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Full title: High-risk respiratory patients' experiences of bronchoscopy with conscious sedation and analgesia: a qualitative study

Concise title: Experiences of bronchoscopy

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Contributions

Study design: PF, CS, KF; data collection and analysis: CS, PF, CFS and manuscript preparation CS, PF, CFS, KF.

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All authors declare they have no conflicts of interest.

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High-risk respiratory patients' experiences of bronchoscopy with conscious sedation and analgesia: a qualitative study

Abstract (300 words)

Aim. To understand the experiences of high-risk respiratory patients undergoing bronchoscopy with conscious sedation.

Background. Due to possible complications, high-risk respiratory patients are usually given smaller, cautious doses of sedation and analgesia for bronchoscopy. Described as 'conscious sedation', this facilitates depression of the patient's consciousness without causing respiratory compromise. Previously, studies have investigated patient experience using quantitative methods. This is the first study that has explored the patient experience during bronchoscopy from a qualitative perspective.

Design. Qualitative, phenomenological approach as described by Van Manen.

Methods. The setting was an endoscopy unit within an Australian tertiary hospital. Unstructured interviews were conducted with 13 patients with chronic obstructive pulmonary disease who underwent day-case bronchoscopy. All participants received conscious sedation. They were interviewed twice, within a week, post-procedure. Interviews were transcribed verbatim and analysed using Van Manen's interpretive approach.

Findings. Participants had varying experiences. Five themes emerged from the analysis: *Frustration and fear; Comfort and safety; Choking and coughing; Being aware; and*

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Consequences. Whilst not all participants experienced procedural awareness or remembered it, for those that did it was a significant event. Overall, experiences were found to be negative; however participants accepted and tolerated them, perceiving them as necessary to obtain a diagnostic result.

Conclusion. The findings demonstrate that often patients are aware during the procedure and their experience may be uncomfortable and distressing.

Relevance to clinical practice. These findings have implications for patient preparation pre- and post-bronchoscopy in terms of what they might expect, and to discuss what has happened after the procedure. Some practices of the bronchoscopy team during the procedure may need modification. For example, in anticipation of the possibility that the patient may be aware, they should provide patient-focused explanations of what is happening during the procedure, as well as providing ongoing reassurance that everything is going as planned.

What does this paper contribute to the wider global clinical community?

- Insight into the patient experience during bronchoscopy for those who are at high risk of respiratory disease and required to have conscious sedation and analgesia.
- From the patient's perspective: suggestions about how the bronchoscopy team can better prepare patients for their procedure and manage their experience during and after the procedure.

Keywords: analgesia; bronchoscopy; chronic obstructive pulmonary disease, patient experience; qualitative research; sedation

(6651 words)

BACKGROUND

Flexible bronchoscopy is an established diagnostic and interventional procedure for the investigation and treatment of respiratory pathology. The bronchoscope is inserted into the patient's lungs via their mouth or nose to facilitate inspection, sampling and treatment of

the large airways and surrounding tissue (Fuhlbrigge & Choi 2012). The procedure is normally performed under sedation to alleviate negative symptoms (Jantz 2009) and is often combined with analgesia (Gasparini 2011). However, not all health facilities provide sedation and analgesia for bronchoscopy (Matot & Kramer 2000, Smyth & Stead 2002, Asano *et al.* 2012) and it is suggested that their use is dependent upon the preferences of the physician (Jantz 2009). In the United Kingdom it was found that whilst two thirds (63%) of physicians sedated patients only 14% administered analgesia (Smyth & Stead 2002) and, in a survey of Japanese health facilities, approximately one third (36%) provided intravenous sedation (Asano *et al.* 2012). In contrast, an earlier Israeli survey reported that most outpatient bronchoscopy centres used both sedation and analgesia (Matot & Kramer 2000). Two studies that compared sedated versus non-sedated patients during bronchoscopy reported that sedated patients had a better tolerance of the procedure and, other than an increased length of recovery time, there was no significant difference in complications (Gonzalez *et al.* 2003, Wahidi *et al.* 2011). Credle *et al.* (1974) found that around half of the major complications associated with bronchoscopy were related to the use of sedation which may, to some extent, explain why some physicians are hesitant to administer it (Gasparini 2011).

Bronchoscopy is frequently performed for patients with chronic obstructive pulmonary disease (COPD), who are at high risk of respiratory complications. In a retrospective study of 272 patients with severe COPD undergoing bronchoscopy, an increased incidence of major complications including pneumonia, respiratory failure, oxygen desaturation and death, was found. However, the subjects with severe COPD were significantly older than the control group. Also, the number of inpatients in the COPD group was greater than the control group suggesting they may have been more unwell at the time of the bronchoscopy (Peacock *et al.* 1994). When bronchoscopy is performed for patients with limited pulmonary air flow or capacity, such as those with COPD, cautious administration of sedation and analgesia is advised (Wahidi *et al.* 2011, Du Rand *et al.* 2013). Unless contra-indicated, the use of midazolam or propofol for sedation and fentanyl for analgesia is recommended (Shulimzon 2010, Wahidi *et al.* 2011, Du Rand *et al.* 2013). However, these drugs may cause respiratory depression. Therefore, *conscious* sedation is used to create a depression of consciousness

without resulting in respiratory compromise (American Society of Anaesthesiologists, 2004). It is defined by the Australian and New Zealand College of Anaesthetists (2014) as:

