# Internet Use for Health-Care Information by Subjects With COPD

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BACKGROUND: Although the internet is an important tool for entertainment, work, learning,
shopping, and communication, it is also a possible source for information on health and disease. The
aim of this study was to evaluate the proportion of subjects with COPD in São Paulo, Brazil, who
use the internet to obtain information about their disease. METHODS: Subjects ($N = 382$) with
COPD answered a 17-question survey, including information regarding computer use, internet
access, and searching for sites on COPD. Our sample was distributed according to the socioeco-
nomic levels of the Brazilian population (low, 17.8%; medium, 66.5%; and high, 15.7%).
RESULTS: Most of the subjects in the sample were male (62.6%), with a mean age of 67.0 ± 9.9 y.
According to Global Initiative for Chronic Obstructive Lung Disease (GOLD) stages, 74.3% of the
subjects were in stage II or III. In addition, 51.6% of the subjects had a computer, 49.7% accessed
the internet, and 13.9% used it to search for information about COPD. The internet was predom-
inantly accessed by male (70.3%) and younger (64.6 ± 9.5 y of age) subjects compared with female
(29.7%, $P = .04$) and older (67.5 ± 9.6 y of age, $P < .007$) subjects. Searching for information about
COPD on the internet was associated with having a computer (5.9-fold), Medical Research Council
dyspnea level 1 (5.3-fold), and high social class (8.4-fold). The search for information on COPD was
not influenced by GOLD staging. CONCLUSIONS: A low percentage of subjects with COPD in São
Paulo use the internet as a tool to obtain information about their disease. This search is associated
with having a computer, low dyspnea score, and high socioeconomic level. Key words: COPD;
internet; health education. [Respir Care 2015;60(9):1276–1281. © 2015 Daedalus Enterprises]

## Introduction

COPD is a progressive inflammatory disease character-
ized by chronic respiratory symptoms, exacerbation of
symptoms, and activity limitation and is becoming one of
the greatest health problems worldwide.[1] This disease is
expected to be the third leading cause of death in the world
by 2020 and to move from twelfth to fifth place in the
disability-adjusted life year. Adherence to treatment is es-
sential for therapeutic success,[2] and one of the important
factors in patient adherence to treatment is disease knowl-
edge. Therefore, patient education regarding the disease
and its evolution and treatment is essential in the manage-
ment of chronic diseases.

According to the National Cancer Institute, the internet
has become a quick and easy tool for providing health-care
information.[3] Patient interest in obtaining information about
disease via the internet varies from 8 to 60% depending on
the problem: breast cancer (43%),[4] chronic pain (39%),[5]
cardiovascular disease (20%),[6] colorectal cancer (8%),[7]
burns (12%),[8] infertility (58%),[9] and lung cancer (16%)[10],
as well as country and population.

This is not a new research phenomenon, and although
the results should not be different for patients with COPD,
they cannot be generalized. Although there are several
sites with information on COPD, there has been no study
to date that has assessed the use of the internet as a means
of providing health-care information to patients. Thus, the
purpose of this study was to estimate the proportion of

subjects with COPD who have a computer and access the internet to find information about this disease in the city of São Paulo, Brazil.

## Methods

This study was approved by the local research ethics Committee (1360/08), and all of the participants gave written consent. The inclusion criteria were a diagnosis of COPD according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD)[2] and clinical stability, including no exacerbations during the prior 4 weeks. Subjects with other unstable respiratory diseases or comorbidities were excluded.

Out-patients with COPD were interviewed and classified by socioeconomic level according to Brazilian economic classification criteria, including information regarding the education level of the head of the household and purchasing capacity (eg, number of home appliances, cars, and household help). The subjects were then grouped into 3 economic levels: high, medium, and low. To obtain information related to the participants' access to computers and the internet and their search for information, a survey including 17 questions was developed. Subjects with COPD were interviewed by an experienced interviewer (CKD) who was trained not to influence their responses.

Spirometry was performed according to European Respiratory Society[11] and Brazilian Thoracic Society[12] criteria for diagnostic confirmation and staging of COPD. The Medical Research Council dyspnea scale[13] was used to assess the intensity of the subjects' dyspnea.

### Statistical Analysis

Numerical data are presented as mean $\pm$ SD, and categorical data are presented as absolute and percent values. The Student $t$ test was used for comparisons between 2 means of numerical variables. The chi-square test or Fisher exact test was used to assess association between 2 categorical variables, such as internet access, economic class, disease severity, and respiratory symptoms. In the search for information about COPD, binary logistic regression was used to analyze the influence of independent variables.

