The PIPAH Study Newsletter

January 2023

Introduction

At the beginning of last year, Britain was beginning to return to some form of normality after the COVID-19 pandemic. This did not mean that COVID-19 had disappeared; many of us still became ill with COVID-19 during 2022 but as a nation we were learning to live with it. The PIPAH study also started to return to some form of normality. We began recruiting new members into the study again, after a break during the COVID-19 lockdown period, and we returned to the Cereals show in Cambridgeshire. The study also reached an important milestone – it is ten years since we first began inviting you to join the study.

Why are we interested in pesticides?

The PIPAH study is trying to better understand if health problems are associated with regular pesticide use, and how to keep people who use these safe and healthy at work. The use of pesticides is very important to our lives in many ways, and we are keen to make sure that when they are used, they are used safely.

Our tenth year…

Over the past ten years the study has continued to grow thanks to our rolling recruitment programme, which we put in place after the two main recruiting phases in 2013 and 2014. City and Guilds helped us with this by approaching new NRoSO members and inviting them to take part in the study. About 7% of the current study members have been recruited through the rolling recruitment programme. The programme ensures that the study covers the entire range of experience, from people at the beginning of their careers to those who have retired from using professional pesticides. This diversity is invaluable to the quality of the study and the generalisability of its findings.

The HSE Science and Research Centre, Buxton

In January 2022 we invited you to complete a short questionnaire on hearing loss and on COVID-19. One of HSE's aims is to promote safe practices with respect to protecting hearing in occupational settings. To identify the actual causes of hearing loss can be difficult, given the many factors, both in the work place and outside of work, that can affect hearing. So, our questionnaire was designed to see if it is possible to identify any factors which may be related to hearing loss.

We included COVID-19 in the questionnaire last year because the PIPAH study participants represent an occupational group – whether working or retired – with different working patterns and possibly also different lifestyles during the pandemic to the general population. We were really interested in finding out whether your experience of COVID-19 might also differ from that of the general population.

At the end of this newsletter we present simple summary statistics of the hearing loss and COVID-19 data we collected. However, a more complex analysis will be needed to provide more definitive results. This analysis will take into account age and gender, and the fact that we are exposed to many different factors over a lifetime.

Cereals

We were delighted to be able to attend Cereals at Chrishall Grange in Cambridgeshire this year. We enjoyed meeting members of the study and appreciated having an opportunity to discuss the study with them and other members of the public. We are hoping to attend Cereals again in 2023.

International collaborations

The international collaborative project, the IMPRESS project, with which we have been involved since it started in 2017, came to an end in December 2022. Originally it was scheduled to finish in December 2021 but the end date was pushed back because of delays caused by COVID-19.

The aim of the project was to get a better understanding of the methods used to assess pesticide usage in epidemiological studies such as the PIPAH study. Altogether five studies, including the PIPAH study, provided data for the project. Members of the PIPAH study contributed directly by completing the project questionnaire and some members also provided biological samples which were used to assess their exposure to the pesticides they had been using. The two IMPRESS publications we started working on in 2021, which describe recall of information on pesticide use, have now been published and are freely available from the journals' websites[1,2]. Further scientific papers describing the results of the biological sampling and the mathematical models used to estimate exposure to pesticides, and describing the performance of the main methods of assessing pesticide use, were written during 2022 and should have completed the publication process by the end of 2023. As the end date for the project approached, it was a busy time for the project team as we finalised analyses and completed all the reports and papers ready for submission. At the same time, members of the project team attended many conferences to present the findings.

The project website (http://www.impress-project.org/) lists the publications and also conferences where the presentations were made.