A drug-induced depression of consciousness during which patients are able to respond purposefully to verbal commands or light tactile stimulation. Interventions to maintain a patent airway, spontaneous ventilation or cardiovascular function may, in exceptional situations, be required. Conscious sedation may be achieved by a wide variety of drugs including propofol, and may accompany local anaesthesia. All conscious sedation techniques should provide a margin of safety that is wide enough to render loss of consciousness unlikely.

The Australian and New Zealand College of Anaesthetists (2014) guidelines recommend that doses of sedatives and analgesia are to be kept to the minimum required for patient comfort when patients are at an increased risk of respiratory complications. Hattotuwa *et al.* (2002) studied 57 patients with COPD that underwent bronchoscopy with minimum sedation sufficient to tolerate the procedure. The incidence of adverse events requiring hospitalisation was 2% and the incidence of minor bleeding requiring no intervention was 3.1%; no deaths or prolonged morbidity were observed. They concluded that bronchoscopy in patients with COPD was safe with minimal sedation.

Conscious sedation is provided to reduce concomitant risks; however it is associated with reduced patient compliance with procedures and increased patient discomfort. Many studies with various patient groups have measured patient experience of bronchoscopy with or without the use of sedation and/or analgesia, reporting a variety of different outcomes, including pain, discomfort, cough, nausea, dyspnoea, anxiety, tolerance and amnesia (e.g. Cases Viedma *et al.* 2010, Lo *et al.* 2011, Ryu *et al.* 2012). Taiwanese researchers measured patient movement and cough during bronchoscopy under different sedation regimes and found that procedural interference by the patient and coughing was significantly less ($p < 0.001$ and $p = 0.001$, respectively) in the group that received a propofol infusion (Lo *et al.* 2011). Significantly reduced coughing when patients were sedated was also found in studies conducted in France and Spain (Atassi *et al.* 2005, Cases Viedma *et al.* 2010). These studies have all assessed the patient experience using quantitative methods, primarily survey-based, using simple assessment tools. Such approaches are usually limited

to direct questioning and rarely delve into the complexities of human experience (Polit & Beck 2012).

Clinical problem

In the study setting, during bronchoscopy with conscious sedation, nurses observed that some patients appeared to be significantly distressed by the procedure. Typically they were observed coughing vigorously, gagging on the bronchoscope, and attempting to remove the bronchoscope before the procedure was completed. However, because the patients were sedated and unable to communicate normally, it was unclear whether these were conscious or unconscious reactions. The general consensus from the attending physicians was that the apparent distress of patients was not of concern because they were unlikely to be aware or remember the procedure. However, it was not known whether patients had any recollection of distress during the procedure and, if so, how this affected them afterwards.

As far as we are aware, only one study has investigated high risk respiratory patients' experiences during bronchoscopy, in which patients were either sedated only or received both sedation and analgesia, with the latter group reporting significantly lower levels of pain and asphyxia (Dreher *et al.* 2010). Because lighter levels of sedation are used for high risk respiratory patients undergoing bronchoscopy there is a greater potential for these patients to experience conscious reactions during the procedure. Consequently, their awareness of the procedure may result in negative experiences such as discomfort and heightened anxiety. To date, no qualitative studies have explored the patient experience during bronchoscopy. Thus, very little is known about their perception of the procedure, and whether or not the quality of their experiences was personally significant or whether, as considered by the treating physicians, it was of no consequence because the procedure was not remembered. In the ethical consideration of doing no harm, it is contended that physical discomfort or psychological distress during a procedure should be considered as harm, even if it is temporary, and especially when it may be avoidable or mitigated. In this context, qualitative research has greater potential to explicate the patient experience and in doing so identify ways in which potential harm may be mitigated.

Aim

Given the clinical concern of apparent patient distress, as well as the paucity of qualitative research into the patient experience during bronchoscopy, and in consideration of the requirement for cautious use of sedation in patients with respiratory disease, the aim of this study was to investigate the experience of high-risk respiratory patients undergoing bronchoscopy with conscious sedation. The study was approved by the hospital (ref: HREC/14/QPCH/49) and university (ref: 2014 160Q) human research ethics committees. All participants provided voluntary consent and pseudonyms have been used to protect their identities.