As this was the first study to assess internet access in Brazil, we conducted a pilot study with 170 subjects to estimate sample size, and we found that 40% of subjects accessed the internet. Using the 40% rate and adopting a CI of 95%, we determined that 369 subjects were necessary as a sample to perform this study. $P < .05$ was interpreted as indicative of statistically significant differences.

### QUICK LOOK

**Current knowledge**

COPD is the world's fourth leading cause of mortality and is projected to be the fifth leading disease in morbidity impact by 2020. The preponderance of patient management is done in primary care and at home. Education of patients regarding their disease, its evolution, and its treatment is essential in the management of patients with COPD.

**What this paper contributes to our knowledge**

In São Paulo, a low percentage of subjects with COPD use the internet to obtain information about their disease. This finding is similar to results of studies carried out in other countries and with other chronic diseases. Higher economic level, lower dyspnea intensity, and computer availability were found to be the independent predictors for access.

## Results

Among the 400 people contacted, 382 consented to participate in the study: 239 (62.6%) were male, and 143 (37.4%) were female. The mean age was 67.0 $\pm$ 9.9 y. Demographic data are provided in Table 1. The subjects were classified according to their economic status, with most of them belonging to the middle class (66.5%). Most of the subjects were in GOLD stages II (40.9%) and III (33.4%).

Of the 382 subjects in the study, 51.6% reported having a computer at home, 49.7% accessed the internet, and 48% of those subjects searched online for information on COPD. Among the 185 subjects (48.4%) who had no computer at home, 7% accessed the internet elsewhere, and 46% sought information about COPD elsewhere (Fig. 1). Thus, only 53 (13.9%) of all COPD subjects evaluated in our study sought information about their disease on the internet.

The mean age of subjects who accessed the internet and searched for information on COPD was lower than that of subjects who did not, but the difference (3 y) had no clinical implication. Table 2 shows the characteristics of the subjects who had a computer, accessed the internet, and searched for information on COPD. Among those who had a computer, men accessed the internet more than women ($P < .05$). No statistical differences were observed regarding the presence of respiratory symptoms, having a computer, access to the internet, and searching for information about COPD.

In the logistic regression model adjusted for variables that could influence the search for information on COPD

Table 1. Characteristics of the Study Population

| Variable | Values |
| --- | --- |
| Age, mean ± SD y | 67.0 ± 9.9 |
| Sex, *n* (%) | |
| Female | 143 (37.4) |
| Male | 239 (62.6) |
| GOLD stage, *n* (%) | |
| I | 20 (5.3) |
| II | 152 (40.9) |
| III | 124 (33.4) |
| IV | 76 (20.4) |
| MRC dyspnea scale score, *n* (%) | |
| 1 | 16 (4.2) |
| 2 | 98 (25.7) |
| 3 | 111 (29.1) |
| 4 | 60 (15.7) |
| 5 | 97 (25.4) |
| Economic status, *n* (%) | |
| High | 60 (15.7) |
| Middle | 254 (66.5) |
| Low | 68 (17.8) |

*N* = 382: 372 subjects underwent spirometry testing, and 10 subjects were not able to repeat spirometry.
GOLD = Global Initiative for Chronic Obstructive Lung Disease
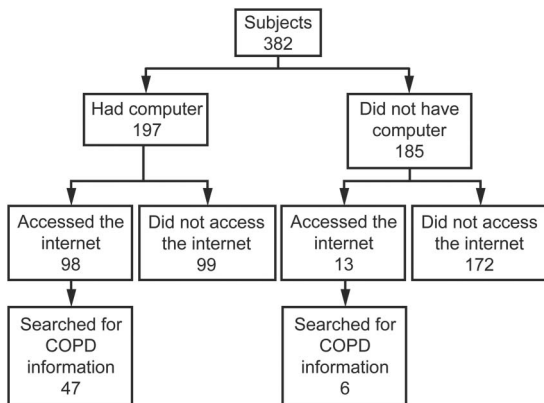MRC = Medical Research Council



Fig. 1. Flow chart.

on the internet, we found that having a computer, the presence of low dyspnea intensity, and inclusion in the high economic class resulted in significant differences. With regard to searching for COPD information on the internet, the odds ratios for subjects with a computer, dyspnea grade 1, and inclusion in the high economic class were 5.9, 5.3, and 8.4 times higher, respectively (Table 3).

Subjects who searched for information on COPD reported accessing the internet from their own homes (*n* = 46, 86.8%), homes of friends or family members (*n* = 4, 7.5%), workplace (*n* = 2, 3.8%), and internet cafes (*n* = 1, 1.9%). In terms of weekly frequency, subjects accessed the internet 1–2 (26.4%), 3–4 (13.2%), 5–7 (13.2%), or > 7 (47.2%) times. When asked about the importance of the internet to their disease knowledge, they answered that the internet helped them a lot (58.5%), moderately (22.6%), little (7.5%), or not at all (11.3%) in their learning.

