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What do COPD patients do while undergoing their first spirometry examination with a French general practitioner: exploring the experience with a micro-phenomenology approach.

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What do COPD patients do while undergoing their first spirometry examination with a French general practitioner: exploring the experience with a micro-phenomenology approach.

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Abstract

Objectives: To explore the patient experience of a spirometry test used to confirm COPD diagnosis in patients with suspected smoking-related COPD.

Design: This is qualitative study, performed with open interviews in adults following a routine spirometry test to confirm COPD diagnosis. Data were analysed with a phenomenological inspired micro-phenomenology approach.

Participants: Eligible patients were recruited through their general practitioner, ten were interviewed.

Setting: Primary care in Centre-Val-De-Loire area, France, in 2018.

Results: Patients reported the spirometry test experience as being unfamiliar but gave meaning to the symptoms they experience. Participants expressed a desire to perform the test well and a willingness to confront their state of health. After the spirometry and the results announced, participants moved through stages of grief from their pre-spirometry self and symptom perception to a state of acceptance. Overall, participants expressed a narrative of an evolving cognitive and corporeal awareness during this spirometry experience. The verbatims describe a cognitive rupture with their chronic illness usually considered "as a way of life".

Conclusions: A spirometry test goes beyond a diagnostic interest, providing patients with an opportunity to gain awareness of their own state of health, re-frame their breathlessness- related limitations and thus to begin to accept the disease. These may be considered as steppingstones in health behavioural change. Spirometry may have educative potential and support lifestyle changes.

Keywords: *Spirometry; COPD; Primary care; Descriptive phenomenology analysis; Micro-phenomenology*

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Strengths and limits of this study

- The subjectivity of the analysts is fully engaged in the interpretation of the data, which can lead to representations and interpretations that are specific to them.
- The use of this interview method allows patients to unfold their own speech rooted in their real-life experience: thus, it decreases the risk of sociability bias and increase the internal consistency.
- Use of spirometry is not widespread in primary care in France, which may account for the small number of participants
- EI characteristics may account for the rather unusual short length of the interview in DPA research with typically last one hour or more.
- This study respected the 32-checklist COREQ about validity criteria for reporting qualitative research

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is currently the fourth leading cause of death in the world but will be the third in 2020. In France, an estimated 3.5 million people are effected by COPD. The annual social cost of this condition is €3.5 billion and mortality is 16,000 patients per year[1, 2] This burden made COPD a public health priority topic in 2018[3].

COPD is a complex, systemic disease that progresses slowly and insidiously, gradually reducing physical activity levels. Phenomenological studies suggest that COPD involves physical, social, psychological and emotional components, meaning patients adapt their lifestyle to their respiratory status over time[4-6]. This adaptive strategy draws people living with COPD into a downward spiral of physical and psychosocial deconditioning that greatly impacts their quality of life[7]. Also the slow disease progression enables many patients to avoid accepting their declining health and eventual mortality[8]. Although some people with COPD engage coping strategies, many do not and instead, become psychologically and emotionally distressed, continuing to deny their ill health[9]. Most patients express "accepting" COPD as "a way of life"[10]. Using this acceptance strategy means that people adapt their daily living activities to their reducing breathing capacities. However, this strategy reinforces the denial coping mechanism, preventing patients from becoming aware of their disease and identifying opportunities [4, 11-13] which may slow down further deterioration of their condition. For an individual to become aware that their feeling of being ill is a disease, they require a clear diagnosis. Understanding the diagnosis allows individuals to accept the symptoms and the slow progression associated with COPD[14,15]. Breaking with denial and recognising personal limitations related to their symptoms forces patients to deal with the illness[6, 16].

Disease acceptance is the first step towards engaging patients to manage their breathlessness[17]. When patients are empowered to manage their health, they experience fewer exacerbations, adhere better to medication and have better quality of life[17-19].

Numerous health behavioural change models have been described and applied in public health interventions to improve quality of life. Some examine patient experience as part of the decision making process with an identified tipping point of opportunity for change[20] One tipping point for patients with a chronic condition is the minimum belief needed in order to make changes that improve their quality of life. For example, importance of the problem in the patient's life, opportunity in their lifetime to take action, and self-confidence in their ability to achieve this change.

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Spirometry is required to diagnosis COPD. When COPD is diagnosed early, patients report fewer exacerbations compared to undiagnosed patients[21, 22]. Thus, using spirometry for early COPD diagnosis is justified in primary care[23-25]. Although the validity and feasibility of spirometry for COPD diagnosis have been shown in primary care[26, 27] its use is suboptimal requiring a motivated clinician [28-30] and patient collaboration to correctly perform the forced exhalation manoeuvre.

Little is known about the effect that the first spirometry test has on raising patient awareness about their symptoms in primary care. Although concepts such as "Lung Age" have been used to foster smoking cessation[31], spirometry has yet to be shown to motivate patients to change their behaviour and accept their diagnosis. These techniques may be used as a steppingstone to improve delivery of care with chronic respiratory conditions.

The aim of this study was to explore the patient experience following a spirometry test in primary care to determine if this experience could meet criteria for health behavioural change.

Methods

Study design

Theoretical framework

We used a micro-phenomenological approach to analyse open interviews with people who had recently had a COPD diagnosis confirmed with spirometry. This approach is inspired by the phenomenologicial approach, which takes a critical stance for concepts such as "disease", preferring to frame symptoms as mediated by cultural ideas of illness[32].Micro-phenomenology is a relatively recent scientific technique that measures characteristics of a personal, introspective view of an experience[33]. This method explores visual, emotional and auditive experiences around a reference event[34, 35]. It was inspired from an explanatory interview developed by the French psychologist Pierre Vermersch. The interviewer evokes a past experience in a participant, who re-enacts the experience during an open interview. This technique allows researchers to explore the reference event from the pre-reflected consciousness (implicit) to the thoughtful consciousness (explicit)[36]. This micro-phenomenology technique has previously been shown to evoke experiences commonly encountered in primary care, such as acute onset of pain in chronic pain diseases[37].

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Inclusion criteria

Patients who had spirometry confirmed, smoking-related COPD, were eligible for the study. Patients were excluded if they had a history of asthma, advanced heart failure, pre-existing COPD diagnosis, did not speak French, or had dementia. The snowball sampling method to ensure a diverse selection of patient characteristics were obtained: age, gender, socio-economic status.

Patient recruitment

Patients with suspected COPD were recruited by general practitioners via a snowball effect in two rural and one urban general practice in the Centre-Val-de-Loire region of France. All GPs were experienced with spirometry and were working in multidisciplinary care centres. Once a general practitioner had informed an eligible participant about the study, the researcher (AB) approached them by telephone. All interested participants took part in the interviews.

The aim of this micro-phenomenological approach is to identify and understand shared features in this lived experience. Data saturation was not required for this micro-phenomenological approach A sample size of 10 patients was sufficient to elicit common structures.

Study procedure and data collection

An open interview guide including phenomenological prompts and probes focused on the spirometry test experience was developed by the methodological team, (MP and MD). A pilot test was unnecessary for an open interview. Patients were not asked to explain or make sense of the reference event. Speech authenticity was respected and follow-up prompts were intended to encourage participants to recount their personal experience.

The interviews were conducted up to 3 months after the spirometry test was performed and took place in the patient's usual primary care setting. The investigator (AB) introduced himself as a medical student specialised in general practice. He had no previous connection with the participants. After providing their consent to participate in the study, participants were asked to describe their thoughts at three specific time points: before spirometry, at the time of spirometry, and at the announcement of results. The interviews were performed once and recorded with a mobile phone, the verbatim transcribed, anonymised and labelled. Additional field notes were made during the interviews and

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included in the analysis. The participants were given the opportunity to stop at any time and were informed that their responses and personal information would remain anonymous. No time limit was expected for the interview but the time frame was limited to before, during and after spirometry. The course of the interview is given in Appendix 1.

Reliability criteria

The investigator AB was trained in micro-phenomenological technique and all researchers involved in data collection and analysis had previous experience in conducting qualitative research studies. The study was designed and reported in line with COREQ guidelines[38] (Appendix 5).

To avoid subjective influence, investigators remained impartial. A work of putting in suspension theoretical knowledge, the *a priori* and the expected answers was carried out on the part of the analyst and a will to be surprised by the results were respected.

Ethical considerations

All participants signed informed consent forms and all audio recordings were destroyed after transcription and anonymisation. Ethics committee approval was obtained by the local ethical review board (Comité central de réflexion éthique, No. 2017 047). The study was conducted in accordance with all French regulations. (Appendix 4).

Data analysis

The micro-phenomenological approach is a descriptive method for classifying re-lived experiences. The analysis performed was similar to the process described by Valenzuela-Moguillansky et al[39]. Topic guides and coding framework are given in Appendix 2 and 3. Before data collection, investigator triangulation was performed to obtain a comprehensive picture. The results a priori were elucidated from four investigators, two general practitioners, one physiotherapist and one narrative medicine specialist. These data were converged and grouped into three categories, (cognitive, perception and feeling) according to the description criteria for experience in the phenomenological approach described in the literature[40]. These three categories enabled us to conceptualise the process with which patients make health behavioural changes after consensual discussion among investigators.

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Emergent categories were captured, respecting the possibility the investigator may be surprised by the results. The emergent categories were derived from the data and presented in order of three time points; before during and after spirometry.

Results

Ten people agreed to participate and were interviewed. There were six males and four females, aged between 40 to 76 years (mean 59). Seven were active smokers and three were ex-smokers. Smoking history ranged from 10 to 40 pack-years (mean: 26). The interviews were carried out between 26/07/2017 and 18/03/2018 and lasted between 20 and 37 minutes. The characteristics of the patients and the interview are summarised in *Table 1*. The transcripts were numbered EX – EY and the emergent categories are presented here in chronological order before, during and after the spirometry text experience. The results are presented here as phenomenological statements in the present tense, including only meaningful words.