METHOD

Design

To understand the patient experience during bronchoscopy an interpretive phenomenological approach was employed, as described by Van Manen (1990, 1997, 2014). Unstructured interviews were used to collect data. Qualitative studies focus on understanding the human experience as it is lived, through the collection and analysis of data that are subjective and descriptive (Polit & Beck 2012). Phenomenology is a qualitative research approach whereby data are collected regarding a phenomenon, in this case, patient experiences of bronchoscopy with conscious use of sedation and analgesia. Van Manen's methods aim to provide an understanding of how the experience affects participants thereby giving them a voice. This approach was selected because interpretation of the generalised meaning of participants' experiences may provide evidence that can assist with the development of health care plans, education tools, health professional empathy, and may uncover previously overlooked issues (Schneider *et al.* 2007, King & Thomas 2013).

Van Manen's (2014) objective in interviewing is to obtain an account of the participant's lived experience in narrative form rather than having a discussion about the experience. He concedes that this is very difficult, and provides the following points regarding settings and researcher approach: avoid formal settings as they are not conducive to thinking about life stories; promote participant privacy by holding interviews in a private spaces; and the researcher should exhibit enthusiasm and openness when the participant's experience of the phenomenon is broached (Van Manen 2014).

Study setting and sedation procedure

This study was conducted at a 630-bed Australian public tertiary hospital. The hospital provides a range of services including cardiothoracic specialties, with around 830 bronchoscopy procedures undertaken annually. The majority are performed for diagnostic investigations. In the study setting, deep sedation and/or analgesia is only provided when an anaesthetist is present, and in general, only when diagnostic or therapeutic interventional bronchoscopy is performed as it requires an immobile patient and has a longer procedure time. For non-interventional bronchoscopies, sedation and analgesia are usually administered by a thoracic physician according to current bronchoscopy guidelines (Du Rand *et al.* 2013).

In this study, the bronchoscopy procedures were performed in a main operating theatre by at least one thoracic physician, one thoracic registrar and two registered nurses. Usual procedures were followed. Initially, the patient's throat was sprayed with a local anaesthetic (lignocaine). Subsequently, sedation and analgesia were administered intravenously using incremental doses of midazolam and fentanyl (1-2 mg and 25mcg, respectively), while observing the patient's response with between one to two minutes between each dose. When an adequate depth of sedation was judged to have been achieved, the bronchoscopy procedure was commenced. If the patient woke during the procedure then additional doses of midazolam or fentanyl were administered with the aim to given maximum doses of 5mg and 100mcg, respectively, although occasionally higher doses were needed.

Participants

Purposive sampling was used to recruit participants. The inclusion criteria were that participants had a diagnosis of COPD and/or respiratory failure, were scheduled for bronchoscopy as a day case with planned use of conscious sedation and analgesia, and were English-speaking.

Data collection

Data were collected between June 2014 and June 2015 using two in-depth, unstructured, digitally recorded interviews. Participants' medical records were accessed to gather additional demographic and procedural information. The first interview was completed

around two hours post-procedure when the patient had returned to baseline conscious level. A follow-up interview was completed within one week, at the participant's convenience; either face-to-face within the outpatient department or by telephone. The purpose of the second interview was to identify and describe longer term impacts of the procedure. Both interviews were conducted by an experienced nurse that was not present during the bronchoscopy. Due to patient safety requirements the first interview was held in hospital rooms, with essential medical equipment available but positioned discreetly. Participants were offered drinks and snacks. The interview was timed to ensure that there was sufficient time before the participant was collected to be taken home.

During the interviews participants were asked to think about their experience of the bronchoscopy and to talk about how it affected them. Prompts were used to facilitate the interview such as, 'Tell me what that was like for you?' or 'How did that make you feel?' Silence was also used to allow the participant to gather their thoughts. Paraphrasing was used if there was an undue pause. Interview recordings were transcribed verbatim and combined with the interviewer's field notes (observations related to participants' verbal tone and body language during the interview).

Data analysis

The methods of Van Manen (1990, 1997, 2014) were used to uncover thematic aspects of the participants' experiences. The transcriptions were reviewed employing a three-phase approach: holistically (identifying significant phrases within the text that captured the central meaning of each interview); selective reading (phrases that were revealing about the phenomenon were highlighted); and line by line approach (reading every sentence to interpret what it revealed about the phenomenon). When using these approaches themes emerged that were repeated in different participant's interviews. Themes were then reflected upon using common elements within the world we live: space, body, time, and relationality (Van Manen 1990). The final analysis involved writing and re-writing about the themes. Data were then arranged thematically, describing and representing the patients' experiences of the phenomenon.

Methodological rigour

In this study, several techniques were used to establish trustworthiness (Graneheim & Lundman 2004). All phases of the study were reviewed by at least two researchers. Furthermore, the interviewer's experience of over twelve years in the study setting enabled her to quickly develop a trusting relationship with each participant. The second interviews helped to confirm findings from the first, and searching for contradictory patterns emerging from the data was used to broaden and confirm the emerging themes. In terms of dependability, verbatim quotes are provided to support the findings, and an audit trail of decisions was maintained throughout the study. Each stage of the data analysis was recorded (see example in Table 1). Sufficient information of adequate quality (Malterud *et al.* 2016) regarding the phenomenon of interest was judged to have been obtained when thirteen participants had been interviewed. With regard to transferability, it is for the reader to determine the applicability of the findings to other settings. This is assisted with reference to the context of the study, which is provided above.