Among subjects with no access to the internet, 157 (57.9%) expressed their wish to obtain information about the disease through the internet. A large proportion of subjects who did not seek information about COPD on the internet answered that the information provided by the physician was sufficient (Fig. 2).

The web sites accessed by subjects when seeking information on COPD were www.dpoc.org.br (35.9%), www.pacientes.com.br (25.6%), www.abcdasaude.com.br (10.2%), www.pulmonar.org.br (7.7%), www.respireeviva.com.br (7.7%), www.unifesp.br (5.1%), and www.lesf.org (2.5%). These sites were rated as good or excellent quality. According to the subjects, having no computer (*n* = 133, 49.1%), not knowing how to use a computer or the internet (*n* = 71, 26.2%), having no interest (*n* = 36, 13.3%), and disliking computers or the internet (*n* = 31, 11.4%) were the main barriers to accessing the internet.

## Discussion

The internet has become one of the greatest means of communication. Every day, people access the internet for entertainment, work, communication, shopping, studying, and obtaining information on health and diseases.[14-16] Efforts to increase patient information and to involve patients actively in making medical decisions are increasing worldwide. Educating patients with regard to COPD is crucial for better disease management, greater treatment adherence, better symptom control, and consequently, better quality of life.[17] The aim of this study was to assess the proportion of subjects with COPD in São Paulo who access the internet for information about their disease. Only 13.9% of the 382 subjects with COPD who were interviewed used the internet to search for information about their disease, and this access was directly related to high economic level (including education level), low-grade dyspnea, and having a computer at home.

A study of lung cancer subjects in the United States showed they had low interest in seeking information about their disease on the internet.[10] Only 16% of the subjects sought information about their disease on the internet, and their search was also related to higher income and higher education level. Another study conducted in the United States with subjects undergoing cardiac surgery showed that only 21% searched for medical information on the internet.[18] Education level was the most important factor. A low education level and female sex seem to be the main limiting factors in accessing internet information[19];

Table 2. Association Between Subjects With a Computer With Internet Access and Search for Information on COPD

| Parameter | Subject Characteristics | | |
|---|---|---|---|
| | Subjects With a Computer ($n = 197$) | Subjects With Access to the Internet ($n = 111$) | Subjects Who Searched for COPD Information ($n = 53$) |
| Sex, $n$ (%) | | | |
| Female | 65 (45) | 33 (29.7) | 18 (34) |
| Male | 132 (55) | 78 (70.3) | 35 (66) |
| Economic status, $n$ (%) | | | |
| High | 55 (27.9) | 39 (35.1) | 24 (45.3) |
| Middle | 130 (66) | 66 (59.5) | 27 (50.9) |
| Low | 12 (6.1) | 6 (5.4) | 2 (3.8) |
| MRC dyspnea scale score, $n$ (%) | | | |
| 1 | 8 (4.1) | 9 (8.1) | 5 (9.4) |
| 2 | 46 (23.4) | 28 (25.2) | 11 (20.8) |
| 3 | 60 (30.5) | 32 (28.8) | 14 (26.4) |
| 4 | 31 (17.5) | 17 (15.3) | 12 (22.6) |
| 5 | 52 (26.4) | 25 (22.5) | 11 (20.8) |

$P$ values were .04, .04, and .48 for sex; $< .001$, $< .001$, and .09 for economic status; and .86, .18, and .29 for the dyspnea scale.
MRC = Medical Research Council

Table 3. Binary Logistic Regression Analysis of Predictors of Information Search by Subjects With COPD

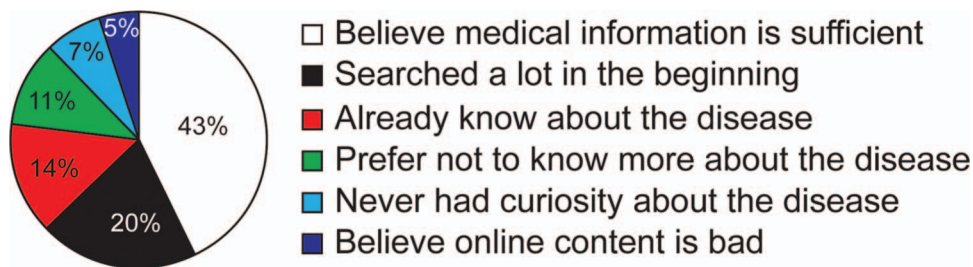| Independent Variable | Coefficient B | SE | $P$ | Exp(B) | 95% CI |
|---|---|---|---|---|---|
| Have a computer | 1.778 | 0.487 | .001 | 5.919 | 2.9–15.4 |
| Sex | −0.077 | 0.356 | .83 | 0.92 | 0.5–1.9 |
| Age | 0.001 | 0.017 | .96 | 1.00 | 0.97–1.1 |
| MRC dyspnea scale score 1 | 1.671 | 0.707 | .02 | 5.31 | 1.3–21.2 |
| High economic status | 2.140 | 0.809 | .008 | 8.49 | 1.7–41.5 |