Table 1: *Patient's characteristics*

Before spirometry

Before their first spirometry, the participants described feeling as if they were getting involved in a mysterious experiment. Although willing, they felt apprehensive about discovering the reason for their ill health. "*There's a moment you have to... dot the i's and cross the t's, see what happens, so here we go ... let's go»*(E1). Discovering the device was a new, unusual experience for these patients *"... I was not used to doing this ... these tests ... " (E3) "... because I did not know that stuff..." (E8).* For some, having confidence in their doctor made the feeling of uncertainty for the future diagnosis more bearable. *"...after all, we never know what is in store for us ..., so we look everywhere but ... it's my doctor, I'm confident ... "(E7)* Patients also reported feeling apprehensive about breathing into the device. *"Then suddenly I was told: "Ok, we will have you blow in the machine "(E1). "In fact; it's super scary!; I say to myself I hope it's okay ... I'm not going to be too sick ..." (E9) "we know but we do not want to know, we have strong doubts "(E1).* Patients also experienced somatic symptoms of stress before breathing into the device. *"I'm starting to stress" (E10) "my heart is beating at 150" (E1). "I had the feeling my whole body was tense" (E1). "Few sweats and knots in the stomach" (E9). "...my stomach is tying itself in knots and I say to myself, this is happening .. well what are we going to find." (E10)* Patients also expressed feeling stressed about the expected outcome of the

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examination. *“we know but we don’t want to know, we have reasonable doubts “(E1) “I tell myself: I hope it's okay ... I mean ... I'm not going to be too sick” ..." (E10)*

During spirometry

The participants described the spirometry test as being strange, unsettling and painful. The emergent lexical field portrayed the spirometer as discovering a new and unimportant object.*"... it is a tool” (E3) "...he makes me blow in the, I don’t know what…” (E4) “I blow again in the thing”(E4) ...* As an appropriation strategy, some patients give the device a nickname*”... I call it a toy ... precisely which are design to do the test…to blow in ... in the trumpet ...”(E8).*

The participants described the forced expiratory manoeuvre as an uncomfortable experience*"... this horrible thing really tried me" (E8) ".. it makes me cough like an animal.” (E4)“... ‘it’s too big for me…” (E4). " I felt like there was no resistance ...in the device.”(E2)* Some even described the manoeuvre as being painful to exhale so strongly. *"It hurts my head to have blown like that… ”(E5). "It makes my head turn…" (E7)* Nevertheless, patients were engaged and motivated to achieve the best result possible. *“I tried to blow out and hold as long as possible ....” (E2) "... I think I've reached the end" (E5“) "I have no more oxygen in my ... in my lungs" (E6).“...I'm empty...”(E3).“... I breathe until I feel that I can’t breathe any more”...(E3).* Some felt a desire or an anxiousness to perform well. *"I feel like I'm not good at blowing" (E2) "As long as I stand tall... well in the rank, and the results are good, that's fine "(E5).*

Participants expressed having a heightened awareness about their health status.

The participants voiced that spirometry made them conscious that there was a problem with their health.*"... I understand it ... since I felt it ..." (E3). "I'm not surprised ..." (E7). "It affects you" (E1)* Furthermore, they expressed a realisation of their limitations. *“By the finding, I had trouble expelling a lot of air" (E3). "...the inside of it ... makes a noise ... "(E9)." I say to myself ... I've lost my breath ... "(E9)" ... well, it's when I heard my lungs that ... that I knew I did not blow well "(E9).*

After spirometry

The participants also voiced being apprehensive about getting the results and felt conflicted between wanting to have a diagnosis and being afraid of the diagnosis. Feelings of grief were expressed when asked to recall the moment the spirometry results were announced. These expressions of grief followed the stages described by E. Kubler-Ross[41]:

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1. shock

"... I tell myself it was not good news ..." (E3)

"Well the end of consultation… the rest was much less important for me ..." (E3)

2. denial

"For me it's not suitable ... it's the system I do not say the device ... it's the system ... "well after I say ... he is kidding" (E8)

"I thought this was a joke" (E5)

3. sadness and cognitive saturation:

"Well, I tell you I felt shame, sadness" (E1)

"I was glad when it ended, I think I had had enough for that day, I had heard enough ..." (E1).

4. Anger and shame

"... it's very distressing (tears)... but there is more to this side ... this mortifying side last longer"(E1)

"... if you are told that you have weakness somewhere… it's a little upsetting"(E2)

"I'm afraid that ... I'll have cancer" (E10)

"Well it breaks my heart ... I have a friend who died of that .... because of cigarettes ... a heart attack" (E6)

5. Expectation for more information:

"... I think ... I was expecting more explanations ..." (E7)

"... I'm thinking ... I'm going to try to smoke less ..." (E9)

"... I'm thinking about stopping smoking..." (E6)

" I think I should try to quit" (E10)

"I tell myself that I smoke too much" (E9)

6. Pain and depression

"... it is like a sentence of the condemned "(E1)

7. *Rebuilding*

"...you know, when you have to go to war… well, it's a bit similar»(E1)

"*I can cope with COPD" E1)*

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"I tell myself she's right" (E6)

"Well…I feel like I'm starting to realise" (E10)

"…now, I can look to the future" (E1)

8. The consultation even enabled some patients to accept the disease

"there's a kind ... of ... I would call it: acceptance (E1)

" ... well it is a diagnosis which I expected "(E7)

"... he tells me it's a ... it's a chronic bronchitis " (E9)

The consultation that follows the spirometry test is also a meaningful part of the patients' experience.

"He concludes that I do not have asthma" (...) *"it somehow reassures me" (E3)*

"… I felt a little improvement with his medication ... so what happens to me is that well ... that reassures me a little bit" (E3).

Discussion:

The experiences the participants reported indicate that spirometry can instigate health behavioural change. Although there have been no other reports of spirometry experience using micro-phenomenology, our results are consistent with the life history of a COPD patient and may provide a breakthrough point for change. These findings indicate that a change occurs when people with confirmed COPD have a spirometry test. These people change from a state where they are willing but apprehensive about the diagnosis and advance to a state of acceptance. This process is similar to the stages of grief described by Kubler Ross[42] and corresponds with the step wise processes of the change model described by Prochaska and Di Clemente[20].

Indeed**,** we observed that a spirometry test creates a situation which combines three characteristics of health behavioural change models; importance, opportunity and confidence[43]. Importance refers to the magnitude of the problem for the patient, opportunity refers to the timing to take action, and confidence is the self-belief in success. Combining these three characteristics of behavioural change motives people living with a chronic disease to engage in self-management with shared decision making[44, 45].

Thus, spirometry may be a key moment for patient empowerment in COPD.

Importance

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Our findings highlight that spirometry as diagnostic tool is important to participants. The participative nature of the spirometry test, elicited a sense of urgency, which encourages the patient's drive to become actively involved in managing their health. This active participation was illustrated by the desire participants expressed to perform well: "*I tried to blow in and hold for as long as possible*" (E1). Spirometry also enabled the participants to confront their state of their own health and their limits. *" I understand", "I heard my lungs", I'm not surprised"* These results show that participants understood that their lungs were the source of their ill health, unlike other qualitative research studies using thematic analysis, which suggested that patients passively accepted and resigned themselves to their circumstance[11]. When patients actively participate in measuring their physical limits, they gain awareness about the impact of the disease. "*what are we going to find?" (E10)* This shows that the patients understand the importance and magnitude of their disease as described in the motivation interviewing model[46].

Opportunity

During spirometry the participants described the experience as being uncomfortable but resembled the symptoms with which they live daily. These illness perceptions are meaningful as they refer to the participants' own life experience. After spirometry, patients expressed a cognitive intention to stop smoking. "*I should try to quit(E10)"* The micro-phenomenological inspired approach adopted in this study, enabled us to explore the patients' emotional experience during spirometry in primary care settings with the empathic support of their own GP. Our data on perception, cognition and emotion suggest that spirometry testing may be an optimal time for primary care clinicians to support their patients to make behavioural changes, such as increasing physical activity or reducing smoking. This reflects similar accounts where lung function testing is an opportune moment to change patient attitudes toward smoking cessation[47, 48].

Confidence

Although the spirometry test felt strange and forced participants to struggle with their symptoms, they remained confident in their ability to manage their health with their doctor, "*we never know what is in store for us, but ... it's my doctor, I'm confident" (E3).* Also, verbatim from the debriefing indicated that participants were confident in their ability to reduce or even stop smoking. This self-confidence is a key step in the process of changing behaviour[43].

Strengths and limits of the study

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To our knowledge, this is the first phenomenological study on spirometry for COPD conducted to date. MP analysis from open elicitation interview has been used in the fields of psychiatry, pedagogy, neuroscience however few studies have applied this technique in primary care[35].

Although this micropheomenological-inspired analysis is limited by the qualitative nature of the study, the open elicitation interview gave us access to participant emotions during spirometry in a primary setting. Although we were aware that researcher attitudes may have influenced the data interpretation, investigator triangulation reduced this possibility of bias. Also, by employing an open elicitation interview participant were able to retell their experience as they lived it, in their own words. This decreased the potential for sociability bias and increased the internal consistency.

The time frame explored through the interview was limited to the short period around the spirometry examination, and some patients had little insight into the spirometry experience that they underwent. This may account for the unusually short interview length for a phenomenological approach, which typically lasts for at least one hour. Other elements surrounding the spirometry experience such as the context of realisation or the relationship with the health professional involved in the spirometry test experience could have been further explored.

Although the sample size was small, it was within recommended limits for DPA research and may have been restricted by the limited use of spirometry in primary care in France[25, 49].

Perspectives

The unique choice of combining a micro-phenomenological analysis and an open elicitation interviewing technique highlighted that spirometry is useful as a diagnostic tool, as well as a tool to empower people with COPD to drive behavioural change. This is consistent with other studies that explored the patient experience of a technical act where patients were more concerned with the attitude of the team and the personal attention they received[49]. Moreover, a recent paper on mobile health in COPD showed that personalised feedback is needed to engage patients[44]. These results highlight the various fields involved when patients experience a medical act. This suggests that there is a need to investigate the patient experience concerning other technical gestures in primary care to promote self-confidence in patient self-management, facilitated by a health professional caring attitude.

Conclusions

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Our findings indicate that with spirometry, people living with COPD are capable of recognising their own limitations, adapting their activities to their lung capacity and displaying a desire to modify behaviour. Spirometry gives patients an opportunity to express an intention to change.

Author statement

At the time of data collection:
M.BREMOND : physiotherapist, Msc
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H.BRETON : Sociologist, PhD
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M.PAUTRAT : senior registrar, general practitioner MD, Msc

Author's contribution :
M.P. and M.B. conceived the original idea and designed the model
M.B. and A.B. carried out the experiment, and wrote the manuscript
H.B. and L.P. helped supervise the project
M.P. directed the project
All authors provided critical feedback and helped shape the research analysis on manuscript.

Data statement

The full dataset is available from the corresponding author.

Patient and Public Involvement statement

Neither the patient nor the public were involved in the design, conduct, reporting or dissemination plans of our research.

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Appendix 1 : course of the interview

Structure globale du déroulement entretien explicitation selon P. Vermersch

- **Contextualisation** de l'évènement vécu à explorer : L'interviewer et l'interviewé s'accorde sur l'événement du vécu, identifiable dans le temps et dans l'espace avec un début et une fin.

-**Établissement d'un contrat de communication** : l'interviewer doit donner son accord pour évoquer l'évènement de référence afin de ne pas induire une «intrusion »mais une verbalisation spontanée. L'entretien début par une phrase d'accroche de type : «*Mr ou Mme….je vous propose si vous en êtes d'accord, de laisser revenir un moment de… »*

-I**nitialisation** : début de l'entretien, mise en confiance et balayage temporel du vécu.