FINDINGS

Five themes emerged from the data analysis, and are described below: *Frustration and fear*; *Comfort and safety*; *Choking and coughing*; *Being aware*; and *Consequences*. Participants' quotes are used to aid expression of the themes.

Participants

All participants were high risk respiratory patients with COPD, of whom all only one had previously experienced a bronchoscopy; which was performed under a general anaesthetic. Their ages ranged from 30 to 70, most were male ($n = 9$), and all were white Australians (see Table 2). Twelve patients that consented to participate prior to their procedure were subsequently withdrawn from the study. One patient was withdrawn pre-procedure as no follow-up interview could be organised and nine were withdrawn due to sedation issues. Of the latter group, eight patients were given greater doses of sedation and analgesia than had been planned thereby no longer meeting the inclusion criterion of conscious sedation and two patients' procedures were cancelled. One patient withdrew from the study stating that their throat was too sore to be interviewed.

Frustration and fear

This theme describes the participants' frustrations and fears while awaiting their procedure and afterwards. In general, waiting time was experienced negatively and was perceived as unnecessarily long. This led to feelings of frustration, as illustrated by Kelly:

It got very drawn out towards the end, and I started getting a bit antsy at that stage, thinking if only I could get the hell out of here!

These feelings were emphasised by participants' perceptions of laborious and lengthy procedures and a sense of neglect. For example, John stated, "*Seemed liked 10 mile of it... just too much paperwork. Even the nurse is struggling with it!*" and Ian lamented, "You can say I went 20 hours without food."

Waiting for the procedure gave participants time to think about its unknown effects and their potentially life-threatening diagnosis. Two main thoughts occupied participants' minds: 'Will it hurt?' and, 'What will I do, if I have lung cancer?' Some participants worried about various aspects of the procedure itself such as, whether or not they might be awake, whether the bronchoscope would make them cough or feel like they were choking – and if so, would this affect the doctor's ability to make a diagnosis, and would they feel sore afterwards? Such concerns caused anxiety, as expressed by Rachel;

They told you bits and pieces ... it still doesn't really prepare you for it, because it's still unknown, you've never had it before. You get nervous but try not to show it.

A number of participants said that they felt relieved after the procedure because it was not as distressing as they thought it would be. However, some were more worried about their diagnosis than the procedure itself. For them, the potential that the procedure would confirm they had lung cancer was fraught with concerns about their future. Thus, the time the spent waiting was time spent contemplating the unknown. This was manifest in mixed feelings of anxiety, nervousness and hope. These feelings are illustrated by Bob: "It's either... a big infection or it could be a cancer... it was just churning away inside... ."

Comfort and safety

The theme of *Comfort and safety* is best described in terms of the perceived relationship between the participants and medical staff in the theatre, which was generally regarded as

positive: participants felt safe and relaxed. Factors that promoted positive experiences between staff and participants included displays of caring, perceived efficiency and use of humour. Participants described how they became aware of the medical staff's responsibilities once they had entered the theatre, recalling that staff introduced themselves, kept them warm, placed monitoring devices on them, and explained procedures. They commented on their competence and caring attitude, which promoted a positive experience, as illustrated in the following quotes:

They were just so wonderful and caring and pleasant... they were all so reassuring and friendly. (Kelly)

But you know I didn't have any problems with – you know the people in the theatre were very friendly and stuff like that. Everybody knows their job and does their job, and very efficient and stuff like that. (Bob)

Several participants recalled how the staff had helped them relax through the use of humour. Rachel recalled:

Yeah bit of humour, lighten the mood, I wasn't so stressed when they started talking about different things. One of the nurses, she was talking about glasses and that, so just getting your mind off the actual procedure eases it as well, you're not so nervous. (Rachel)

A number of participants commented on the large amount of staff in the procedure room. For some participants this made them feel safe, as exemplified by Cameron:

I wasn't worried at all... I knew there was a shit load of people there with instruments and stuff; I didn't feel in danger of dying.

But sometimes it was a cause of anxiety, as in George's case:

They're around you like a mob of flies. You know all over the place... is about seven or eight there... well one was doing this and one was doing something else... I probably was a bit anxious I suppose.