MRC = Medical Research Council



Fig. 2. Reasons given by subjects with COPD explaining why they did not search for COPD information online.

however, internet access seems to be related to disease severity.[20]

In our regression model, we found that subjects with lower degrees of dyspnea were more likely to seek information about COPD on the internet, possibly because patients in the initial phase of their disease usually have high expectations regarding their treatment. We found no association between age and searching for information. However, in another study, British colorectal cancer subjects younger than 60 y of age were more likely to use the internet to obtain medical information.[7] Similarly, Swiss subjects 25–44 y of age were more likely to search for information on the internet[20]; however, the comparison is not equivalent, as this group was much younger than our subjects (67.9 y old) and the subjects in the British study.[7]

Ease of access to the internet can be a factor related to searching for information. In our study, only 13.9% of subjects sought information on COPD. However, this rate increased to 48% when the evaluation was restricted

to subjects who had internet access. Previous studies have not discriminated internet access by population subgroups; therefore, it is difficult to make comparisons with our results. However, a Dutch study that assessed subjects with pain showed that 39% of them sought specific information about this condition on the internet.[21] Similar to our study, the rate increased to 58% when subjects with internet access were evaluated as a subgroup. This high percentage of subjects seeking information about pain in The Netherlands might be related to the fact that 83% of the general population has internet access.

Not having a computer or internet access (49.1%), not knowing how to use a computer (26.2%), having no interest (13.3%), and disliking computers or the internet (11.4%) were the main reasons that our subjects provided for not using the internet. Our results are similar to those of a United States study in which 53% of cancer subjects claimed lack of a computer as their main barrier to seeking information on the internet.[10] Moreover, in a study of subjects who underwent thoracic surgery in a rural area of the United States, the high cost of internet services was a barrier to internet access.[22]

Regarding quality of information found on the internet, our subjects rated the sites they accessed as being of good or excellent quality. In a Dutch study, 43% of the subjects interviewed also rated the quality of the information as good.[5]

In this study, 43% of the subjects said that they did not access the internet because they considered the information provided by their physicians to be sufficient, and 5% considered the internet content to be incorrect. In a study conducted in England, 80% of the subjects preferred to receive their medical information directly from their physicians; only 19% searched for information on the internet.[21] Similarly, in a study conducted in The Netherlands, the subjects generally preferred to have their medical information provided by their physicians, despite having access to the internet.[5] Subjects in a study conducted in Taiwan stated that they did not seek medical information on the internet due to lack of time, lack of skill in accessing it, motivation, or even dissatisfaction with the information, considering it to be unreliable.[23]

In our study, however, a proportion of the subjects (57.9%) without access to the internet expressed a wish to obtain information about their disease via the internet. This group believed that they could have better control over their symptoms if they knew more about the disease. They also stated that if the physician were to recommend a site, a family member could access the information and pass it along to the subjects. This finding is similar to that described in the literature, in which 60–78% of subjects wished to have an internet source of information about the disease.[10,24,25] These data indicate that the internet will become even more important in the coming years. Although barriers to internet access still exist, we believe that they will decrease with time as technology progresses, making health-care information on the internet more common.

We were unable to quantify the impact of internet use on the doctor-patient relationship or on self-management of the disease. We also did not measure the amount of disease knowledge acquired via the internet due to the difficulty in isolating other media, which generated confounding factors for the analyses.

## Conclusions

Our study shows that in São Paulo, a low percentage of subjects with COPD use the internet to obtain information about their disease. Although this finding is similar to results of studies carried out in other countries and with other diseases, it is the first time that this information has been provided for COPD. Higher economic level, lower dyspnea intensity, and computer availability were found to be the independent predictors for access. Although the percentage of subjects who searched for information online was still low, nearly 60% of the subjects were interested in acquiring knowledge about their disease via the internet. This finding indicates that barriers to internet access tend to decrease as patient interest increases and that use of this medium will increase. Therefore, health-care professionals should encourage their patients to search for information on the internet, refer them to reliable sites, and be available to clarify doubts that might arise. It is still the responsibility of the health-care professional to determine patients' needs, the best method to present this education, and the best method to evaluate the effects. internet cost is likely to remain a barrier unless free access becomes available. Finally, we believe that this information might be generalizable for patients with COPD from other countries, as the profile of our subjects was very similar to those described in the literature, and they were studied according to socioeconomic level.

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