-**Guidage vers la verbalisation de l'évènement et la position de parole incarnée** : Le sujet doit être dans l'évocation, c'est-à-dire la verbalisation authentique de son vécu. L'interviewer vérifie la présence des indicateurs habituels de l'évocation : ralentissement de la vitesse d'élocution, baisse de tonalité, fuite du regard, langage plus sensoriel, langage corporel avec gestes d'accompagnement

-**Identification des informations satellites de l'action** : Description ci-dessous du recueil d'information par l'entretien d'explicitation

-**Focaliser** : L'interviewer recentre ses questions sur un point du vécu particulier

-**Élucider** : L'interviewer affine son questionnement et ses relances en évitant d'utiliser le «pourquoi »pour guider la verbalisation d'une information pertinente et obtenir un niveau de description conforme avec l'objectif de recherche.

-**Réguler** : L'interviewer vielle à ce que le sujet reste en évocation, régule ses échanges, ralentit la vitesse d'élocution.

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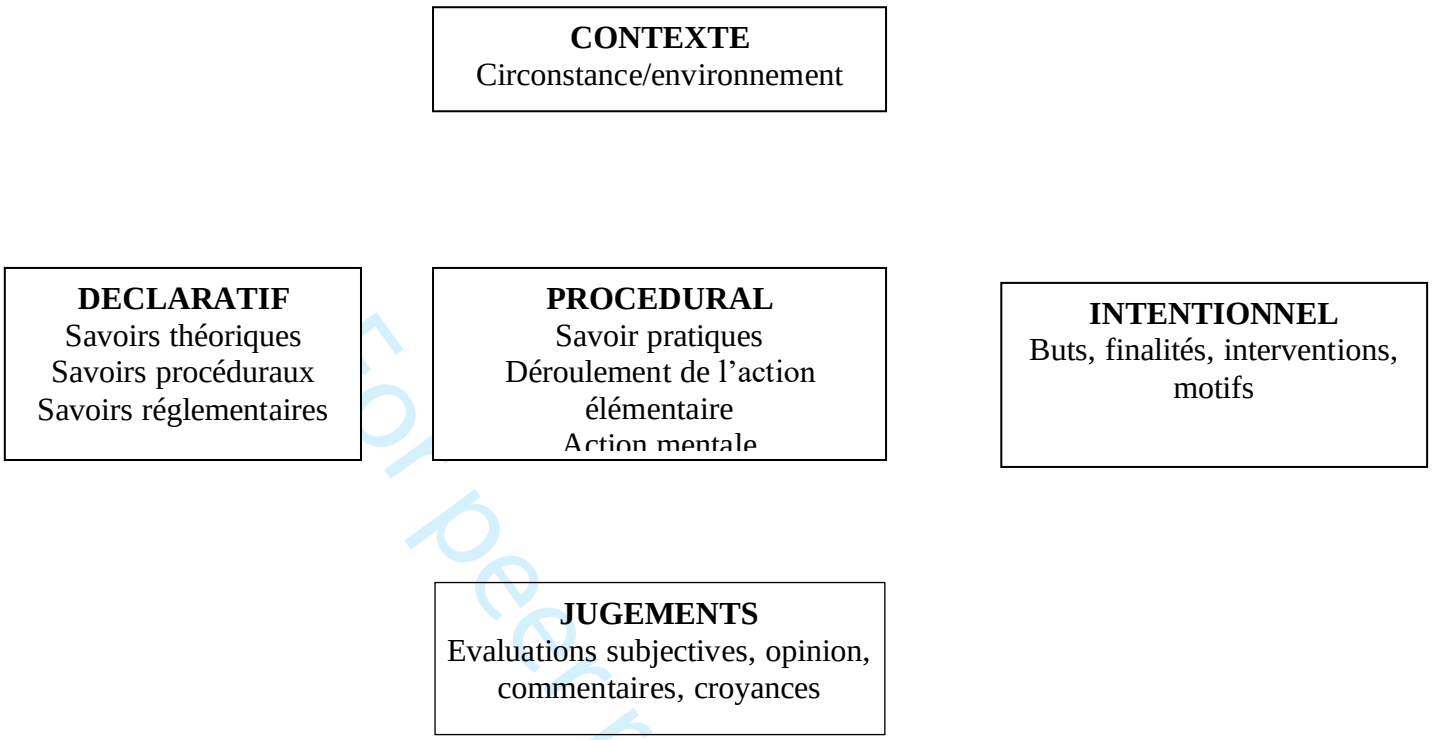
Appendix 2 : Topic guides



Le système des informations satellites de l'action

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Appendix 3 : coding framework

Les différentes phases d'une analyse phénoménologique interprétative (33)

ETAPES	OBJECTIFS
Étape 1 : écoute, lecture et relecture de l'entretien	Immersion dans les données et entrée dans le monde du participant (démarche compréhensive)
Étape 2 : annotations initiales	Production d'un ensemble de notes et de commentaires compréhensifs et détaillés sur les données en considérant le contenu sémantique du discours ainsi que le langage utilisé par le participant
Étape 3 : développement de thèmes émergents	Production de thèmes reflétant à la fois le discours du participant et la démarche d'interprétation active de l'analyste
Étape 4 : recherche de liens entre les thèmes émergents	Production d'une structure capable de rendre compte des aspects les plus intéressants et importants du récit du participant en regroupant et mettant en liens les thèmes produits lors de l'étape précédente
Étape 5 et 6 : passage au cas suivant et recherche de liens entre les entretiens	Application des étapes 1 à 4 sur un nouvel entretien puis recherche des liens entre les différents entretiens sélectionnés pour l'analyse

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Appendix 4 : Ethical considerations

GROUPE ETHIQUE D'AIDE A LA RECHERCHE CLINIQUE POUR LES PROTOCOLES DE RECHERCHE NON SOUMIS AU COMITE DE PROTECTION DES PERSONNES
ETHICS COMMITTEE IN HUMAN RESEARCH

AVIS

Responsable de la recherche : Dr Anthony BERTHELOT
Titre du projet de recherche : Exploration du ressenti des patients bénéficiant d'un dépistage de la Broncho Pneumopathie Chronique Obstructive (BPCO) en médecine générale par spirométrie
N° du projet : 2017 047

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☐ **DÉCLARATION D'INCOMPÉTENCE**

au projet de recherche n° 2017 047

A Tours, le

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Numéro de déclaration

2057086 v 0

du 25 avril 2017

Monsieur BERTHELOT Anthony
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Finalité : THÈSE D'EXERCICE DE MÉDECINE DONT LE SUJET PORTE SUR L'EXPLORATION DU RESSENTI DES PATIENTS QUI SONT DÉPISTÉS PAR LEUR MÉDECIN TRAITANT D'UNE MALADIE PULMONAIRE CHRONIQUE APPELÉE BPCO PAR LE BIAIS D'UNE SPIROMÉTRIE. LES PATIENTS SONT INVITÉS PAR LEUR MÉDECIN TRAITANT À PARTICIPER À UN ENTRETIEN POUR EXPLORER LEUR VÉCU DE CE DÉPISTAGE ET REMPLISSENT LE FORMULAIRE DE CONSENTEMENT. LES ENTRETIENS SONT RÉALISÉS SELON LA MÉTHODE DE L'ENTRETIEN D'EXPLICITATION, C'EST À DIRE QUE LE PATIENT VERBALISE...

Fait à Paris, le 25 avril 2017
Par délégation de la commission

Isabelle FALQUE PIERROTIN
Présidente

Appendix 5 : COREQ Checklist

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.			
No.	Item	Guide questions/description	Response/page number referenced
Domain 1: Research team and reflectivity			
Personal characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	Page 7 (Patient recruitment section): "They were all performed by the same investigator (AB), a MD student of general medicine"
2.	Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 19 (Author statement section): "at the time of data collection : M.BREMOND : physiotherapist, Msc A.BERTHELOT : GP student H.BRETON : Sociologist, PhD L.PLANTIER : physiologist, PhD M.PAUTRAT : senior registrar, GP MD, Msc"
3.	Occupation	What was their occupation at the time of the study?	Page 19 (Author statement section, as above)
4.	Gender	Was the researcher male or female?	Not relevant in the context of this study as would not have affected conduct or analysis of focus groups on pain assessment.
5.	Experience and training	What experience or training did the researcher have?	Page 14 (Discussion section): "All researchers involved in data collection and analysis had conducted and been involved in prior qualitative research studies."
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Not applicable as professional relationships were used as the basis for recruitment (snowballing).
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research.	Page 7 (Patient recruitment section): "investigator (AB), a MD student of general medicine without any connection to any of the participants"

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			Participants were also given a brief background to the rationale of the study when they signed the informed consent.
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic.	Bias/assumptions reported on Page 14 (Discussion section): "A work of putting in suspension theoretical knowledge, the a priori and the expected answers was carried out on the part of the analyst and a will to be surprised by the results were respected." Reasons and interest in the topic area reported on Page 5 (Introduction section): "spirometry has yet not been associated with increased motivation for healthy behaviour "
Domain 2: study design			
Theoretical framework			
9.	Methodological orientation and theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 5 (Exploration of the experience section): "A phenomenological analysis inspired by Micro-Phenomenology (MP) approach was used. Micro-phenomenology is a method of descriptive phenomenology inspired by the 'entretien d'explicitation' [...] a method of open non-inductive interview "
Participant selection			
10.	Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 6 (Patient recruitment section): " Patients were recruited by the snowball effect in several rural or urban general practices "

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11.	Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 6 (Patient recruitment section): " They were approached by AB by phone after their GP told them about the study"
12.	Sample size	How many participants were in the study?	Page 8 (Results section): " Six men and four women, aged from 40 to 76 years (mean :59), were interviewed"
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Not applicable- All who registered interest took part in the interviews.
Setting			
14.	Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 7 (Patient recruitment section): " The interviews took place in the usual primary care settings."
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Not applicable- no other persons present during conduct of interviews.
16.	Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Participant characteristics: Table 1.
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Not applicable as no specific interview guide
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Not applicable - interviews are not repeated.
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 7 (Patient recruitment section): "The interviews were recorded, transcribed verbatim, and anonymized."
20.	Field notes	Were field notes made	Page 7 (Patient recruitment section):

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		during and/or after the interview or focus group?	"Field notes collected by the researchers during the conduct of interviews were used to provide additional context to the analytical process."
21.	Duration	What was the duration of the interviews or focus group?	Page 8 (Results section): " The interviews lasted between 20 and 37 minutes."
22.	Data saturation	Was data saturation discussed?	Not applicable as not an aim of this micro-phenomenological approach.
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Not applicable as transcripts were not returned to participants.
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	Page 7 (Patient recruitment section): " This descriptive phenomenological analysis has been carried out by all the researchers following the process described in the literature."
25.	Description of the coding tree	Did authors provide a description of the coding tree?	Not applicable for this micro-phenomenological approach.
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Page 8 (Results section): Coders not defined what would be considered a significant theme prior to data analysis but for clarity "The results were presented chronologically from before spirometry, during spirometry, and after spirometry. ".
27.	Software	What software, if applicable, was used to manage the data?	No specific software was used, only Excel to help with classification
28.	Participant checking	Did participants provide feedback on the findings?	Not applicable as participants did not provide feedback on the data/findings.
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number.	Page 8-Page 12 (Results section): Quotations are presented throughout the text alongside interpretations.
30.	Data and findings consistent	Was there consistency between the data presented and the	Page 8-12 (Results section): Quotations are presented alongside interpretations for transparency between data and

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		findings?	findings.
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Page 8-12 (Results section): the results have been presented chronologically and the most symbolic quotations have been organised in this chronology
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	The micro-phenomenological approach does not make it possible to list certain major or minor themes in the results. The discussion gives meaning to the most significant quotations

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A micro-phenomenological approach to explore the patient experience during an initial spirometry examination to diagnose COPD in general practice in France

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A micro-phenomenological approach to explore the patient experience during an initial spirometry examination to diagnose COPD in general practice in France

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Abstract

Objectives: To explore the patient experience of a spirometry test used to confirm COPD diagnosis in patients with suspected smoking-related COPD.