Choking and coughing

This theme describes the participants' experiences of coughing and choking before, during and after the bronchoscopy. Factors contributing to this experience include; pre-existing

shortness of breath and coughing, the use of throat spray and introduction of a foreign object into the participant's airway. The throat spray prior to the procedure was generally perceived as a negative experience, which some participants found distressing. The spray tasted nasty, made their throat feel numb, and made it difficult to swallow. They could feel fluid at the back of their throat but could not do anything about it. Some participants found that it felt like their throat swelled in response to the spray, which made them choke. This was particularly scary for participants as they already had a history of shortness of breath and/or coughing. It was considered a memorable but transient part of the procedure. Participants' experiences are typified in the following quote:

They put stuff down your throat... you can't actually feel yourself swallow, it's like quite a strange feeling. You feel like you're going to choke in some ways, and sort of like it feels like you choke, your throat's really swollen or whatever, and I'm a mouth breather anyway, so I just breathe through mouth which actually probably helped, and just didn't bother swallowing I suppose was the way I coped with it. (Bob)

Two participants described negative physical reactions during the procedure which resulted in emotional anguish. They could feel the bronchoscope in their throat during the procedure, which made them cough, gag and struggle. Their anxiety was increased because they could not control their reactions and realised that their behaviour could disrupt the procedure. The stress of the experience is illustrated graphically in the following quotes:

Had this thing stuck down me throat.... tried coughing it up all the way down, and every now and then they would move it or wriggle it and you can feel that, and it made you want to cough ... There was no real pain or anything. Just really made it cough....Choking was the worst. I felt I didn't want to choke, because it would probably make it harder for them, so I was struggling not to cough or anything. But yeah I suppose that was the worst part. (John)

I coughed nearly all the time that he was doing it...They kept spraying inside the mouth to ... well they were trying to stop the coughing because I couldn't help coughing. .. I knew I was coughing a lot.... I couldn't help coughing because you've got this thing in your throat... When I didn't go to sleep, well I felt that I would have been better if I went to sleep...You see, last time I had the –whatever you call it, right

down into my lung they put me out; right out and I had a good sleep. But this time they didn't. (George)

Some participants felt like they could not get enough breath, their chest felt tight or they coughed after the procedure. Participants described these experiences calmly, their demeanour illustrating their historical familiarity with breathing problems. Participants experienced shortness of breath or chest tightness for up to two days following the procedure, as described by Bob:

I'm asthmatic, so after 24 hours- for the first 24 hours it was like a dry hacking cough I suppose. Then for the next 48 hours I suppose my asthma was worse than normal.

Being aware

The theme *Being aware* describes participants' experiences of awareness during their procedure and the impact of this awareness. For those that had some degree of awareness, their experience was mostly a negative one characterised by frustration and discomfort. Participants reported hearing medical staff talking, and discussing how to take specimens and whether they were adequate enough for diagnostic use. This was particularly disappointing for Bob because he overheard staff say that they could not perform a biopsy.:

I can remember like them saying ..., can't go there, ...no, can't see it there... I could almost tell where they were poking the 'scope from the way they were talking ... but I couldn't feel anything... now I know they haven't done a biopsy ... I can't see how they're going to tell anything.

Bob thought he needed a biopsy to determine whether he had lung cancer and how long he had to live. As a result of hearing that a biopsy could not be done, he thought he would need to wait longer for a diagnosis and prognosis, and feared he would need further procedures. Consequently, he was very agitated during the post-procedure interview. This may not have been the case had he been unaware during his procedure.

Some participants were aware of the bronchoscope during the procedure. They found this very uncomfortable as it caused coughing and choking, as described in the previous theme. Alternatively, some participants interpreted awareness of the procedure in a different light. The introduction of sedative medications was considered a pleasurable experience. They felt

relaxed and comfortable. One participant thought it was fun and not dissimilar to being drunk, as related by June:

I was wide awake the whole time...Yeah I didn't fall [asleep] - no didn't even want to close my eyes. Didn't feel a thing... I couldn't see what he was doing... It was just like I was drunk... I was having a wonderful time!

Half of participants "were unaware during the procedure their reflections were largely positive. They mentioned drifting away, being 'knocked out' by the drugs, and not remembering anything. Kelly described her experiences:

I don't know when I disappeared...I don't remember anything... Until I woke up in the ward... it was a very positive experience and I have no recollection.

Consequences

The *Consequences* theme depicts some of the participants' experiences after the bronchoscopy procedure. Whereas most participants stated that they felt good after the procedure others highlighted negative experiences which were interpreted as uncomfortable but bearable because they were short-term. Participants complained about a variety of symptoms including headache, sore throat, cough, chest discomfort, and influenza-like feelings. They described a number of factors that they felt were related to their symptoms, including fluid restriction pre- and post-procedure, insertion of an instrument into their throat, and having fluids flushed into their lungs. These experiences are captured in the following quotes:

I can feel... Like as if you have got a cold in your chest... my head was like a pumpkin... I finished up with a roaring headache... It hasn't affected me in any way really.
(George)

I think they flushed my lungs a bit with the camera down there, so I think that might have shaken a few of the mucous – to try and get me to bring them up and out of the lungs... Bit of a sore throat... for probably a couple of days... I don't feel any worse or any better. (Rachel)

I felt marvellous. So they said how do you feel? I said, "Wonderful." They said, "Really?" I said, "Yeah." I said I felt like nothing's happened. But you know I might have been on a high too, who knows? I felt pretty good actually. (June)

DISCUSSION

The findings from this study show that while waiting for their procedure, participants encountered feelings of frustration, fear and anxiety. However, once in the operating room they felt comforted by the staff, who encouraged relaxation with humour and engendered feelings of safety by their clinical competence. The throat spray was perceived to be a distasteful and uncomfortable experience. Some participants were blissfully unaware during the procedure, but others were privy to physicians' conversations and/or suffered choking, coughing and anxiety. After the procedure some participants were untouched by the experience but others bore headaches, sore throats and aggravation of asthma. In the participants' minds the negative experiences were outweighed, in most cases, by the attention of the staff and the perceived necessity of the procedure. However, participants were often left with anxiety related to the upcoming diagnosis of their condition.

