



Qualitative assessment of sensations and triggers in chronic cough

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To the Editor:

Chronic cough (lasting ≥ 8 weeks) affects $\sim 10\%$ of the global population and has a substantial impact on patients' quality of life [1]. Chronic cough which persists despite extensive investigation and treatment trials is termed refractory chronic cough (RCC). Expert consensus is that RCC is largely driven by cough reflex hypersensitivity (CRH), considered to be of neurological pathology [2–4]. Evidence for neural pathophysiology in chronic cough includes the presence of hyperinnervation of airway nerves [5], decreased activation of cough suppression centres in functional magnetic resonance imaging studies [6], and benefit to cough from neuromodulator medication [7–9]. Objectively, CRH is identified by tussive challenge testing with stimuli such as capsaicin, ATP and citric acid [10]. Furthermore, key CRH features are akin to triggers and sensations of neuropathic pain, namely allotussia, hypertussia and laryngeal paraesthesia [11]. There is a paucity of studies that have investigated triggers and sensations in chronic cough. Of these, no study has used qualitative methodology to elucidate the range of potential triggers and sensations. The aim of this study was to qualitatively assess chronic cough triggers and sensations, utilising open-ended concept elicitation in semi-structured interviews.

This qualitative study involved single, one-on-one, semi-structured interviews with patients recruited from a specialist cough centre. All participants had RCC, defined according to European Respiratory Society guidelines [4], with no recent respiratory infection (within 6 weeks). Clinical assessment deemed that, despite current management of treatable traits or use of neuromodulators, chronic cough was not suppressed. Participants gave informed consent, and the study was approved by East London and the City Research Ethics Committee (reference 10/H0703/6). A single interviewer (B. Hirons) with experience in qualitative interview methodology conducted interviews using a standardised, semi-structured guide, developed by a chronic cough multidisciplinary team. Through concept elicitation, open-ended questions were utilised to discuss and assess a wide range of personal cough triggers and sensations, followed by prompting for commonly known ones. Each interview was coded for qualitative content analysis using methodology described by Willis [12]. A coding dictionary of key concepts was created, then tested by coding subsequent transcripts. One researcher coded all transcripts using the constant comparative method. This iterative coding approach involved moving back and forth between consecutive transcripts and incorporating new codes that emerged during the process [13]. Potential themes and subthemes were inputted into a framework matrix to aid recognition of trends and selection of extracts to illustrate participant responses [14]. Interviews ceased at concept saturation, pre-defined as no new concepts elicited for two consecutive interviews [15]. Saturation occurred after the eighth interview.

Participants with RCC (n=10) completed assessments; 70% female, median (interquartile range (IQR)) age 63 (55–67) years, duration of cough 96 (69–120) months and body mass index 28 (27–29) $\text{kg}\cdot\text{m}^{-2}$. Median (IQR) cough severity visual analogue scale was 74 (63–81) mm and Leicester Cough Questionnaire score 7.5 (6.8–9.0), indicating at least moderate cough severity and impairment of cough-specific health status. In 10 interviews, nine distinct cough sensations were elicited. The most common sensation elicited was “tickle in the throat” (n=9), followed by “urge to cough before coughing starts”, “dry throat” and “irritation in throat” (all n=8) (table 1). 24 distinct cough triggers were elicited. The most common triggers reported were “smoke or smoky atmosphere” and “change in body position” (both n=9), followed by “perfumes or scents”, “talking” and “exercise” (all n=8) (table 1). The changes in body position reported as triggers were varied without a consistent pattern; the most common was “lying down” (n=5).



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Qualitative interviews show a wide range of cough triggers and sensations in patients with refractory chronic cough. Knowledge of these may help us manage this complicated and impactful condition. <https://bit.ly/41k90t5>

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TABLE 1 Cough sensations and triggers from concept elicitation *via* semi-structured interviews, in patients with refractory chronic cough (n=10), with illustrative quotations

