale [12].

Although less than perfect tools [12], both of them have been applied during spontaneous asthmatic attack and under controlled, experimental conditions such as methacholine-induced bronchoconstriction and physical exercise; In using the correlations between symptom intensity, scored by the VAS or the modified Borg Scale, and changes in lung function, particularly the fall in the forced expiratory volume in 1 second (FEV1), most of the studies have attempted to divide the patients into two groups: adequate perception and poor perception.

This concise review estimate the dimension of the phenomenon of poor perception in asthma and its consequences and management; accordingly we explore and describe the potential disconnect between a patient's experience of dyspnoea and his or her lung function, how this can affect their use of inhaler therapy and the associated clinical risks.

2. Estimable Magnitude of Poor Perception Occurrence

Objective assessment of airflow rates remain a fundamental aspect of assessing severity and control of asthma, and when there appear to be discrepancies between symptoms and objective measures, an abnormal symptom perception is present.

A poor perception of airway obstruction represents a challenge for the clinicians because the proportion of such patients could be very high.

Despite a number of confounding factors, some "real life" studies have explored the magnitude of the matter.

McFadden et al [13] in1973 studied the interrelation between physiology and clinical manifestations of 22 young asthmatic patients during an acute asthma exacerbation and until the subjects considered their attacks ended: most patients "could not detect or would seriously underestimate a large reservoir of residual disease".

Kendrick et al., examined a cohort of 255 adult asthmatic patients recruited by random selection from the general practices' disease registers: the authors evaluated the accuracy of patients' perception of the degree of their asthma by matching subjective assessments of severity of the condition by a visual analogue score with the values of PEF measures: 152 (60%) of the patients showed no significant correlation between visual analogue asthma scores and simultaneous peak flow measurements and were termed poor discriminators (under- and over perceivers) [14].

Teeter et al. estimated that 17% of sixty-seven adult patients with chronic asthma, characterized by the relationship between symptoms and the degree of airway obstruction as determined by the FEV 1 and peak expiratory flow (PEF), underestimated their level of airway obstruction [15].

A large international survey (Asthma Insight and Reality) evaluating the severity, control and management of 7786 adults and 3153 children with asthma estimated a "discrepancy between the level of reported symptoms and patients 'perception of their asthma control'. The surveys indicate that 32% to 49% of patients experiencing severe symptoms and 39% to 70% of patients with moderate symptoms believed their current level of asthma control to be "well" or "complete"" [16].

A greater number of studies compared asthmatic patients' subjective assessment of symptoms with the degree of airflow obstruction in laboratory based setting and have tended to use selected groups of subjects.

The reported frequency of under perception in asthma has been measured with various instruments, protocols and in different settings, but efforts to estimate the extent of inadequacy of dyspnoea perception more commonly used the comparison between the subjective evaluation of the symptom (VAS, BORG, etc.) and the value of objective measure (e.g. FEV1, Threshold Loading Test) following different types of bronchial provocation tests (e.g.: histamine, methacholine).

The first, documented observation of the phenomenon of poor perception of dyspnoea in asthma dates back to 1952 when Bates described the presence of functional abnormalities in symptom-free asthmatic patients [17].

Thereafter a number of reports shed some more light in the dimension of patients' poor insight in level of their airways obstruction.

The percentage of poor perceivers, based on these parameters, has been commonly estimated between ranges of approximately 15-25% [18 - 21] (see table 1).

Table 1. *Frequency/percentage of under perception of symptoms following BPT.*

author	pts n	%	BPT	subjectiv score/objective evaluation
Rubinfeld (1976)	82	12 (15%)	methacholine	S. P.*/FEV1
Boulet (1994)	150	19 (13%)	histamine	Borg/FEV1
Bijl-Hofland (2000)	36	9 (25%)	histamine	VAS/FEV1
Stravinskaitè (2005)	192	43 (22.4%)	methacholine	Borg/FEV1
O'Loghlen (2020)	183	16-24%	methacholine	Borg/FEV1

*Subjective perception.