More specifically, these findings uncovered underlying problems that led to participants experiencing feelings of frustration including the amount of documentation and length of fasting and waiting times, which were perceived as excessive. Whilst paperwork is required for patient safety and quality care, the administrative burden can shift the focus from patient care to paperwork (American Hospital Association 2006). Whilst fasting times were not measured in this study, there is clear evidence in participants accounts that these were exceeded on several occasions. Fasting pre-bronchoscopy is required to prevent aspiration of fluids into the patient's lungs (Ignatavicius *et al.* 2014). It is recommended that patients should fast four hours before food, after which clear fluids is acceptable until two hours before the procedure (Shulimzon 2010, Du Rand *et al.* 2013). Fasting pre-procedure will lower blood sugar levels, which is associated with higher levels of aggression in response to frustrating situations (DeWall *et al.* 2011). The use of explicit written instructions and adherence to recommended fasting times would promote patient comfort associated with hunger and thirst. Waiting time has been acknowledged as a significant factor related to patient satisfaction (Boudreaux and O'Hea 2004).

In a systematic review of patient satisfaction in emergency departments it was found that predictors of in-patient satisfaction were (in order of significance): interpersonal interactions with providers; perceptions of health care providers' skills; and waiting time (Boudreaux and O'Hea 2004). Our findings indicate that participants were very happy with their interactions with staff and perceived the healthcare professionals to be highly skilled. Whilst participants were generally satisfied with their care, in their interviews they were keen to highlight the difficulties they had encountered so that the service could be improved for others in the future. For example, participants described being afraid that the procedure would be painful and that it would make them cough. For those that were unaware during the procedure they did not report any experiences of pain, these fears were largely unfounded. When participants were aware they reported that their throat was numb and discomfort associated with coughing and choking was experienced commonly. None of the participants reported having pain. Poi *et al.* (1998) explored patient fears before undergoing bronchoscopy. Similarly, they found pain and oropharyngeal irritation to be the most common fears. Their study also revealed that physicians were more likely to explain how and why the bronchoscopy was being undertaken as opposed to what the patient might experience. They suggested that the provision of more detailed information about what the sensations the patient might feel would help to allay some of their common fears (Poi *et al.* 1998).

In our study, the processing of pre-procedure information provided to participants may have been influenced by their anticipation of a fatal diagnosis. Indeed, most participants had already been informed of the potential diagnosis of lung cancer. Kessels (2003) concluded that patient recall of medical information after being given bad news was around 40-50%. When giving information it is important to consider the patient's emotional needs and provide simple, specific instructions with supportive written and visual documentation (Kessels 2003, Van Osch *et al.* 2014). In this context, the affective communication techniques described by Van Osch *et al.* (2014) are helpful: ask the patient what their fears are before the procedure and listen to their fears and discuss them, then progress to discussion of the procedure. This should include information about the safety of the procedure, an explanation about how they might feel, and reassurance that the healthcare team will keep them safe.

Although participants in our study described feeling scared of the procedure, once they entered the procedure room a sense of comfort and safety was engendered by the presence of a large healthcare team and its perceived competence, relaxed attitude and use of humour. Lechtzin *et al.* (2002) measured patient satisfaction of bronchoscopy by asking the patients to evaluate specific aspects of bronchoscopy care including physician and nursing skills regarding, courtesy, clinical skill and ability to comfort. They reported that over three quarters of patients found the physicians and nursing staff to be very good or excellent in all areas and that 80% would probably or definitely return for a repeat procedure. When patient satisfaction is high, it promotes return business, patient referrals, reduced likelihood of complaints or law suits and increased patient compliance (Trout *et al.* 2000).

Current findings identified a variety of negative attributes to the local anaesthetic that was sprayed into participants throats prior to the bronchoscopy. Commonly experienced sensations included a terrible taste, feeling their throat was swollen, choking and inability to swallow. Discomfort relating to throat spray has been reported in other studies (Lo *et al.* 2011, Contoli *et al.* 2013) and an older study found that a significant number of patients with asthma had airway constriction related to the administration of local anaesthetic (McAlpine & Thomson 1989). Similarly to the participants in our study, previous studies have reported shortness of breath, cough and sore throat associated with bronchoscopy (Houghton *et al.* 2004, Ni *et al.* 2010). In our study, all bronchoscopies were performed via the oral route which may be a factor relating to the degree of discomfort experienced. However, a recent randomised controlled trial that compared oral versus nasal bronchoscopy insertion found no statistical difference in patient comfort scores (Delage 2014).

