working voices

research summary

Our research and development programme

IOSH, the Chartered body for health and safety professionals, is committed to evidence-based practice in workplace health and safety. We maintain a Research and Development Fund to support research, lead debate and inspire innovation as part of our work as a thought leader in health and safety.

In this document, you'll find a summary of the independent study we commissioned from the University of Ulster: 'Working voices: an epidemiological study of occupational voice demands and their impact on the call centre industry'.

The researchers would like to thank all those organisations and individuals that took part in the research as well as those who facilitated their contact with organisations and individuals.

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Working voices

What's the problem?

Many workers, including teachers, actors, singers and telephonists, depend on the human voice. Some of them receive specific training to protect their voices, but others don't. This includes the call centre industry, where the number of agents employed is growing. Although many organisations encourage customers to use other services such as email and text message, customers often prefer to speak to a representative on the phone. Workers in the call centre industry depend on their voices, but the importance of vocal health is often underestimated.

Call centre workers speak for long periods on the phone, placing significant demands on their voices. This increases the risk of occupational voice disorders, such as musculoskeletal problems caused by muscle tension in the larynx. As well as the physiological demands of talking for long periods, call agents also have to balance psychological, behavioural and environmental factors to make sure they can interact effectively.

So far, little research has been done to investigate how call centre workers use their voices and what impact this has. This represents a significant gap in the evidence base of occupational health and safety research. The majority of published studies investigating the vocal demands on call agents have been based on small numbers of participants. There have been no studies investigating voice use or the impact of vocal and communication demands in the call centre industry in the UK and Ireland.

We commissioned Dr Diane Hazlett, Dr Anne Moorhead and Dr Orla Duffy from the University of Ulster to research this issue. We asked them to find out whether there is a relationship between physiological voice production and psychosocial* and medical health among workers in call centres.

The research had three key goals:

- to investigate the work context and vocal communication demands that affect call agents
- to evaluate the vocal health, awareness and performance of call agents
- to identify key risks and training needs for employers and employees in UK and Ireland call centres.

* Psychosocial: relating to a person's psychological development in, and interaction with, a social environment

What did our researchers do?

The research involved both quantitative and qualitative approaches and was carried out in three stages:

- telephone interviews with senior managers at the call centres
- an online survey of call centre employees
- acoustic measurements in the working environment.

Recruitment

A list of call centres was compiled and their human resources departments were invited to take part in the study. Employees from 14 call centres in the UK and Ireland took part in the research.

Interviews

The research team developed a semi-structured telephone questionnaire to use during interviews with senior managers, such as call centre or human resources managers, at the call centres. The interviews lasted for about 10 minutes and aimed to assess the organisation's communication and training needs. Data from the interviews were transcribed and analysed thematically to determine the context and process characteristics of the organisations, while qualitative analysis was used to identify underlying themes and issues. The information gathered from the interviews was used to develop the online questionnaire for employees.

Online survey

Call centre employees took part in an online biopsychosocial questionnaire* to investigate their work environment, vocal demands and health. The questionnaire was completed by 598 employees. The research team used structural equation modelling (SEM) to analyse the data from the online questionnaire.

Acoustic measurement

Quality teams in call centres routinely monitor and record calls between their call agents and customers. The research team took acoustic measurements from a random sample of these calls in one of the call centres that was taking part. Call centre staff selected a sample of natural conversation and gave it to the research team in digital format for analysis.

Three sections of each call, at the beginning, middle and end, were chosen for analysis. Each section consisted of three seconds of the call agent's uninterrupted voice. The research team used the Multi Dimensional Voice Program to analyse the voice sample recordings for 14 acoustic parameters.†

* The biopsychosocial questionnaire addressed a combination of biological, psychological and social factors that affect the call centre workers.

† The study obtained ethical approval from the School of Communication Risk and Ethics Filter Committee, University of Ulster.

What did our researchers find out?

Overall, 25 per cent of the call agents reported voice misuse, 25 per cent presented voice symptoms, 11 per cent reported being diagnosed with a voice disorder, and 10 per cent reported that their voice had an impact on their performance at work.