[1] Mueller et al 2022. Recall of exposure in UK farmers and pesticide applicators: trends with follow-up time, Annals of Work Exposures and Health, 2022 (https://doi.org/10.1093/annweh/wxac002)

[2] Mueller et al 2022. Evaluation of two-year recall of self-reported pesticide exposure among Ugandan smallholder farmers. International Journal of Hygiene and Environmental Health; 240 (https://doi.org/10.1016/j.ijheh.2021.113911)

Behind the scenes

Over the years, the study team has developed an efficient smooth-running operation to manage the PIPAH study. There are a number of cycles within the study. One study cycle begins and ends when we distribute the newsletter along with the follow-up questionnaire early in the new year. It is the culmination of a year's work preparing the documents. The first step involves the study team and stakeholders within HSE deciding which topics to include in the questionnaire and identifying an appropriate question set; wherever possible we use validated questions that have been used in a study previously. Once finalised we submit the new questionnaire for approval to the national Research Ethics Committee and to NHS Scotland's Public Benefit and Privacy Panel (PBPP) for Health and Social Care. They make sure that everything we do is appropriate and within the scope of the Study Protocol, which they have approved in the past. Only after these bodies have approved the questionnaire can it go for printing.

A second cycle revolves around the processing of the data we receive from you. This includes the questionnaires we receive from new participants as part of the rolling recruitment programme and the follow-up questionnaires such as the questionnaire we have sent to you along with this newsletter. Everything received is logged and batched ready for further processing. The questionnaire data are entered into the electronic data base, the data entered is checked for accuracy and finally the paper copies are sorted and stored in a restricted access secure room within the office building. The paper copies are kept for audit purposes. Once the data have been checked, we can analyse the data using statistical software and prepare the summary statistics for the newsletter. The newsletter can then be drafted, ready to slot into the first cycle mentioned above and be sent to you early in the new year.

Outside of these two cycles we have a whole host of other activities to keep the study on track. Principal among these are responding to any queries or comments from you, and activities to ensure that we meet our obligations set by the Research Ethics Committee, NHS Digital (for England and Wales), and NHS Scotland Public Benefit and Privacy Panel for Health and Social Care. Finally, we also try to disseminate our findings as much as possible and to this end we prepare scientific papers, conference presentations and other material as appropriate.

What's next?

There will be some activities associated with the IMPRESS project in 2023, mainly responding to comments and tidying up any loose ends while the scientific papers work their way through the peer-review publication process. With the IMPRESS project ending, the main focus for publications will turn to scientific papers based entirely on data provided by you.

This year we are inviting you to complete a short three-section questionnaire. The first section asks about movement disorders which could be related to neurological conditions. There is some uncertainty in the scientific literature about whether there are links between pesticide use and neurological conditions. The study team and stakeholders decided that it would be valuable to address this question in this year's follow-up questionnaire. The second section asks you to indicate whether you have ever used any of the pesticides mentioned in the lists provided, and to estimate as best you can when you used them. The final section comprises the question set which we include in every questionnaire and asks your main areas of pesticide use in the previous year. We are inviting everyone to complete the questionnaire, including anyone who no longer uses pesticides.

Analysis of the January 2022 Short Questionnaire on Hearing Loss and COVID-19

Hearing loss among PIPAH study participants

Altogether 1,901 members of the PIPAH study responded to our invitation to complete the January 2022 questionnaire. It covered two health outcomes, the first of these was hearing loss. Hearing loss is an important public health issue which potentially can have significant personal and societal-level costs. In the UK, an estimated 18% of the population live with at least mild hearing loss in their better ear and 10% of adults suffer from tinnitus[3]. Major causes of hearing loss include genetic factors and early childhood hearing loss, chronic middle ear infections, noise-induced hearing loss, age-related hearing loss, and medicines and work-related chemicals that are toxic to sensory cells in the inner ear[4]. Many causes of hearing loss are preventable, while others are less preventable. Effective strategies to reduce hearing loss depend on stage of life, but at an individual or local level may include immunisation, management of common ear conditions, safe listening strategies to reduce exposure to loud sounds in recreational settings, occupational measures to minimise exposure to noise and ototoxic chemicals, and sensible use of medicines to prevent ototoxic hearing loss[4]. Global strategies to reduce hearing loss are being implemented: in 2019 an international standard was issued for the manufacture of personal audio devices, such as mobile phones and audio players, to reduce excessive exposure to loud sounds[5]. So, efforts to reduce hearing loss can be implemented at many levels, from personal right through to international levels. There is also good evidence to show that using hearing aids can improve both communication and quality of life for those who have hearing loss, although on average, people wait 10 years before getting help for their hearing loss[3].