Participants in our study that mentioned choking and coughing during the procedure said that choking was the worst feeling. To some degree, their reactions to the bronchoscope may have been exacerbated by their chronic lung conditions, which are associated with breathing difficulties and coughing. They were distressed further because they did not want to cough as they thought it would make difficulties for the healthcare professionals carrying out their procedure. Coughing and choking can be very frightening experiences, as both are associated with breathing difficulties. Such fears may be compounded when the person is unable to exert control over their situation. Using visual analogue scales, some studies have

assessed choking and coughing associated with bronchoscopy, finding that both were reduced when greater levels of sedation and/or analgesia were used (Gonzalez *et al.* 2003, Dreher *et al.* 2010). In some cases coughing and choking may be helped by increasing the use of sedation but for others for whom this risk is high, it is vital that they are provided with detailed explanations before the procedure about what might happen, including the high possibility of experiencing choking sensations and coughing, and providing reassurance that this is normal and that the attending team will ensure their safety.

In the current study, half of the participants described being aware of what was happening during their bronchoscopy. In most cases, the experiences were negative. As well as various sensations of discomfort, awareness induced anxiety and fear. Also, conversations were overheard; this was particularly distressing when aspects of the procedure such as difficulties obtaining a biopsy were discussed. Although some studies have measured the degree of awareness during bronchoscopy (Silvestri *et al.* 2009, Cases Viedma *et al.* 2010) its impact has not been explored previously from the patient's perspective. Whilst awareness, and thereby distress, might be alleviated with the use of higher doses of sedation this could increase the risk of complications. From a clinical perspective, this raises questions of patient safety versus patient distress. To some extent, risks associated with sedative use may be mitigated through sedative choice. For example, propofol has been shown to provide a higher quality of sedation than midazolam (Clark *et al.* 2009) and due to its rapid action and short half-life it is often the drug of choice for older patients with COPD (Gruber & Tschernko 2003). In a relatively recent randomised controlled trial of the use of propofol for bronchoscopy with high risk respiratory patients only minor adverse events (oxygen desaturation, hypotension) were reported (Stolz *et al.* 2004). On the other hand, whilst propofol may have some benefits over other sedatives such as midazolam it is more expensive and usually requires the presence of an anaesthetist to administer it.

In our study, participants suffered various negative consequences from the procedure. These included headaches, sore throats, coughing, chest discomfort and influenza-like feelings. The results from the longitudinal cohort study by Diette *et al.* (2013) are consistent with some of our findings. They collected symptom data from 451 patients following bronchoscopy however the proportion of subjects with COPD is unclear. They reported post-procedure throat and nose pain, swallowing discomfort and haemoptysis, with some

subjects reporting worsening of cough and wheezing, and chest pain. In our study, in which all were patients with COPD, it was more likely that respiratory complications such as cough and wheeze would be observed post-procedure. Bronchoscopy guidelines (British Thoracic Society, 2013) recommend pre-procedure administration of bronchodilators for asthmatic patients.

Limitations

All interviews were conducted post-procedure, prior to the confirmation of diagnosis, therefore some participants' anxiety may have influenced their accounts. It is also possible that due to participants' general health condition (COPD) some may have suffered some degree of cognitive impairment, although this was not apparent during the interviews. Whilst participants' ongoing suffering as a result of their chronic health condition may have contributed to their state of mind during the bronchoscopy, this is contextually relevant to the experience of this particular sample. Only one participant had previously experienced conscious sedation, and therefore had some idea of what to expect. For the others, who had not experienced either a bronchoscopy or conscious sedation, the reality of being aware during the procedure may have contributed to a heightened perception of the experience. In terms of transferability, the experiences typified by the participants may not be representative of others' experiences in similar settings, especially when different bronchoscopy insertion techniques, local anaesthetics and sedative agents may be used. Finally, it is important to acknowledge the influence of the lead author's past observations of apparent distress when patients were undergoing bronchoscopy, and concede that at least to some degree this helped shape all phases of the research. However, as suggested by Van Manen (1984) it is better to be explicit about preconceived ideas, biases and theories as they are shallow in comparison with the real data that is collected.

CONCLUSIONS

This study has demonstrated that some patients are fully aware during bronchoscopy when conscious sedation and analgesia is used, and may have full recollection of the procedure with its attendant discomforts. Participants remembered coughing and choking and that they were distressed by it. We also found that awareness during the procedure could lead to the disclosure of information to the patient at an inappropriate time, such as difficulties associated with the procedure, obtaining a biopsy, or diagnostic outcomes. Specific to the

setting, this study uncovered issues regarding repetitive and lengthy documentation procedures, and unnecessarily long fasting and waiting times. These are amenable to improvement. As explored in previous studies, we confirmed that patient fear was a problem before bronchoscopy and discovered that little attention was accorded to participants' potential experience of the bronchoscopy and how it might feel. However, despite their negative experiences, participants were accepting of their experience, considering it a 'necessary evil' in order to obtain a diagnosis.