Design: This is a qualitative study, performed with open interviews in adults following a routine spirometry test to confirm COPD diagnosis. Data were analysed with a phenomenological-inspired micro-phenomenology approach.

Participants: Eligible patients were recruited through their general practitioner, ten were interviewed.

Setting: Primary care in Centre-Val-De-Loire area, France, in 2018.

Results: Participants reported the spirometry test experience as being unfamiliar but gave meaning to the symptoms they experience. Participants expressed a desire to perform the test well and a willingness to confront their state of health. After the spirometry had been completed and the results announced, participants moved through stages of grief from their pre-spirometry self and symptom perception to a state of acceptance. Overall, participants expressed a narrative of an evolving cognitive and corporeal awareness during this spirometry experience. The verbatims describe a cognitive rupture with their chronic illness usually considered as a "way of life".

Conclusions: A spirometry test goes beyond a diagnostic interest, providing patients with an opportunity to gain awareness of their own state of health, re-frame their breathlessness-related limitations and thus begin to accept the disease. These may be considered as steppingstones in health behavioural change. Spirometry may have educative potential and support lifestyle changes.

Keywords: *Spirometry; COPD; Primary care; Descriptive phenomenology analysis; Micro-phenomenology*

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Strengths and limitations of this study

- The researchers coded the verbatim separately and cross checked between them avoid subjective bias.
- This interview method allows participants to express themselves freely about their real-life experience: thus, it decreases the risk of sociability bias and increases the internal consistency.
- The use of spirometry is not widespread in primary care in France, which may account for the small number of participants.
- The elicitation interview may have been limited in this specific population due to a low level of insight into the procedure. This may account for the unusually short interview length compared with the descriptive phenomenological approach.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is currently the fourth leading cause of death in the world but will be the third in 2020, and in France, an estimated 3.5 million people are affected. The annual social cost is €3.5 billion and mortality is 16,000 patients per year[1, 2] This burden made COPD a public health priority topic in 2018[3].

COPD is a complex, systemic disease that progresses slowly and insidiously, gradually reducing physical activity levels. Phenomenological studies suggest that COPD involves physical, social, psychological and emotional components, meaning patients adapt their lifestyle to their respiratory status over time[4-6]. This adaptive strategy draws people living with COPD into a downward spiral of physical and psychosocial deconditioning that greatly impacts their quality of life[7]. Also, the slow disease progression enables many patients to avoid accepting their declining health and eventual mortality[8]. Although some people with COPD engage coping strategies, many do not and instead, become psychologically and emotionally distressed, continuing to deny their ill health[9]. Most patients express "accepting" COPD as a "way of life"[10]. Using this acceptance strategy means that people adapt their daily living activities to their reducing breathing capacities. However, this strategy reinforces the denial coping mechanism, preventing patients from becoming aware of their disease and identifying opportunities [4, 11-13] which may slow down further deterioration of their condition. For an individual to become aware that their feeling of being ill is a disease, they require a clear diagnosis. Understanding the diagnosis allows individuals to accept the symptoms and the slow progression associated with COPD[14, 15]. Breaking with denial and recognising personal limitations related to their symptoms forces patients to deal with the illness[6, 16].

Disease acceptance is the first step towards engaging patients to manage their breathlessness[17]. When patients are empowered to manage their health, they experience fewer exacerbations, adhere better to medication and have better quality of life[17-19]. Some health behavioural change models examine patient experience as part of the decision-making process with an identified tipping point of opportunity for change[20]. One tipping point for patients with a chronic condition is the minimum belief needed in order to make changes that improve their quality of life. For example, the importance of the problem in the patient's life, the level of opportunity in their lifetime to take action, and self-confidence in their ability to achieve this change.

Spirometry is required to diagnosis COPD. When COPD is diagnosed early, patients report fewer exacerbations compared to undiagnosed patients[21, 22]. Thus, using spirometry for early COPD diagnosis is justified in primary care[23-25]. Although the validity and feasibility of spirometry for

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COPD diagnosis have been shown in primary care[26, 27], its use is suboptimal, requiring a motivated clinician [28-30] and patient collaboration to correctly perform the forced exhalation manoeuvre.

Little is known about the effect the first spirometry test has on raising patient awareness about their symptoms in primary care. Although concepts such as "Lung Age" have been used to foster smoking cessation[31], spirometry has yet to be shown to motivate patients to change their behaviour and accept their diagnosis. These techniques may be used as a steppingstone to improve delivery of care to patients with chronic respiratory conditions.

The aim of this study was to explore the patient experience following a spirometry test in primary care to determine if this experience could meet criteria for health behavioural change.

Methods

Study design

The phenomenological interview

Micro-phenomenology is a novel analytic technique to measure the introspective, personal view of an experience by exploring visual, emotional and auditive experiences around the reference event [32-34]. This approach was inspired by the more complex phenomenological approach, which challenges the concept of disease, whereby signs and symptoms are mediated by cultural ideas of illness.[35] The interview technique was inspired by an explanatory interview developed by the French psychologist Pierre Vermersch. Using this technique to elicit the patient experience, the interviewer evokes a past experience within the interviewee, who in turn re-enacts the experience during an open interview. This technique allows researchers to explore the reference event from the pre-reflected consciousness (implicit) to the thoughtful consciousness (explicit)[36]. This micro-phenomenology technique has previously been shown to evoke experiences commonly encountered in primary care, such as acute onset of pain in chronic pain diseases[37].

Participants

Ten adults who had spirometry-confirmed, smoking-related COPD, participated in this study of which, six were male and four female, aged between 40 to 76 years (mean 59). The mean age was 59 years, range (40 -76) and lung function (mean FEV1) was 62% (range: 35-85%). There were of

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which. Seven were active smokers and three were ex-smokers and and a smoking history that ranged from 10 to 40 pack-years (mean 26). Patients were excluded if they had a history of asthma, advanced heart failure, pre-existing COPD diagnosis, did not speak French or had dementia. The snowball sampling method was used to ensure a diverse selection of patient characteristics were obtained: age, gender, socio-economic status. Six participants lived in a rural environment, four had retired, five were in current employment and one was unemployed. Among those with current or previous employment, six were manual workers, three were office-based workers and one was a health professional. All but three participants were being treated with inhaled therapy for their respiratory symptoms.

Patient recruitment

Patients with suspected COPD were recruited by general practitioners (GPs) in two rural and one urban general practice in the Centre-Val-de-Loire region of France. All GPs were experienced with spirometry and were practicing in multidisciplinary care centres. Once a general practitioner had informed an eligible participant about the study, the researcher (AB) approached them by telephone. All interested participants took part in the interviews.

Study procedure and data collection

The research team, (MB, AB and MP) developed an open interview guide with phenomenological prompts and probes focused on the spirometry test experience. A pilot test was unnecessary for an open interview. Patients were not asked to explain or make sense of the reference event. Speech authenticity was respected, and follow-up prompts were intended only to encourage participants to recount their personal experience. Data saturation was not required for this micro-phenomenological approach as the objective was to identify and understand shared features in this lived experience. Thus, a sample size of 10 patients was considered sufficient to elicit common structures.

The interviews were conducted up to 3 months after the spirometry test was performed and took place in the patient's usual primary care setting. The investigator (AB) introduced himself as a medical student specialised in general practice. He had no previous connection with the participants. After providing their consent to participate in the study, participants were asked to describe their thoughts at three specific time points: before spirometry, at the time of spirometry and at the announcement of results. The interviews were performed once and recorded with a mobile phone, the verbatim transcribed, anonymised and labelled. Additional field notes were made during the interviews and included in the analysis. The participants were given the opportunity to stop at any time and were

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informed that their responses and personal information would remain anonymous. No time limit was expected for the interview apart from the defined timepoints. The interview was structured according to P. Vermersch[36].

Reliability criteria

The investigator AB was trained in micro-phenomenological technique and all researchers involved in data collection and analysis had previous experience in conducting qualitative research studies.

To avoid subjective influence, investigators remained impartial, laying aside theoretical knowledge, *a priori* and the expected answers. Analysts remained impartial and willing to be surprised by the results.

Ethical considerations

All participants signed informed consent forms and all audio recordings were destroyed after transcription and anonymisation. Ethics committee approval was obtained by the local ethical review board (Comité central de réflexion éthique, No. 2017 047). The study was conducted in accordance with all French regulations.

Data analysis

The analysis was performed in accordance with the process described by Valenzuela-Moguillansky et al[38]. The coding framework consisted of six steps as outlined in Table 1. Before data analysis, investigator triangulation was performed to obtain a comprehensive picture. The results *a priori* were elucidated from four investigators, two general practitioners, one physiotherapist and one narrative medicine specialist. The investigators used an iterative process and were careful to allow the themes to emerge from the data. After consensual discussion among investigators these data were converged and grouped into three categories, according to the description criteria for experience in the phenomenological approach (cognitive, perception and feeling) [39]. These three categories provide a conceptual framework in which patients make health behavioural changes.