Among PIPAH study respondents, 42% reported having ‘good hearing’ and 58% reported fair or poor hearing in one or both ears. Further breakdown of the figures showed that 32% have fair hearing in both ears, 12% reported poor hearing in both ears, and 16% wear a hearing aid in one or both ears. These figures are not directly comparable with the UK population estimates because the definitions of ‘hearing loss’ are not the same and because the age distribution in the UK population is not the same as in the PIPAH study group.

Age-related damage to the cochlea, which is part of the inner ear, is the single biggest cause of hearing loss[3]. Age-related hearing loss is often a result of changes in the inner ear which occur as we get older, but changes in the middle ear or in the nerve pathways between the ear and the brain, and other medical conditions, may also be involved. It can be difficult to distinguish between age-related hearing loss and hearing loss caused by environmental factors such as loud noise; in many older people their hearing loss is a result of a combination of age-related and noise-induced hearing loss[6]. Among our respondents, about a third reported having ringing in their ears (tinnitus). Sometimes this is caused by earwax blocking the ear canal, but health conditions such as ear and sinus infections, can also cause tinnitus[7]. One of the most common causes of tinnitus is noise-induced hearing loss.

In the questionnaire we asked about possible factors that could affect your hearing. **Figure 1** summarises our respondents' exposure to these factors. Overall, there were substantial differences in the number of respondents who have been exposed to each factor; the most commonly reported exposure was 'exposure to gunfire, blasts or explosions' (57%) and the least commonly reported was 'ever exposed to drugs or solvents that can damage hearing' (7%). The figure compares the hearing status of individuals who reported having experienced the factor in question. For example, taking the factor 'suffered trauma to the ears', 22% of respondents who have suffered trauma to their ears have good hearing and 78% of respondents who have suffered trauma to their ears have fair or poor hearing in one or both ears. If trauma to the ears had no effect on hearing, we would expect roughly 42% of respondents to have good hearing in both ears and 58% to have fair or poor hearing in one or both ears, because this is what the percentages are among all respondents. It is clear that more respondents (78%) have fair or poor hearing than expected and it is likely that the trauma they suffered affected their hearing. With one exception, the differences seen between those with good hearing and those with fair or poor hearing are statistically significant. This means that the differences are unlikely to have happened just by chance and there is likely to be an association between hearing loss and the factor in question. The exception, where there is no evidence of an association with hearing loss, is 'ever had a head injury, concussion or been unconscious'. There was some evidence that having a 'noisy hobby' was associated with hearing loss. When we looked at individual noisy hobbies such as motor sports, discos/loud music, DIY or motorcycling, there was no evidence of an association with any of these individually.