Obviously, these measurement does not provide a comprehensive evaluation of the perception of dyspnoea and more data could derive by more sophisticated studies. Association between impaired perception of respiratory function and dynamic hyperinflation, small airways disease and airways resistance have been explored but the best relevant evidences derive from investigating any mismatch in subjective evaluation/FEV1.

3. Conclusion

The blunted perception of dyspnoea, in some patients with asthma, is still poorly understood as it might involve a multitude of mechanisms in its origin [22].

Different methodological studies have attempted to measure the frequency of the problem either in "acute" setting (with bronchial challenge tests) or in chronic ambulatory asthmatic patients matching questionnaires with pulmonary function (FEV1).

In both categories, a roughly estimable percentage of 20% of asthmatic patients showed a significant degree of poor perception and comprehension of their respiratory condition.

The accuracy of symptom perception is critical for the optimal management of asthma and patients who underestimate the severity of their condition are more susceptible to a wide range of serious complications (see table 2).

Table 2. *Complications of poor perception.*

Delayed diagnosis
Poor adherence to maintenance therapy
Increased risk of exacerbation
Increased risk of near fatal asthma and death
Increased health services utilization
Decreased level of physical activity
Reduced quality of life

It is also not off subject considering that in an asthma clinic it will be necessary to be aware that questionnaires of asthma control could be misleading (if patients cannot accurately judge their symptoms' severity), and generate an erroneous feeling of safety if not matched with a combining spirometry [23, 24].

Evaluation of symptoms' perception risks to be a neglected topic in asthma clinic, particularly when history and physical examination are misleading.

Actually these patients should actively looked for, intercepted and identified (obtaining an objective measure of their pulmonary function) cause they will need a special educational approach. In fact patients who do not perceive dyspnoea may not feel how important is to comply with their chronic controller medication.

Needless to say that, generally, a delayed diagnosis, a sub-optimal therapeutic approach or an increased risk of exacerbation (with eventual catastrophic outcomes) is a clear physician duty and could be a medical responsibility failing to characterize a poor perceiver phenotype.

These particular patients need a special management in educating them to gain a different understanding of their condition adopting all the strategies could improve their degree of perception [21].

Patients identified as having poor perception, more than others, require a regular monitoring of daily PEF or FEV1 that could potentially be used to assess the variability of pulmonary function and enable treatment to be stepped up in response to any deterioration and prevent an impending exacerbation.

This strategy may help to detect poor perceivers who may be at risk of severe worsening of asthma, as they may not perceive the loss of control of their asthma early enough to modify their therapy.

Moreover, solicitation of a patient poor perceiver to "calibrate" his/her perception on the objective evidences (spirometry/PEF) could produce a long term educational effect with an increased ability to understand more appropriately the symptom and manage it.

A stringent monitoring of PEF associated with use of a fast acting bronchodilator or a correct calibration of ICS treatment [25] could therefore contribute to increase their insight and perceived differences in the "meaning" of a "good respiration", reducing the risks connected.

References

[1] Bas LAM Weusten, Akkermans LMA, Vanberge-Henegouwen GP, and Smout AJPM Symptom Perception in Gastroesophageal Reflux Disease Is Dependent on Spatiotemporal Reflux Characteristics. GGastroenteroly 1995; 108: 1739-1744.

[2] Rienstra, M., Lubitz, S. A., Mahida, S. et al, Symptoms and functional status of patients with atrial fibrillation: state of the art and future research opportunities. *Circulation*. 2012; 125: 2933–2943.

[3] Rubinfeld AR, Pain MCF. Perception of asthma. Lancet 1976; i: 882-4.

[4] Barnes PJ "Poorly perceived asthma" Thorax 1992; 47: 408-409.

[5] Magadle R, N Berar-Yanay, and Weiner P, "The Risk of Hospitalization and Near-Fatal and Fatal Asthma in Relation to the Perception of Dyspnea" Chest 2002; 121: 329–333.