RELEVANCE TO CLINICAL PRACTICE

Since a significant proportion of patients undergoing bronchoscopy with conscious sedation and analgesia are likely to be aware during the procedure and in consideration that most aspects are unpleasant, it is important for nurses and other members of the healthcare team working in this setting to firstly acknowledge the patient experience and what they are going through. This should start before the procedure with an exploration of what they are feeling and what they are worried about, enabling them to give voice to their concerns. The information provided by the patient in turn enables healthcare professionals to provide individually tailored information with specifically focused reassurance. What the patients might experience during the bronchoscopy should be discussed fully, ensuring that they are aware that some people may be fully 'awake' during the procedure whereas others may have no recollection of it whatsoever. For the former group, an explanation of the possible sensations they might experience – including coughing and choking – and confirmation that whilst uncomfortable they are not unusual and that the healthcare will ensure they are safe the whole time, will help to alleviate intra-procedure anxiety and fear. For the attending healthcare team, in anticipation of the possibility that the patient may be aware, it would be good practice to provide patient-focused explanations of what is happening during the procedure as well as providing ongoing reassurance that everything is going as planned. Talking about the patient should be abandoned in favour of talking to the patient. Whilst a simple solution might appear to be to increase the use of sedation, inherent risks associated with deeper sedation when used in high risk patient groups must always be considered. Thus, each patient should be considered individually which inevitably means that some will receive only light sedation and will have greater awareness of the procedure. Patients may benefit from debriefing after this experience, particularly if it has been negative. As well as

benefiting the patient, the information gained from debriefing would provide a source of data to improve patient care.

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Table 1: Example of analysis process

Method	Description	Example
Wholistic approach	Written phrase that expresses the central meaning	Bob was processing information at an inappropriate time; during the procedure. Bob feared that he may have cancer and believed he needed to have a biopsy to find out if this was the case. He was angry when the doctor was unable to take a biopsy.
Selective approach	Selection of phrase that is revealing about the phenomenon	<i>I went in there under the thought that I was going to have a biopsy on this thing that's in my lung here or whatever, but they didn't do a biopsy. So now I know they haven't done a biopsy, whereas I suppose if I was asleep I wouldn't know. I would have been none the wiser until I went on Tuesday. So whether that's good or bad, I don't know. 1a 4.17</i>
Line by line approach	Line by line Interpretation	<i>I can remember like them saying, yeah, yeah, can't go there, okay here, no, can't see it there, and like stuff like that. 1a5.17</i> Bob was aware of what medical staff were saying during the procedure; he understood that they were unable to take a biopsy.
Reflection of the theme in relationship to the world we live in	Space, body, time, relationality	Space: Bob was aware during the procedure. Body: Bob could almost tell where they were putting the bronchoscope from the way they were talking. Feelings of frustration and anger resulted as Bob felt that he would have to undergo more procedures to obtain a diagnosis. Relationality: Bob was not angry at the staff performing the procedure; he was frustrated with the situation.

Table 2. Participant characteristics

Participant (pseudonym)	Age (years)	Gender	Weight (kg)	Indications for procedure	Type of procedure (length mins)	Lignocaine (mg)	Midazolam (mg)	Fentanyl (mcg)
Alec	48	M	98	Left lower lobe Lung mass	Diagnostic + wash + Endobronchial biopsy and brush (32)	260	8	100
Bob	59	M	76	Haemoptysis; right middle lobe mass	Diagnostic + BAL (31)	220	4	75
Cameron	56	M	74	Haemoptysis	Diagnostic + wash (22)	140	5	100
George	80	M	82	Haemoptysis; right pleural effusion	Diagnostic + wash (9)	200	5	0
John	65	M	83	Shortness of breath, changes on X-ray	Diagnostic +EBUS (55)	260	7	0
Ian	79	M	77	Haemoptysis	Diagnostic + wash (23)	220	3.5	100
June	79	F	60	X-ray changes	Diagnostic + EBUS (46)	200	4	75
Kelly	78	F	72	Right middle lobe mass	Bronchoscopy +TBLBx (23)	260	4	75
Mark	55	M	35	Left Upper lobe mass	Diagnostic +EBUS (28)	220	5	100
Nathan	81	M	74	Right lower lobe mass	Diagnostic + EBUS (25)	220	5	100
Penny	70	F	65	Haemoptysis; history of lung cancer	Diagnostic + wash (19)	220	5	100
Rachel	35	F	34	Persistent cough; bronchiectasis	Diagnostic + wash (9)	140	3	100
Sam	69	M	124	Haemoptysis; history of small cell lung cancer	Diagnostic + wash (15)	220	2.5	50

BAL: broncho-alveolar lavage; EBUS: endobronchial ultrasound; TBLBx: trans-bronchial biopsy; wash: flushing of respiratory tract with saline solution

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