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Table 1: The six steps of coding framework

Steps	OBJECTIFS
Step 1: listen, read and reread the interview	Data immersion and entry into the participant's world (comprehensive approach)
Step 2: initial annotations	Produce a set of comprehensive and detailed notes and comments on the data considering the semantic content of the speech as well as the language used by the participant
Step 3: Develop emerging themes	Produce themes reflecting both the participant's discourse and the analyst's active interpretation process
Step 4: Identify links between emerging themes	Produce a structure capable of reflecting the most interesting and important aspects of the participant's story by grouping and linking the themes produced in the previous step
Step 5 and 6: move on to the next case and search for links between the interviews	Apply steps 1 to 4 on a new interview then search for links between the different interviews selected for analysis

Results

Ten people agreed to participate and were interviewed. The interviews were carried out between 26/07/2017 and 18/03/2018 with a mean duration of 27.15mins (range 20-37 mins). The transcripts were numbered EX – EY and the emergent categories are presented here in chronological order before, during and after the spirometry text experience. To illustrate the context for the reported

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experiences, the emergent categories derived from the data are presented chronologically; before during and after spirometry, in the present tense, including only meaningful words.

Before spirometry

Before their first spirometry, the participants described feeling as if they were getting involved in a mysterious experiment. Although willing, they felt apprehensive about discovering the reason for their ill health. *"There's a moment you have to...dot the i's and cross the t's, see what happens, so here we go...let's go"* (E1). Discovering the device was a new, unusual experience for these patients *"I was not used to doing this ... these tests ..." (E3), "...because I did not know that stuff" (E8).* For some, having confidence in their doctor made the feeling of uncertainty for the future diagnosis more bearable. *"...after all, we never know what is in store for us, ... so we look everywhere but ... it's my doctor, I'm confident ... " (E7).* Patients also reported feeling apprehensive about breathing into the device. *"Then suddenly I was told: 'Ok, we will have you blow in the machine'"(E1). "In fact, it's super scary!; I say to myself I hope it's okay ... I'm not going to be too sick ..." (E9). "We know but we do not want to know; we have strong doubts" (E1).* Patients also experienced somatic symptoms of stress before breathing into the device. *"I'm starting to stress" (E10), "my heart is beating at 150" (E1). "I had the feeling my whole body was tense" (E1). "Few sweats and knots in the stomach" (E9). "My stomach is tying itself in knots and I say to myself, 'this is happening .. well, what are we going to find?'" (E10).* Patients also expressed feeling stressed about the expected outcome of the examination. *"We know, but we don't want to know; we have strong doubts" (E1). "I tell myself: 'I hope it's okay ... I mean ... I'm not going to be too sick' ..." (E10).*

During spirometry

The participants described the spirometry test as being strange, unsettling and painful. The emergent lexical field portrayed the spirometer as discovering a new and unimportant object. *"It is a tool" (E3), "...he makes me blow in the, I don't know what..." (E4), "I blow again in the thing." (E4).* As an appropriation strategy, some patients give the device a nickname. *"I call it a toy ... precisely which are design to do the test...to blow in ... in the trumpet ..." (E8).*

The participants described the forced expiratory manoeuvre as an uncomfortable experience. *"This horrible thing really tried me." (E8) "It makes me cough like an animal." (E4) "It's too big for me." (E4). "I felt like there was no resistance ...in the device" (E2).* Some even described the manoeuvre as being painful to exhale so strongly. *"It hurts my head to have blown like that...",(E5). "It makes*

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my head turn…" (E7). Nevertheless, patients were engaged and motivated to achieve the best result possible. *"I tried to blow out and hold as long as possible ..." (E2) "I think I've reached the end." (E5) "I have no more oxygen in my ... in my lungs" (E6). "I'm empty..." (E3). "I breathe until I feel that I can't breathe any more" (E3).* Some felt a desire or an anxiousness to perform well. *"I feel like I'm not good at blowing" (E2), "As long as I stand tall... well in the rank, and the results are good, that's fine " (E5).*

Participants expressed having a heightened awareness about their health status.

The participants voiced that spirometry made them conscious that there was a problem with their health. *"I understand it ... since I felt it ..." (E3). "I'm not surprised ..." (E7). "It affects you" (E1).* Furthermore, they expressed a realisation of their limitations. *"By the finding, I had trouble expelling a lot of air" (E3). "...the inside of it ... makes a noise ..." (E9). "I say to myself ... I've lost my breath ..." (E9), "Well, it's when I heard my lungs that ... that I knew I did not blow well"(E9).*

After spirometry

The participants also voiced being apprehensive about getting the results and felt conflicted between wanting to have a diagnosis and being afraid of the diagnosis. Feelings of grief were expressed when asked to recall the moment the spirometry results were announced. These expressions of grief naturally emerged according to the stages described by E. Kubler-Ross[40]:

1. Shock

   "I tell myself it was not good news ..." (E3)

   "Well, the end of consultation… the rest was much less important for me ..." (E3)

2. Denial

   "For me it's not suitable ... it's the system I do not say the device ... it's the system ...", "well after I say ... he is kidding" (E8)

   "I thought this was a joke" (E5)

3. Sadness and cognitive saturation:

   "Well, I tell you I felt shame, sadness" (E1)

   "I was glad when it ended, I think I had had enough for that day, I had heard enough." (E1)

4. Anger and shame

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"It's very distressing (tears)… but there is more to this side ... this mortifying side lasts longer" (E1)

"If you are told that you have weakness somewhere… it's a little upsetting" (E2)

"I'm afraid that ... I'll have cancer" (E10)

"Well, it breaks my heart ... I have a friend who died of that .... because of cigarettes ... a heart attack"(E6)

5. Expectation of more information:

"I think ... I was expecting more explanations ..." (E7)

"I'm thinking ... I'm going to try to smoke less ..." (E9)

"I'm thinking about stopping smoking..." (E6)

"I think I should try to quit" (E10)

"I tell myself that I smoke too much" (E9)

6. Pain and depression

"It is like a sentence of the condemned" (E1)

7. Rebuilding

"You know, when you have to go to war… well, it's a bit similar" (E1)

"I can cope with COPD" (E1)

"I tell myself she's right" (E6)

"Well… I feel like I'm starting to realise" (E10)

"Now, I can look to the future" (E1)

8. The consultation even enabled some participants to accept the disease

"There's a kind ... of ... I would call it: acceptance" (E1)

"Well, it is a diagnosis that I expected" (E7)

"He tells me it's a ... it's a chronic bronchitis" (E9)

The consultation that follows the spirometry test is also a meaningful part of the patient's experience.

"He concludes that I do not have asthma (...) *it somehow reassures me" (E3)*

"I felt a little improvement with his medication ... so what happens to me is that well ... that reassures me a little bit" (E3)

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Discussion

Summary of findings

Before the spirometry experience the participants were willing but expressed feeling apprehensive about discovering the reason for their ill health. During the spirometry experience**,** the participants described the spirometry test as being strange, unsettling and painful. After the spirometry experience, the participants also voiced renewed apprehension about the results and felt conflicted between wanting to have a diagnosis and being afraid of the diagnosis.

We observed that these elicited reports of the spirometry experience combined three characteristics of health behavioural change models; importance, opportunity and confidence[41]. Importance refers to the magnitude of the problem for the patient, opportunity refers to the timing to take action and confidence is the self-belief in success. Combining these three behavioural change characteristics motivates people living with a chronic disease to engage in self-management with shared decision-making[42, 43].

Our findings highlight that apart from being a diagnostic tool, spirometry is an important step for participants. In fact, the participative nature of the spirometry test, elicited as a sense of urgency, encourages the patient's drive to become actively involved in their health. This active participation was illustrated by the desire participants expressed to perform well: "*I tried to blow in and hold for as long as possible*" (E1). Spirometry also enabled the participants to confront the state of their own health and their limits. *"I understand", "I heard my lungs", I'm not surprised".* These results show that participants understood their lungs were the source of their ill health, unlike other qualitative research studies using thematic analysis, which suggested that patients passively accepted and resigned themselves to their circumstances[11]. When patients actively participate in measuring their physical limits, they gain awareness about the impact of the disease. "*What are we going to find?"* (E10) This shows that the patients understand the importance and magnitude of their disease as described in the motivation interviewing model[44].

We also found that participants expressed this spirometry experience as an opportunity to act. They described the experience as being uncomfortable but resembled the symptoms with which they live daily. These illness perceptions are meaningful as they refer to their own life experience. After spirometry, patients expressed a cognitive intention to stop smoking. "*I should try to quit"* (E10)

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Lastly, although the participants expressed feeling strange about the spirometry test and were forced to struggle with their symptoms, they gained confidence in their ability to manage their health with the support of their doctor, "*We never know what is in store for us, but ... it's my doctor, I'm confident"* (E3). Also, verbatim from the debriefing indicated that participants were confident in their ability to reduce or even stop smoking, which is an important step in the process of changing behaviour[41].

Strengths and limitations of the study

To our knowledge, this is the first phenomenological study on spirometry for COPD conducted to date. Micro-phenomenological analysis from open elicitation interview has been used in the fields of psychiatry, pedagogy and neuroscience, however few studies have applied this technique in primary care[34].

Although this micro-phenomenological-inspired analysis is limited by the qualitative nature of the study, the open elicitation interview gave us access to participant emotions during spirometry in a primary setting. Although we were aware that researcher attitudes may have influenced the data interpretation, investigator triangulation reduced this possibility of bias. Also, by employing an open elicitation interview, participants were able to retell their experience as they lived it, in their own words. This decreased the potential for sociability bias and increased the internal consistency.

The time frame explored through the interview was limited to the short period around the spirometry examination, and some participants had little insight into the spirometry experience. This may account for the unusually short interview length for a micro-phenomenological approach, which typically lasts for at least one hour. Other elements surrounding the spirometry experience such as the context of realisation or the relationship with the health professional involved in the spirometry test experience could have been further explored.

Although the sample size was small, it was within the recommended limits for the descriptive phenomenological approach and may have been restricted by the limited use of spirometry in primary care in France [25, 45].

Thus, the experiences the participants reported appear to stimulate the right combination of these three characteristics of health behavioural change models[41]. This suggests that spirometry can instigate health behavioural change and may be a key moment for patient empowerment in COPD.

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Although there have been no other reports of spirometry experience using micro-phenomenology, our results are consistent with the life history of a COPD patient and may provide a breakthrough point for change. These findings indicate that a change occurs when people with confirmed COPD have a spirometry test. These people change from a state where they are willing but apprehensive about the diagnosis, and advance to a state of acceptance. This process is similar to the stages of grief described by Kubler Ross[46] and corresponds with the step wise processes of the change model described by Prochaska and Di Clemente[20].

The micro-phenomenological inspired approach adopted in this study, enabled us to explore the participants' emotional experience during spirometry in primary care settings with the empathic support of their own GP. Our data on perception, cognition and emotion suggest that spirometry testing may be an optimal time for primary care clinicians to support their patients to make behavioural changes, such as increasing physical activity or reducing smoking. This reflects similar accounts where lung function testing is an opportune moment to change patient attitudes toward smoking cessation[47, 48].