[6] Aaron SD, Boulet LP, Reddel HK, Gershon AS "Underdiagnosis and Overdiagnosis of Asthma" Am J Respir Crit Care Med. 2018 Oct 15; 198 (8): 1012-1020.

[7] American Thoracic Society. Dyspnea: mechanisms, assessment, and management. A consensus statement. Am J Respir Crit Care Med 1999; 159: 321–340.

[8] Von Leupoldt A, Riedel F, Dahme B (2006) The impact of emotions on the perception of dyspnea in pediatric asthma. Psychophysiology 43: 641–644.

[9] Serrano J, Plaza V, Sureda B, de Pablo J, Picado C, et al. (2006) Alexithymia: a relevant psychological variable in near-fatal asthma. Eur Respir J 28: 296–302.

[10] von Leupoldt A, Vovk A, Bradley MM, Lang PJ, Davenport PW (2010) Habituation in neural processing and subjective perception of respiratory sensations. Psychophysiology 48: 808–812.

[11] Kikuchi Y, Okabe S, Tamura G, Hida W, Homma M, et al. (1994) Chemosensitivity and perception of dyspnea in patients with a history of nearfatal asthma. N Engl J Med 330: 1329–1334.

[12] Banzett RB, Dempsey JA, O'Donnell DE, Wamboldt MZ. Symptom perception and respiratory sensation in asthma. Am.

[13] McFadden ER, Kiser R, De Groot WJ. Acute bronchial asthma: relations between clinical and physiologic manifestations. N Engl J Med 1973; 288: 221-25.

[14] Kendrick AH, Higgs CMB, Whitfield MJ, Laszlo G Accuracy of perception of severity of asthma: patients treated in general practice BMJ 1993; 307: 422-4.

[15] Teeter JG, Bleecker ER Relationship Between Airway Obstruction and Respiratory Symptoms in Adult Asthmatics CHEST 1998; 113: 272-77.

[16] Rabe KF, Adachi M, Lai CKW, et al. Worldwide severity and control of asthma in children and adults: The global Asthma Insights and Reality surveys J Allergy Clin Immunol. 2004 Jul; 114 (1): 40-7.

[17] Bates, D. V. "Impairment of respiratory function in bronchial asthma. Clin Sci. 1952, 11, 203.

[18] Rubinfeld AR, Pain MCF. Perception of asthma. Lancet 1976; 1: 882-84.

[19] Bijl-Hofland ID, Cloosterman SG, van Schayck CP, et al. Perception of respiratory sensation assessed by means of histamine challenge and threshold loading tests. Chest. 2000 Apr; 117 (4): 954-9.

[20] Stravinskaitė K, Malakauskas K, Šitkauskienė B, Sakalauskas R Perception of dyspnea in asthmatics with normal lung function Medicina (Kaunas) 2005; 41 (9): 747-753.

[21] O'Loghlen SB, Levesque L, Fisher T, et al Health Services Utilization Is Increased in Poor Perceivers of Bronchoconstriction and Hyperinflation in Asthma J Allergy Clin Immunol Pract. Vol. 8 issue 8 p 2643–2650. e2.

[22] von Leupoldt A, Brassen S, Baumann HJ, et al Structural Brain Changes Related to Disease Duration in Patients with Asthma. PlosONE 2011, Vol. 6 Issue 8 e23739.

[23] So Young P, Sun-Young Y, Bomi S, et al Clinical Factors Affecting Discrepant Correlation Between Asthma Control Test Score and Pulmonary Function Allergy Asthma Immunol Res. 2015 January; 7 (1): 83-87.

[24] Schuler M, Faller H, Wittmann M and Konrad Schultz Asthma Control Test and Asthma Control Questionnaire: factorial validity, reliability and correspondence in assessing status and change in asthma control, J Asthma 2016; 53 (4): 438-45.

[25] Salome CM, Reddel HK, Ware SI, et al. Effect of budesonide on the perception of induced airway narrowing in subjects with asthma. Am J Respir Crit Care Med 2002; 165: 15-21.