Voice misuse and symptoms

The call agents reported various types of voice misuse, including:

- difficulty talking against background noise (60 per cent)
- coughing or clearing the throat (43 per cent)
- the voice sounding creaky and dry (43 per cent)
- failure to be heard when talking on the telephone (41 per cent)
- finding it an effort or tiring to speak on the telephone (38 per cent).

These types of misuse reflect the demands of the work environment in the call centres, such as background noise and room acoustics.

The average number of symptoms reported by call agents was four, and the call agents who reported the highest levels of voice misuse also reported the most voice symptoms. The most common of these was hoarseness (66 per cent), followed by loss of pitch range (45 per cent) and the voice being lower in pitch (38 per cent). See Table 1 on page 04.

Voice symptom (number of respondents)	Frequency (%)				
	Never	Rarely	Sometimes	Often	Very often
Hoarseness (548)	16	18	33	19	14
Trouble speaking loudly (550)	68	14	12	4	2
Voice is lower in pitch (548)	36	26	26	8	4
Loss of pitch range (highest to lowest note) (550)	31	24	29	11	5
Loss of volume (549)	57	20	14	6	3
Breathiness (air escaping as you talk) (548)	62	21	11	4	2
Increased effort to talk (546)	64	18	12	4	2
Tendency to lose voice at end of sentence (545)	58	23	14	3	2
Tendency to lose voice mid-sentence (550)	67	20	9	2	2
Voice 'breaks' during speaking (550)	60	21	13	4	2
Vocal fatigue (voice tires or changes quality after speaking for a short time) (547)	57	19	17	5	2
Shortness of breath while speaking (548)	59	21	15	4	1
Pain in the throat or neck (550)	59	22	16	2	1
Dryness in the throat (548)	59	23	14	2	2
Sore throat (548)	54	27	13	4	2
Burning sensation in the throat (548)	46	27	20	5	2
Feeling thirsty (549)	56	26	14	2	2

Table 1
Voice symptoms among call agents

Vocal impact

Overall, 10 per cent of the call agents reported that problems with their voice had an impact on them. On average, each call agent agreed with one vocal impact statement. The most reported statements were:

- 'my voice problem upsets me' (31 per cent)
- 'my voice makes me feel less able to do my job' (14 per cent).

Of the 598 call agents who took part in the survey, 28 per cent reported voice misuse, voice-related symptoms and vocal impact. Some 20 per cent indicated that they would like further information or training to improve their vocal performance at work. See Table 2 on page 06.

Training needs

The telephone interviews with senior managers at the call centres indicated that call agents receive regular, comprehensive job training, both at induction and ongoing. However, the researchers found that most call centres do not include vocal training. Furthermore, most of the managers said that they understood the need and benefits of voice training for employees.

Acoustic data

The acoustic data indicated that at the end of the telephone call, the call agent's voice can be hoarse, fatigued and inconsistent in pitch, compared to the start of the call.

Vocal impact (number of respondents)	Frequency (%)				
	Never	Rarely	Sometimes	Often	Very often
My voice makes it more difficult for people to hear me (554)	87	6	4	2	1
People have difficulty understanding me in a noisy room (543)	89	6	3	1	1
People ask 'What's wrong with your voice?' (545)	91	4	3	1	1
I feel as though I have to strain to produce voice (546)	88	6	3	2	1
My voice difficulties restrict my personal and social life (546)	74	14	9	2	1
The clarity of my voice is unpredictable (541)	87	8	3	1	1
I feel left out of conversation because of my voice (547)	76	14	7	2	1
My voice problem causes me to lose income (546)	85	10	3	1	1
My voice problem upsets me (546)	46	23	21	7	3
My voice makes me feel less able to do my job (546)	63	23	10	2	2

Table 2
Vocal impact among call agents

Health implications

Analysis of the data from the online questionnaire found that psychosocial health and medical health are both clearly associated with physiological voice production among call agents. Therefore, an increase in problems with psychosocial and medical health may lead to an increase in physiological voice problems.

Three factors significantly contributed to physiological voice production among the call agents:

- mechanics – problems with physical voice production, such as the voice breaking during a sentence
- sensations – physical feelings in the throat, such as pain or dryness
- acoustics – perceptions of the sound of the voice, such as hoarseness and volume.