Comparison with existing literature and implications clinical practice

The unique choice of combining a micro-phenomenological analysis and an open elicitation interviewing technique highlighted that spirometry is not only a useful diagnostic tool, but also a tool to empower people with COPD to drive behavioural change. This is consistent with other studies that have explored the patient experience of a technical act where patients were more concerned with the attitude of the team and the personal attention they received[45]. Moreover, a recent paper on mobile health in COPD showed that personalised feedback is needed to engage patients[42]. These results highlight the various fields involved when patients experience a medical act. This suggests that there is a need to investigate the patient experience of other technical gestures in primary care to promote self-confidence in patient self-management, facilitated by a health professional's caring attitude. Physicians should allow adequate time and listen to patients' stories, and thus develop a shared understanding of the temporal aspect of the illness and patients' needs and concerns.

Conclusions

Although this study is exploratory, our findings suggest that spirometry gives patients with COPD an opportune support for behaviour change. Spirometry may allow people living with COPD to recognise their own limitations, adapt their activities to their lung capacity and to modify behaviour.

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Author statement

At the time of data collection:
M.BREMOND : physiotherapist, Msc
A.BERTHELOT : general practitioner student
H.BRETON : Sociologist, PhD
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Author's contribution :
M.P. and M.B. conceived the original idea and designed the model
M.B. and A.B. carried out the experiment, and wrote the manuscript
H.B. and L.P. helped supervise the project
M.P. directed the project
All authors provided critical feedback and helped shape the research analysis on manuscript.

Competing interest

The authors declare that there is no conflict of interest regarding the publication of this article, and no financial resources.

Data statement

The full dataset is available from the corresponding author.

Patient and Public Involvement statement

Neither the patient nor the public were involved in the design, conduct, reporting or dissemination plans of our research.

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COREQ Checklist

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.			
No.	Item	Guide questions/description	Response/page number referenced
Domain 1: Research team and reflectivity			
Personal characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	Page 6 (Patient recruitment section): "They were all performed by the same investigator (AB), a MD student of general medicine"
2.	Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 15 (Author statement section): "at the time of data collection : M.BREMOND : physiotherapist, Msc A.BERTHELOT : GP student H.BRETON : Sociologist, PhD L.PLANTIER : physiologist, PhD M.PAUTRAT : senior registrar, GP MD, Msc"
3.	Occupation	What was their occupation at the time of the study?	Page 15 (Author statement section, as above)
4.	Gender	Was the researcher male or female?	Not relevant in the context of this study as would not have affected conduct or analysis of focus groups on pain assessment.
5.	Experience and training	What experience or training did the researcher have?	Page 12 (Discussion section): "All researchers involved in data collection and analysis had conducted and been involved in prior qualitative research studies."
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Not applicable as professional relationships were used as the basis for recruitment (snowballing).
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research.	Page 6-7 (Patient recruitment section): "investigator (AB), a MD student of general medicine without any connection to any of the participants"

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			Participants were also given a brief background to the rationale of the study when they signed the informed consent.
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic.	Bias/assumptions reported on Page 12 (Discussion section): "A work of putting in suspension theoretical knowledge, the a priori and the expected answers was carried out on the part of the analyst and a will to be surprised by the results were respected." Reasons and interest in the topic area reported on Page 4 (Introduction section): "spirometry has yet not been associated with increased motivation for healthy behaviour "
Domain 2: study design			
Theoretical framework			
9.	Methodological orientation and theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 5 (study design section): "A phenomenological analysis inspired by Micro-Phenomenology (MP) approach was used. Micro-phenomenology is a method of descriptive phenomenology inspired by the 'entretien d'explicitation' [...] a method of open non-inductive interview "
Participant selection			
10.	Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 5-6 (Patient recruitment section): " Patients were recruited by the snowball effect in several rural or urban general practices "

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11.	Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 6 (Patient recruitment section): " They were approached by AB by phone after their GP told them about the study"
12.	Sample size	How many participants were in the study?	Page 8 (Results section): Ten people agreed to participate and were interviewed
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Not applicable- All who registered interest took part in the interviews.
Setting			
14.	Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 6 (Patient recruitment section):
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Not applicable- no other persons present during conduct of interviews.
16.	Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 8-9 (Result section)
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Not applicable as no specific interview guide
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Not applicable - interviews are not repeated.
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 6 (Patient recruitment section): "The interviews were recorded, transcribed verbatim, and anonymized."
20.	Field notes	Were field notes made	Page 6 (Patient recruitment section):

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		during and/or after the interview or focus group?	"Field notes collected by the researchers during the conduct of interviews were used to provide additional context to the analytical process."
21.	Duration	What was the duration of the interviews or focus group?	Page 8 (Results section): mean duration of 27.15mins (range 20-37 mins).
22.	Data saturation	Was data saturation discussed?	Not applicable as not an aim of this micro-phenomenological approach.
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Not applicable as transcripts were not returned to participants.
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	Page 6 (Patient recruitment section): " This descriptive phenomenological analysis has been carried out by all the researchers following the process described in the literature."
25.	Description of the coding tree	Did authors provide a description of the coding tree?	Not applicable for this micro-phenomenological approach.
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Page 8-9 (Results section): Coders not defined what would be considered a significant theme prior to data analysis but for clarity "The results were presented chronologically from before spirometry, during spirometry, and after spirometry. ".
27.	Software	What software, if applicable, was used to manage the data?	No specific software was used, only Excel to help with classification
28.	Participant checking	Did participants provide feedback on the findings?	Not applicable as participants did not provide feedback on the data/findings.
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number.	Page 8-11 (Results section): Quotations are presented throughout the text alongside interpretations.
30.	Data and findings consistent	Was there consistency between the data presented and the	Page 8-11 (Results section): Quotations are presented alongside interpretations for transparency between data and

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		findings?	findings.
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Page 8-11 (Results section): the results have been presented chronologically and the most symbolic quotations have been organised in this chronology
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	The micro-phenomenological approach does not make it possible to list certain major or minor themes in the results. The discussion gives meaning to the most significant quotations

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A micro-phenomenological approach to explore the patient experience during an initial spirometry examination to diagnose COPD in general practice in France

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A micro-phenomenological approach to explore the patient experience during an initial spirometry examination to diagnose COPD in general practice in France

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Abstract

Objectives: To explore the patient experience of a spirometry test used to confirm COPD diagnosis in patients with suspected smoking-related COPD.

Design: This is a qualitative study, performed with open interviews in adults following a routine spirometry test to confirm COPD diagnosis. Data were analysed with a phenomenological-inspired micro-phenomenology approach.

Participants: Eligible patients were recruited through their general practitioner, ten were interviewed.

Setting: Primary care in Centre-Val-De-Loire area, France, in 2018.

Results: Participants reported the spirometry test experience as being unfamiliar but gave meaning to the symptoms they experience. Participants expressed a desire to perform the test well and a willingness to confront their state of health. After the spirometry had been completed and the results announced, participants moved through stages of grief from their pre-spirometry self and symptom perception to a state of acceptance. Overall, participants expressed a narrative of an evolving cognitive and corporeal awareness during this spirometry experience. The verbatims describe a cognitive rupture with their chronic illness usually considered as a "way of life".

Conclusions: A spirometry test goes beyond a diagnostic value, providing patients with an opportunity to gain awareness of their own state of health, re-frame their breathlessness-related limitations and thus begin to accept the disease. These awareness gains may be considered as small steps towards health behavioural change. Spirometry may have educative potential and support lifestyle changes.

Keywords: *Spirometry; COPD; Primary care; Descriptive phenomenology analysis; Micro-phenomenology*

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Strengths and limitations of this study

- To avoid subjective bias, the researchers coded the verbatim separately and then cross-checked their findings.
- This interview method allows participants to express themselves freely about their real-life experience: thus, it decreases the risk of sociability bias and increases the internal consistency.
- The use of spirometry is not widespread in primary care in France, which may account for the small number of participants.
- The elicitation interview method may have been limited in this specific population due to participant low level of insight into the procedure. This may account for the unusually short interview length compared with the descriptive phenomenological approach.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is currently the third leading cause of death in the world, and in France, an estimated 3.5 million people are affected. The annual social cost is €3.5 billion and mortality is 16,000 patients per year[1, 2] This burden made COPD a public health priority topic in 2018[3].

COPD is a complex, systemic disease that progresses slowly and insidiously, gradually reducing physical activity levels. Phenomenological studies suggest that COPD involves physical, social, psychological and emotional components, meaning patients adapt their lifestyle to their respiratory status over time[4-6]. This adaptive strategy draws people living with COPD into a downward spiral of physical and psychosocial deconditioning that greatly impacts their quality of life[7]. Also, the slow disease progression enables many patients to avoid accepting their declining health and eventual mortality[8]. Although some people with COPD engage coping strategies, many do not and instead, become psychologically and emotionally distressed, continuing to deny their ill health[9]. Most patients express "accepting" COPD as a "way of life"[10]. Using this acceptance strategy means that people adapt their daily living activities to their reducing breathing capacities. However, this strategy reinforces the denial coping mechanism, preventing patients from becoming aware of their disease and identifying opportunities [4, 11-13] which may slow down further deterioration of their condition. For an individual to become aware that their feeling of being ill is a disease, they require a clear diagnosis. Understanding the diagnosis allows individuals to accept the symptoms and act to slow the progression associated with COPD[14, 15]. Breaking with denial and recognising personal limitations related to their symptoms forces patients to deal with the illness[6, 16].

Disease acceptance is the first step towards engaging patients to manage their breathlessness[17]. When patients are empowered to manage their health, they experience fewer exacerbations, adhere better to medication and have better quality of life[17-19]. Some health behavioural change models examine patient experience as part of the decision-making process with an identified tipping point of opportunity for change[20]. One tipping point for patients with a chronic condition is the minimum belief needed in order to make changes that improve their quality of life. For example, the importance of the problem in the patient's life, the level of opportunity in their lifetime to take action, and self-confidence in their ability to achieve this change.

Spirometry is required to diagnosis COPD. When COPD is diagnosed early, patients report fewer exacerbations compared to undiagnosed patients[21, 22]. Thus, using spirometry for early COPD diagnosis is justified in primary care[23-25]. Although the validity and feasibility of spirometry for

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COPD diagnosis have been shown in primary care[26, 27], its use is suboptimal in France, requiring a motivated clinician [28-30] and patient collaboration to correctly perform the forced exhalation manoeuvre.

Little is known about the effect the first spirometry test has on raising patient awareness about their symptoms in primary care. Although concepts such as "Lung Age" have been used to foster smoking cessation[31], spirometry has yet to be shown to motivate patients to change their behaviour and accept their diagnosis. These techniques may be useful for a stepwise improvement in the delivery of care to patients with chronic respiratory conditions.

The aim of this study was to explore the patient experience following a spirometry test in primary care to determine if this experience could meet criteria for health behavioural change.