	Total	Patient										Illustrative quotation
		A	B	C	D	E	F	G	H	I	J	
Sensations												
Tickle in throat	9	p	p		p	p	s	p	p	s	p	Straightforward. Anyone gets a tickle in the throat, they're gonna cough
Urge to cough	8		p	p	p	s	s	s	s		s	Something in there all the time...you wanna cough just to get rid of something
Dry throat	8	p	p		s	s	s		p	s	s	I tend to drink a lot of water and things, and tea, just to lubricate the throat
Irritation in throat	8	s	p		p	s	s	s	s	p		There is something that's irritating your throat that you can't do anything about it
Itchy throat	5	s				s	p		p	p		A pinprick sensation in my throat...Just one spot. And that itches. And it makes me cough
Sensation in chest	4	s	p	p							s	You've written what I would describe. It's a sensation in the chest rather than in the throat
Blockage in throat	1		s									I always feel like there's a blockage and it won't clear unless I've got to an end of a cough
Choking	1				s							Because I have that feeling of choking and I've got that urge to cough to clear it
Prickle in throat	1						s					It's sort of like a prickling and a tickling in the back of my throat
Triggers												
Smoke/smoky atmosphere	9	p	p		s	p	p	p	s	p	s	Smoke from bonfires, people smoking, even if they're not, you know it's on their clothes. It's just an irritant
Change in body position	9	s	s	s	s	s	p	s		s	p	So from lying down to sitting up in bed, I start off without fail
Perfumes/scents	8	s	s		s	s	s	p	s		p	I avoid perfume counters or where all the washing products are kept because that definitely affects me
Talking	8		p	p		p	p	s	p	s	s	You're forcing, the strain on your throat, drying your mouth out
Exercise	8	s	s	p		s	p		p	p	p	The more I do it, the worse it'll be. And I just, I end up giving up with it half the time. It's not worth it
Cold air	7	s	p	s			s		p	s	s	It catches you all of a sudden when you go out in the cold
Dry air	7		p		p	s	s		p	p	s	If you've got air conditioning or fans going on, it feels hot, it feels dry. And dry winds too would trigger it
Laughing	7	s	p		p		p	p	p		p	Laughing is a big one. I think you'll find most people will say yes, it starts me coughing
Sputum	7	s	p	s	s			p	p		s	It makes you wanna cough. Get rid of stuff from the chest, rubbish in the throat
Eating/drinking	6	p				s	s	s	p	s		I eat fruits before I eat my food. And when I start on eating them, yeah, it comes on soon
Brushing teeth	6	p	p				p	p	p	p		It's anything around the back of the throat. Just, well, a gag reaction and coughing
Hot air	4		p			p	s		s			I tend to not have the heating on because I feel I can breathe better. That the air is better for me
Damp	4		p					p	p		p	If it is cold and my hair's damp it will start my cough
Post-nasal drip	4				p	p				p	p	The throat's...itchy through something that's gone down the back of the nose
Heartburn	3			p	p						p	I drink really cold water...it makes the heartburn go away but often the heartburn will cause me to cough
Dust	2		s	s								When you're where there's a lot of dust...you're then breathing it in, causing you to cough it out
Stress	2			s		s						When you stress yourself, you bring it up on yourself 'cause you start coughing
Indigestion	1		p									I don't digest food properly with my Crohn's and that can cause issues where food hasn't gone down properly
Singing	1		s									I will have to cough if I try to do a little bit more than just a standard bit
Air conditioning	1			s								If we had air conditioning on, I wouldn't be able to have this conversation
Facemask	1					s						As soon as I put the mask on I start coughing

Continued



TABLE 1 Continued

	Total	Patient										Illustrative quotation
		A	B	C	D	E	F	G	H	I	J	
Pollen	1						s					The hay fever and pollen seem to affect it
Cleaning products	1						s					Cleaning, definitely, with the fluids and soap powders
Paint fumes	1								s			Paint smells. That's sort of thing, just creates a reaction
New items		14	9	3	2	1	3	0	1	0	0	
Total items		14	21	11	13	16	19	12	18	13	16	

Shaded boxes indicate new concepts. p: prompted; s: reported spontaneously.

Our qualitative analysis has revealed a wide range of cough triggers and sensations in patients with RCC, with many features shared among participants. Features were suggestive of a neuropathic disorder; all patients reported hypertussia (*e.g.* smoke as trigger) and allotussia (*e.g.* talking as trigger), nine out of 10 reported laryngeal paraesthesia (*e.g.* throat tickle). The ability to identify cough triggers and sensations could be important, as this may suggest underlying neuropathology which might indicate susceptibility to treatments such as neuromodulators [16, 17]. Regarding limitations of our study, the sample size of 10 met our pre-defined saturation target and provided a rich dataset. However, it is possible that a larger sample may have revealed other sensations and triggers, although the added value of this is not immediately apparent. Previous studies that have investigated laryngeal sensations and cough triggers have tended to use clinician-generated questionnaires rather than those developed from open-ended discussions with patients in concept elicitation [11, 18–20]. While patient-reported outcomes are abundant in chronic cough, there are a paucity of questionnaire tools that explore cough triggers or sensations. The Hull Airway Reflux Questionnaire (HARQ) is a validated 14-item self-administered tool utilising Likert-style response scales, which investigates for the presence of airway reflux and cough hypersensitivity [19]. HARQ specifically evaluates five cough triggers (position change, eating certain foods, getting out of bed, singing or speaking) and four sensations, two of which may relate to laryngeal paraesthesia (throat tickle and hoarse voice). HARQ has been used in large clinical trials [21], is recommended in guidelines to help recognise underlying reflux and cough hypersensitivity [4] and may help predict response to gabapentin treatment in chronic cough [16]. The number of cough triggers and sensations in the HARQ is limited compared to those determined in our concept-elicitation study. Further investigation is required to determine the optimal choice and number of triggers to include in such a questionnaire. The Newcastle Laryngeal Hypersensitivity Questionnaire (NLHQ) is a 14-item self-administered questionnaire which uses Likert-style questions to measure the extent of laryngeal paraesthesia in laryngeal conditions such as inducible laryngeal obstruction and chronic cough [20]. Cough triggers are not assessed, and laryngeal sensations are evaluated across three domains: obstruction, pain/thermal and irritation. NLHQ may be a useful tool when predicting response to treatments such as gabapentin in chronic cough [17].

In conclusion, through qualitative methodology we demonstrate a wide range of triggers and sensations associated with chronic cough. This work provides a unique insight into the profile of cough hypersensitivity from a patient's perspective and will aid development of patient reported outcome tools that assess and quantify these triggers and sensations. Novel tools may have the potential to expedite the diagnostic process by identifying clinical phenotypes and cough reflex hypersensitivity, which should be investigated further.

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Data sharing statement: The authors confirm that the data supporting the findings of this study are available within the article.

Conflict of interest: None declared.

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