Two factors played an important role in psychosocial health among the call agents:

- functionality – the effectiveness of the voice, such as people having difficulty hearing the speaker
- emotions – such as feeling depressed or embarrassed about the voice.

Where a call agent reported an associated medical condition and sought advice, this significantly contributed to medical health.

The researchers also identified a high-risk group of call agents who are significantly at risk of developing physiological voice problems. These are female workers who have recently started working in a call centre, who received no vocal training and who have taken time off work on sick leave.

The research team found that vocal training delivered within the workplace significantly reduces the risk of developing physiological voice problems.

What does the research mean?

The project demonstrated a number of important points:

- There's a significant relationship between vocal health and medical and psychosocial health among call agents.
- Mechanical, sensation and acoustic factors significantly contribute to physiological voice production among call agents.
- A physiological voice problem is a predictor of medical and psychosocial health.
- Vocal training delivered in the workplace significantly reduces the risk of developing physiological voice problems.
- Preventive strategies are needed to address the needs of a high risk group of call agents.
- Further robust research is needed.

The research has several implications for occupational safety and health. There should be an emphasis on preventing, rather than treating, voice problems among call agents, and the level of risk of voice disorders among these workers needs to be measured. In addition, occupational safety and health policies on voice care should be established and reviewed regularly.

All call agents, and especially new starters, should receive vocal training. This should include:

- awareness of vocal health
- tone of voice
- volume of voice
- listening skills
- voice projection and handling
- cognitive issues
- sources of advice.

There is a clear need for vocal health to be included in the health and safety policy of call centres, and for initiatives and strategies to reduce absenteeism among call agents.

What's next?

Further robust research needs to be carried out among call centre agents. Recommendations for further research include:

- determining universally accepted definitions of voice disorders, assessment and methods
- identifying a set of standardised tests for universal use across all research
- finding out whether occupation causes or aggravates voice disorders among professional voice users
- conducting a large scale risk assessment to find out which factors contribute to occupational voice disorders and classify the levels of risk
- identifying optimum levels of intervention to help with assessing and preventing voice problems in call centres
- developing the biopsychosocial questionnaire that was used in the online survey for this study so that it can be used as a screening tool
- assessing the effectiveness of different types of voice training to develop a vocal training programme for call centre workers
- establishing the effect of voice training among call agents by conducting a controlled trial with agents
- investigating cost-effective methods of providing voice training to call agents
- verifying physiological change to vocal function using medical visualisation techniques.

Don't forget

Like most studies, this one had some limitations. The researchers had difficulty recruiting call centres to participate in the study. This was partly due to the current economic downturn, which meant that many organisations were operating on limited resources. In addition, many organisations reported that it was the company's policy not to participate in research studies. However, the researchers kept recruiting and achieved a large sample size for the online survey within the allocated timeframe.

Although the acoustic measurements were objective, both the interviews with managers from the call centres and the online survey completed by call agents were subjective. The call agents reported their own voice use, symptoms and vocal impact, along with information about themselves and their work environment. Self-reported data are often treated with caution, but the large sample size of the online survey effectively reduced the margin of error. As the data for this study were self-reported, there was a lack of medical verification for physiological change to vocal performance.

Our research

This project is one of a series of projects commissioned by IOSH to focus on the interactions between work, health and wellbeing. The first report looked at the impact of work-related violence on health and wellbeing and how these incidents affect health (University of Sheffield). The second explores the relationship between work, wellbeing and health (Cardiff University). The third is a longitudinal study of the effects of shift work on health (University of Monaco project).

You can download the research summaries at **www.iosh.co.uk/researchreports**. Visit **www.iosh.co.uk/researchgrants** to find out about other research in progress.

Good practice in action – managing vocal health, safety and performance in the workplace

The voice is a primary work tool for one in three jobs in industrialised societies. In a vocally demanding work environment like a call centre, there are a several preventive and protective measures which can improve employees' wellbeing and performance. The information and advice offered here is based on research evidence and existing best practice.