Methods

Study design

The phenomenological interview

Micro-phenomenology is a novel analytic technique to measure the introspective, personal view of an experience by exploring visual, emotional and auditive experiences around the reference event [32-34]. This approach was inspired by the more complex phenomenological approach, which challenges the concept of disease, whereby signs and symptoms are mediated by cultural ideas of illness.[35] The interview technique was inspired by an explanatory interview developed by the French psychologist Pierre Vermersch. Using this technique to elicit the patient experience, the interviewer evokes a past experience within the interviewee, who in turn re-enacts the experience during an open interview. This technique allows researchers to explore the reference event from the pre-reflected consciousness (implicit) to the thoughtful consciousness (explicit)[36]. This micro-phenomenology technique has previously been shown to evoke experiences commonly encountered in primary care, such as acute onset of pain in chronic pain diseases[37].

Participants

Ten adults who had spirometry-confirmed, smoking-related COPD, participated in this study of which, six were male and four were female, aged between 40 to 76 years (mean 59). The mean age was 59 years, range (40 -76) and lung function (mean FEV1) was 62% (range: 35-85%). Seven were active

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smokers and three were ex-smokers and and a smoking history that ranged from 10 to 40 pack-years (mean 26). Participants were excluded if they had a history of asthma, advanced heart failure, pre-existing COPD diagnosis, did not speak French or had dementia. The snowball sampling method was used to ensure a diverse selection of patient characteristics were obtained: age, gender, socio-economic status. Six participants lived in a rural environment, four had retired, five were in current employment and one was unemployed. Among those with current or previous employment, six were manual workers, three were office-based workers and one was a health professional. All but three participants were being treated with inhaled therapy for their respiratory symptoms.

Patient recruitment

Patients with suspected COPD were recruited by general practitioners (GPs) in two rural and one urban general practice in the Centre-Val-de-Loire region of France. All GPs were experienced with spirometry and were practicing in multidisciplinary care centres. Once a general practitioner had informed an eligible participant about the study, the researcher (AB) approached them by telephone. All interested participants took part in the interviews.

Study procedure and data collection

The research team, (MB, AB and MP) developed an open interview guide with phenomenological prompts and probes focused on the spirometry test experience. A pilot test was unnecessary for an open interview. Patients were not asked to explain or make sense of the reference event. Speech authenticity was respected, and follow-up prompts were intended only to encourage participants to recount their personal experience. Data saturation was not required for this micro-phenomenological approach as the objective was to identify and understand shared features in this lived experience. Thus, a sample size of 10 patients was considered sufficient to elicit common structures.

The interviews were conducted up to 3 months after the spirometry test was performed and took place in the patient's usual primary care setting. The investigator (AB) introduced himself as a medical student specialised in general practice. He had no previous connection with the participants. After providing their consent to participate in the study, participants were asked to describe their thoughts at three specific time points: before spirometry, at the time of spirometry and at the announcement of results. The interviews were performed once and recorded with a mobile phone, the verbatim transcribed, anonymised and labelled. Additional field notes were made during the interviews and included in the analysis. The participants were given the opportunity to stop at any time and were informed that their responses and personal information would remain anonymous. No time limit was

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expected for the interview apart from the defined timepoints. The interview was structured according to P. Vermersch[36].

Reliability criteria

The investigator AB was trained in micro-phenomenological technique and all researchers involved in data collection and analysis had previous experience in conducting qualitative research studies.

To avoid subjective influence, investigators remained impartial, laying aside theoretical knowledge, *a priori* and the expected answers. Analysts remained impartial and willing to be surprised by the results.

Ethical considerations

All participants signed informed consent forms and all audio recordings were destroyed after transcription and anonymisation. Ethics committee approval was obtained by the local ethical review board (Comité central de réflexion éthique, No. 2017 047). The study was conducted in accordance with all French regulations.

Data analysis

The analysis was performed in accordance with the process described by Valenzuela-Moguillansky et al[38]. The coding framework consisted of six steps as outlined in Table 1 Before data analysis, investigator triangulation was performed to obtain a comprehensive picture. The results *a priori* were elucidated from four investigators, two general practitioners, one physiotherapist and one narrative medicine specialist. The investigators used an iterative process and were careful to allow the themes to emerge from the data. After consensual discussion among investigators these data were converged and grouped into three categories, according to the description criteria for experience in the phenomenological approach (cognitive, perception and feeling) [39]. These three categories provide a conceptual framework in which patients make health behavioural changes.

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Table 1: The six steps of coding framework

Steps	OBJECTIFS
Step 1: listen, read and reread the interview	Data immersion and entry into the participant's world (comprehensive approach)
Step 2: initial annotations	Produce a set of comprehensive and detailed notes and comments on the data considering the semantic content of the speech as well as the language used by the participant
Step 3: Develop emerging themes	Produce themes reflecting both the participant's discourse and the analyst's active interpretation process
Step 4: Identify links between emerging themes	Produce a structure capable of reflecting the most interesting and important aspects of the participant's story by grouping and linking the themes produced in the previous step
Step 5 and 6: move on to the next case and search for links between the interviews	Apply steps 1 to 4 on a new interview then search for links between the different interviews selected for analysis

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Results

Ten people agreed to participate and were interviewed. The interviews were carried out between 26/07/2017 and 18/03/2018 with a mean duration of 27.15mins (range 20-37 mins). The transcripts were numbered EX – EY and the emergent categories are presented here in chronological order before, during and after the spirometry text experience. To illustrate the context for the reported

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experiences, the emergent categories derived from the data are presented chronologically; before during and after spirometry, in the present tense, including only meaningful words.

Before spirometry

Before their first spirometry, the participants described feeling as if they were getting involved in a mysterious experiment. Although willing, they felt apprehensive about discovering the reason for their ill health. *"There's a moment you have to...dot the i's and cross the t's, see what happens, so here we go...let's go"* (E1). Discovering the device was a new, unusual experience for these patients *"I was not used to doing this ... these tests ..." (E3), "...because I did not know that stuff" (E8).* For some, having confidence in their doctor made the feeling of uncertainty for the future diagnosis more bearable. *"...after all, we never know what is in store for us, ... so we look everywhere but ... it's my doctor, I'm confident ... " (E7).* Patients also reported feeling apprehensive about breathing into the device. *"Then suddenly I was told: 'Ok, we will have you blow in the machine'"(E1). "In fact, it's super scary!; I say to myself I hope it's okay ... I'm not going to be too sick ..." (E9). "We know but we do not want to know; we have strong doubts" (E1).* Patients also experienced somatic symptoms of stress before breathing into the device. *"I'm starting to stress" (E10), "my heart is beating at 150" (E1). "I had the feeling my whole body was tense" (E1). "Few sweats and knots in the stomach" (E9). "My stomach is tying itself in knots and I say to myself, 'this is happening .. well, what are we going to find?'" (E10).* Patients also expressed feeling stressed about the expected outcome of the examination. *"We know, but we don't want to know; we have strong doubts" (E1). "I tell myself: 'I hope it's okay ... I mean ... I'm not going to be too sick' ..." (E10).*

During spirometry

The participants described the spirometry test as being strange, unsettling and painful. The emergent lexical field portrayed the spirometer as discovering a new and unimportant object. *"It is a tool" (E3), "...he makes me blow in the, I don't know what..." (E4), "I blow again in the thing." (E4).* As an appropriation strategy, some patients give the device a nickname. *"I call it a toy ... precisely which are design to do the test...to blow in ... in the trumpet ..." (E8).*

The participants described the forced expiratory manoeuvre as an uncomfortable experience. *"This horrible thing really tried me." (E8) "It makes me cough like an animal." (E4) "It's too big for me." (E4). "I felt like there was no resistance ...in the device" (E2).* Some even described the manoeuvre as being painful to exhale so strongly. *"It hurts my head to have blown like that...",(E5). "It makes*

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my head turn…" (E7). Nevertheless, patients were engaged and motivated to achieve the best result possible. *"I tried to blow out and hold as long as possible ..." (E2) "I think I've reached the end." (E5) "I have no more oxygen in my ... in my lungs" (E6). "I'm empty..." (E3). "I breathe until I feel that I can't breathe any more" (E3).* Some felt a desire or an anxiousness to perform well. *"I feel like I'm not good at blowing" (E2), "As long as I stand tall... well in the rank, and the results are good, that's fine " (E5).*

Participants expressed having a heightened awareness about their health status.

The participants voiced that spirometry made them conscious that there was a problem with their health. *"I understand it ... since I felt it ..." (E3). "I'm not surprised ..." (E7). "It affects you" (E1).* Furthermore, they expressed a realisation of their limitations. *"By the finding, I had trouble expelling a lot of air" (E3). "...the inside of it ... makes a noise ..." (E9). "I say to myself ... I've lost my breath ..." (E9), "Well, it's when I heard my lungs that ... that I knew I did not blow well"(E9).*

After spirometry

The participants also voiced being apprehensive about getting the results and felt conflicted between wanting to have a diagnosis and being afraid of the diagnosis. Feelings of grief were expressed when asked to recall the moment the spirometry results were announced. These expressions of grief naturally emerged according to the stages described by E. Kubler-Ross[40]:

1. Shock

   "I tell myself it was not good news ..." (E3)

   "Well, the end of consultation… the rest was much less important for me ..." (E3)

2. Denial

   "For me it's not suitable ... it's the system I do not say the device ... it's the system ...", "well after I say ... he is kidding" (E8)

   "I thought this was a joke" (E5)

3. Sadness and cognitive saturation:

   "Well, I tell you I felt shame, sadness" (E1)

   "I was glad when it ended, I think I had had enough for that day, I had heard enough." (E1)

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4. Anger and shame

"It's very distressing (tears)… but there is more to this side ... this mortifying side lasts longer" (E1)

"If you are told that you have weakness somewhere… it's a little upsetting" (E2)

"I'm afraid that ... I'll have cancer" (E10)

"Well, it breaks my heart ... I have a friend who died of that .... because of cigarettes ... a heart attack"(E6)

5. Expectation of more information:

"I think ... I was expecting more explanations ..." (E7)

"I'm thinking ... I'm going to try to smoke less ..." (E9)

"I'm thinking about stopping smoking..." (E6)

"I think I should try to quit" (E10)

"I tell myself that I smoke too much" (E9)

6. Pain and depression

"It is like a sentence of the condemned" (E1)

7. Rebuilding

"You know, when you have to go to war… well, it's a bit similar" (E1)

"I can cope with COPD" (E1)

"I tell myself she's right" (E6)

"Well… I feel like I'm starting to realise" (E10)

"Now, I can look to the future" (E1)

8. The consultation even enabled some participants to accept the disease

"There's a kind ... of ... I would call it: acceptance" (E1)

"Well, it is a diagnosis that I expected" (E7)

"He tells me it's a ... it's a chronic bronchitis" (E9)

The consultation that follows the spirometry test is also a meaningful part of the patient's experience.