In this study, one in four call handlers reported early symptoms of vocal strain or misuse. By contrast, one in 25 UK workers in general report occupational voice loss each year. However, only a small proportion of these workers show frequent or consistent symptoms of vocal strain or voice loss.

Health and safety knowledge and awareness of the work environment

There are many factors which can contribute to voice or throat problems, so it's important for employers and employees to be aware of potential risks and to manage the work environment positively. Individuals can then take responsibility for behavioural, lifestyle, hereditary, environmental and vocational hazards.

Be aware of the employee's physical environment. How close are they to other call handlers? How many calls do they handle? Are headsets of good quality and used properly? In the study, problematic background noise came not only from colleagues taking other calls but also from the customer's environment or the headset itself.

Advice to reduce the risk for new starters

New starters, especially women, are at most risk as they adjust to the heavy vocal demands of the job.

The risk of vocal health problems can be minimised with good work design and by providing information and training. Regular breaks, either as a change of activity, readjustment of head and neck posture or rest, can reduce call handlers' exposure to uncomfortable environmental conditions.

Drinking frequently and keeping the throat lubricated are essential for maintaining good vocal health. To help with this, make sure the air quality, humidity, ventilation and temperature are as good as possible.

Make sure that call handlers' computers and other equipment are set up correctly. This will help them maintain a good posture and minimise the risk of musculoskeletal disorders of the neck and voice.

Some tips for keeping the voice healthy

- **Speaking loudly or over long periods may lead to a voice disorder.** Voices aren't designed for talking continuously without breaks. We raise our voices when the background noise is above 40 dB, straining to be heard. Learn to recognise when your voice is tired – vocal endurance, like athletics, needs special skills.

- **Persistent hoarseness or breathiness may be a sign of a voice problem.** If either symptom persists for more than two weeks, consult your GP or a speech and language therapist. As the voice gets tired it tails off, and you need to make extra effort to be heard. This causes a damaging cycle of misuse. A sore throat is a warning sign that the vocal tissues are inflamed and need a break.

- **Stress can lead to strained, forceful voice production, with possible tissue damage.** Stretching and relaxation techniques can improve the voice and allow more effective vocal control, quality and volume for longer periods of speaking.

- **Caffeine, alcohol and some medications dehydrate the vocal cords, which can make it more difficult to keep them vibrating for clear strong voice.** Antihistamines taken for colds or allergies can shrink swollen membranes and reduce the production of saliva and mucus, which dries the vocal tissues. Dehydration can increase the risk of throat infections. Drinking plenty of water and other fluids helps, especially if you also drink caffeinated drinks. For example, for every mug of coffee, drink 200 mL of water too.

- **Repeatedly clearing your throat or coughing may damage vocal fold tissues.** Throat clearing slams the vocal folds together, irritating the surrounding tissue. Instead, try swallowing, taking a sip of water or sucking a throat sweet.

- **Frequent heartburn or stomach acids spilling into your larynx may lead to voice problems.** If you have these symptoms, avoid high acid foods and eating late at night. Try raising your head with extra pillows in bed.

- **Smoking is a leading cause of throat cancer.** Smoking irritates the vocal tissues used for talking and singing.

Psychological and psychosocial health

A number of factors contribute to the stress and complexities of communicating in a call centre environment. Previous research by the Health and Safety Executive (HSE) showed that stress or poor wellbeing often result when call handlers aren't making full use of their skills, have a higher workload, are uncertain about their work role or are expected to meet conflicting work requirements.

Training is essential for maintaining and updating skills for handling challenging callers, and it's vital to review work design, repetitive scripted tasks or time and quality monitoring pressures regularly. These measures will have a direct impact on vocal health and effectiveness for the job.

References

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Voice Care Network UK,www.voicecare.org.uk.

Our summary gives you all the major findings of the independent project report by the University of Ulster. If you want to read about the study in more depth, you can download the free full report from **www.iosh.co.uk/researchreports** or buy a paper copy by emailing andrea.alexander@iosh.co.uk.

This research complements our guides, *Working well – guidance on promoting health and wellbeing at work* and *A healthy return – good practice guide to rehabilitating people at work*.

Download IOSH's good practice guides at **www.iosh.co.uk/techguide**.

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