"He concludes that I do not have asthma (...) *it somehow reassures me" (E3)*

"I felt a little improvement with his medication ... so what happens to me is that well ... that reassures me a little bit" (E3)

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Discussion

Summary of findings

Before the spirometry experience the participants were willing but expressed feeling apprehensive about discovering the reason for their ill health. During the spirometry experience**,** the participants described the spirometry test as being strange, unsettling and painful. After the spirometry experience, the participants also voiced renewed apprehension about the results and felt conflicted between wanting to have a diagnosis and being afraid of the diagnosis.

We observed that these elicited reports of the spirometry experience combined three characteristics of health behavioural change models; importance, opportunity and confidence[41]. Importance refers to the magnitude of the problem for the patient, opportunity refers to the timing to take action and confidence is the self-belief in success. Combining these three behavioural change characteristics motivates people living with a chronic disease to engage in self-management with shared decision-making[42, 43].

Our findings highlight that apart from being a diagnostic tool, spirometry is an important step for participants. In fact, the participative nature of the spirometry test, elicited as a sense of urgency, encourages the patient's drive to become actively involved in their health. This active participation was illustrated by the desire participants expressed to perform well: "*I tried to blow in and hold for as long as possible*" (E1). Spirometry also enabled the participants to confront the state of their own health and their limits. *"I understand", "I heard my lungs", I'm not surprised".* These results show that participants understood their lungs were the source of their ill health, unlike other qualitative research studies using thematic analysis, which suggested that patients passively accepted and resigned themselves to their circumstances[11]. When patients actively participate in measuring their physical limits, they gain awareness about the impact of the disease. "*What are we going to find?"* (E10) This shows that the patients understand the importance and magnitude of their disease as described in the motivation interviewing model[44].

We also found that participants expressed this spirometry experience as an opportunity to act. They described the experience as being uncomfortable but resembled the symptoms with which they live daily. These illness perceptions are meaningful as they refer to their own life experience. After spirometry, patients expressed a cognitive intention to stop smoking. "*I should try to quit"* (E10)

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Lastly, although the participants expressed feeling strange about the spirometry test and were forced to struggle with their symptoms, they gained confidence in their ability to manage their health with the support of their doctor, "*We never know what is in store for us, but ... it's my doctor, I'm confident"* (E3). Also, verbatim from the debriefing indicated that participants were confident in their ability to reduce or even stop smoking, which is an important step in the process of changing behaviour[41].

Strengths and limitations of the study

To our knowledge, this is the first phenomenological study on spirometry for COPD conducted to date. Micro-phenomenological analysis from open elicitation interview has been used in the fields of psychiatry, pedagogy and neuroscience, however few studies have applied this technique in primary care[34].

Although this micro-phenomenological-inspired analysis is limited by the qualitative nature of the study, the open elicitation interview gave us access to participant emotions during spirometry in a primary setting. Although we were aware that researcher attitudes may have influenced the data interpretation, investigator triangulation reduced this possibility of bias. Also, by employing an open elicitation interview, participants were able to retell their experience as they lived it, in their own words. This decreased the potential for sociability bias and increased the internal consistency.

The time frame explored through the interview was limited to the short period around the spirometry examination, and some participants had little insight into the spirometry experience. This may account for the unusually short interview length for a micro-phenomenological approach, which typically lasts for at least one hour. Other elements surrounding the spirometry experience such as the context of realisation or the relationship with the health professional involved in the spirometry test experience could have been further explored.

Although the sample size was small, it was within the recommended limits for the descriptive phenomenological approach and may have been restricted by the limited use of spirometry in primary care in France [25, 45].

Thus, the experiences the participants reported appear to stimulate the right combination of these three characteristics of health behavioural change models[41]. This suggests that spirometry can instigate health behavioural change and may be a key moment for patient empowerment in COPD.

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Although there have been no other reports of spirometry experience using micro-phenomenology, our results are consistent with the life history of a COPD patient and may provide a breakthrough point for change. These findings indicate that a change occurs when people with confirmed COPD have a spirometry test. These people change from a state where they are willing but apprehensive about the diagnosis, and advance to a state of acceptance. This process is similar to the stages of grief described by Kubler Ross[46] and corresponds with the step wise processes of the change model described by Prochaska and Di Clemente[20].

The micro-phenomenological inspired approach adopted in this study, enabled us to explore the participants' emotional experience during spirometry in primary care settings with the empathic support of their own GP. Our data on perception, cognition and emotion suggest that spirometry testing may be an optimal time for primary care clinicians to support their patients to make behavioural changes, such as increasing physical activity or reducing smoking. This reflects similar accounts where lung function testing is an opportune moment to change patient attitudes toward smoking cessation[47, 48].

Comparison with existing literature and implications clinical practice

The unique choice of combining a micro-phenomenological analysis and an open elicitation interviewing technique highlighted that spirometry is not only a useful diagnostic tool, but also a tool to empower people with COPD to drive behavioural change. This is consistent with other studies that have explored the patient experience of a technical act where patients were more concerned with the attitude of the team and the personal attention they received[45]. Moreover, a recent paper on mobile health in COPD showed that personalised feedback is needed to engage patients[42]. These results highlight the various fields involved when patients experience a medical act. This suggests that there is a need to investigate the patient experience of other technical gestures in primary care to promote self-confidence in patient self-management, facilitated by a health professional's caring attitude. Physicians should allow adequate time and listen to patients' stories, and thus develop a shared understanding of the temporal aspect of the illness and patients' needs and concerns.

Conclusions

Although this study is exploratory, our findings suggest that spirometry gives patients with COPD an opportune support for behaviour change. Spirometry may allow people living with COPD to recognise their own limitations, adapt their activities to their lung capacity and to modify behaviour.

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Author statement

At the time of data collection:
M.BREMOND : physiotherapist, Msc
A.BERTHELOT : general practitioner student
H.BRETON : Sociologist, PhD
L.PLANTIER : professor physiologist, PhD
M.PAUTRAT : senior registrar, general practitioner MD, Msc

Author's contribution :
M.P. and M.B. conceived the original idea and designed the model
M.B. and A.B. carried out the experiment, and wrote the manuscript
H.B. and L.P. helped supervise the project
M.P. directed the project
All authors provided critical feedback and helped shape the research analysis on manuscript.

Data statement

The full dataset is available from the corresponding author.

Patient and Public Involvement statement

Neither the patient nor the public were involved in the design, conduct, reporting or dissemination plans of our research.

Competing Interest

The authors declare that they have no conflict of interests.

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COREQ Checklist

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.			
No.	Item	Guide questions/description	Response/page number referenced
Domain 1: Research team and reflectivity			
Personal characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	Page 6 (Patient recruitment section): "They were all performed by the same investigator (AB), a MD student of general medicine"
2.	Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 15 (Author statement section): "at the time of data collection : M.BREMOND : physiotherapist, Msc A.BERTHELOT : GP student H.BRETON : Sociologist, PhD L.PLANTIER : physiologist, PhD M.PAUTRAT : senior registrar, GP MD, Msc"
3.	Occupation	What was their occupation at the time of the study?	Page 15 (Author statement section, as above)
4.	Gender	Was the researcher male or female?	Not relevant in the context of this study as would not have affected conduct or analysis of focus groups on pain assessment.
5.	Experience and training	What experience or training did the researcher have?	Page 12 (Discussion section): "All researchers involved in data collection and analysis had conducted and been involved in prior qualitative research studies."
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Not applicable as professional relationships were used as the basis for recruitment (snowballing).
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research.	Page 6-7 (Patient recruitment section): "investigator (AB), a MD student of general medicine without any connection to any of the participants"

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			Participants were also given a brief background to the rationale of the study when they signed the informed consent.
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic.	Bias/assumptions reported on Page 12 (Discussion section): "A work of putting in suspension theoretical knowledge, the a priori and the expected answers was carried out on the part of the analyst and a will to be surprised by the results were respected." Reasons and interest in the topic area reported on Page 4 (Introduction section): "spirometry has yet not been associated with increased motivation for healthy behaviour "
Domain 2: study design			
Theoretical framework			
9.	Methodological orientation and theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 5 (study design section): "A phenomenological analysis inspired by Micro-Phenomenology (MP) approach was used. Micro-phenomenology is a method of descriptive phenomenology inspired by the 'entretien d'explicitation' [...] a method of open non-inductive interview "
Participant selection			
10.	Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 5-6 (Patient recruitment section): " Patients were recruited by the snowball effect in several rural or urban general practices "

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11.	Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 6 (Patient recruitment section): " They were approached by AB by phone after their GP told them about the study"
12.	Sample size	How many participants were in the study?	Page 8 (Results section): Ten people agreed to participate and were interviewed
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Not applicable- All who registered interest took part in the interviews.
Setting			
14.	Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 6 (Patient recruitment section):
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Not applicable- no other persons present during conduct of interviews.
16.	Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 8-9 (Result section)
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Not applicable as no specific interview guide
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Not applicable - interviews are not repeated.
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 6 (Patient recruitment section): "The interviews were recorded, transcribed verbatim, and anonymized."
20.	Field notes	Were field notes made	Page 6 (Patient recruitment section):

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		during and/or after the interview or focus group?	"Field notes collected by the researchers during the conduct of interviews were used to provide additional context to the analytical process."
21.	Duration	What was the duration of the interviews or focus group?	Page 8 (Results section): mean duration of 27.15mins (range 20-37 mins).
22.	Data saturation	Was data saturation discussed?	Not applicable as not an aim of this micro-phenomenological approach.
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Not applicable as transcripts were not returned to participants.
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	Page 6 (Patient recruitment section): " This descriptive phenomenological analysis has been carried out by all the researchers following the process described in the literature."
25.	Description of the coding tree	Did authors provide a description of the coding tree?	Not applicable for this micro-phenomenological approach.
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Page 8-9 (Results section): Coders not defined what would be considered a significant theme prior to data analysis but for clarity "The results were presented chronologically from before spirometry, during spirometry, and after spirometry. ".
27.	Software	What software, if applicable, was used to manage the data?	No specific software was used, only Excel to help with classification
28.	Participant checking	Did participants provide feedback on the findings?	Not applicable as participants did not provide feedback on the data/findings.
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number.	Page 8-11 (Results section): Quotations are presented throughout the text alongside interpretations.
30.	Data and findings consistent	Was there consistency between the data presented and the	Page 8-11 (Results section): Quotations are presented alongside interpretations for transparency between data and

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		findings?	findings.
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Page 8-11 (Results section): the results have been presented chronologically and the most symbolic quotations have been organised in this chronology
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	The micro-phenomenological approach does not make it possible to list certain major or minor themes in the results. The discussion gives meaning to the most significant quotations

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