Figure 1 – Factors that may affect hearing by hearing status

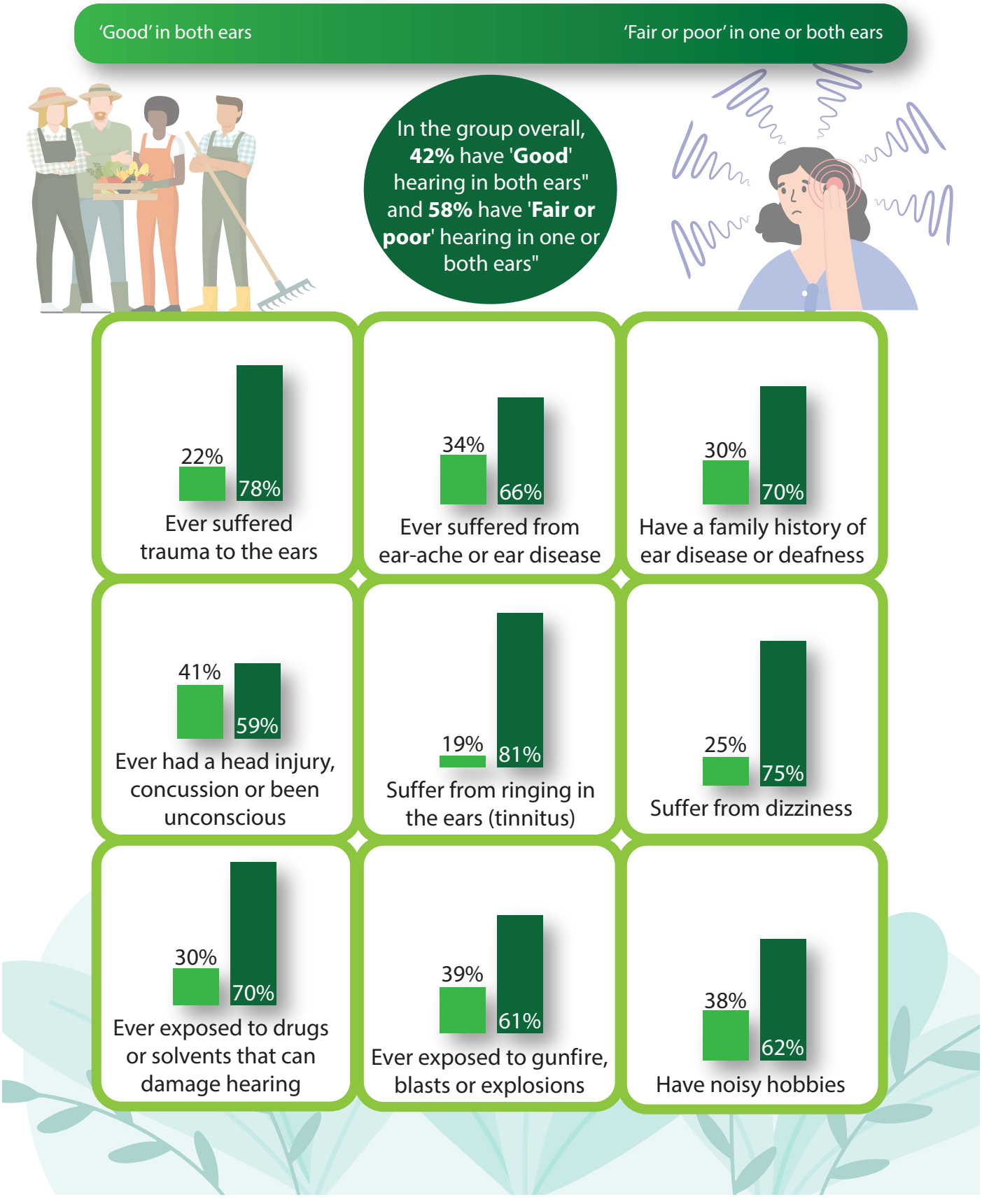


Figure 2 is similar to **Figure 1** except it only covers work-related exposures that may affect hearing. With one exception, there was either no difference or only a small difference between the percentage of people with good hearing and the percentage of people with fair or poor hearing when it came to these work exposures. However, among those who have worked with organophosphate pesticides, a higher percentage of respondents (62%) have fair or poor hearing than respondents with good hearing (38%).

The remaining figures focus on hearing loss and working in noisy jobs. **Figure 3** shows hearing status (good or fair/poor in one or both ears) by the total number of years spent working in noisy jobs. It shows that respondents who worked in noisy jobs for more than 20 years are more likely to report fair or poor hearing in one or both ears than those who worked in noisy jobs for less than 20 years. The figure also shows that factors other than noise at work must be also related to hearing loss. About a quarter of respondents have fair or poor hearing but have never worked in noisy jobs. **Figure 4** includes only those respondents who reported having a hearing problem and answered the question on whether their hearing problem was work related. Among these respondents with fair or poor hearing, a higher percentage stated that their hearing problem was work-related (35%) than the percentage who stated that it was not work-related (17%). However, nearly half of respondents with fair or poor hearing (48%) did not know whether their hearing loss was work-related or not. This highlights the difficulty in identifying the causes of hearing loss, given the many different factors that can affect hearing.

Figure 2 – Previous work-related factors that may affect hearing by hearing status

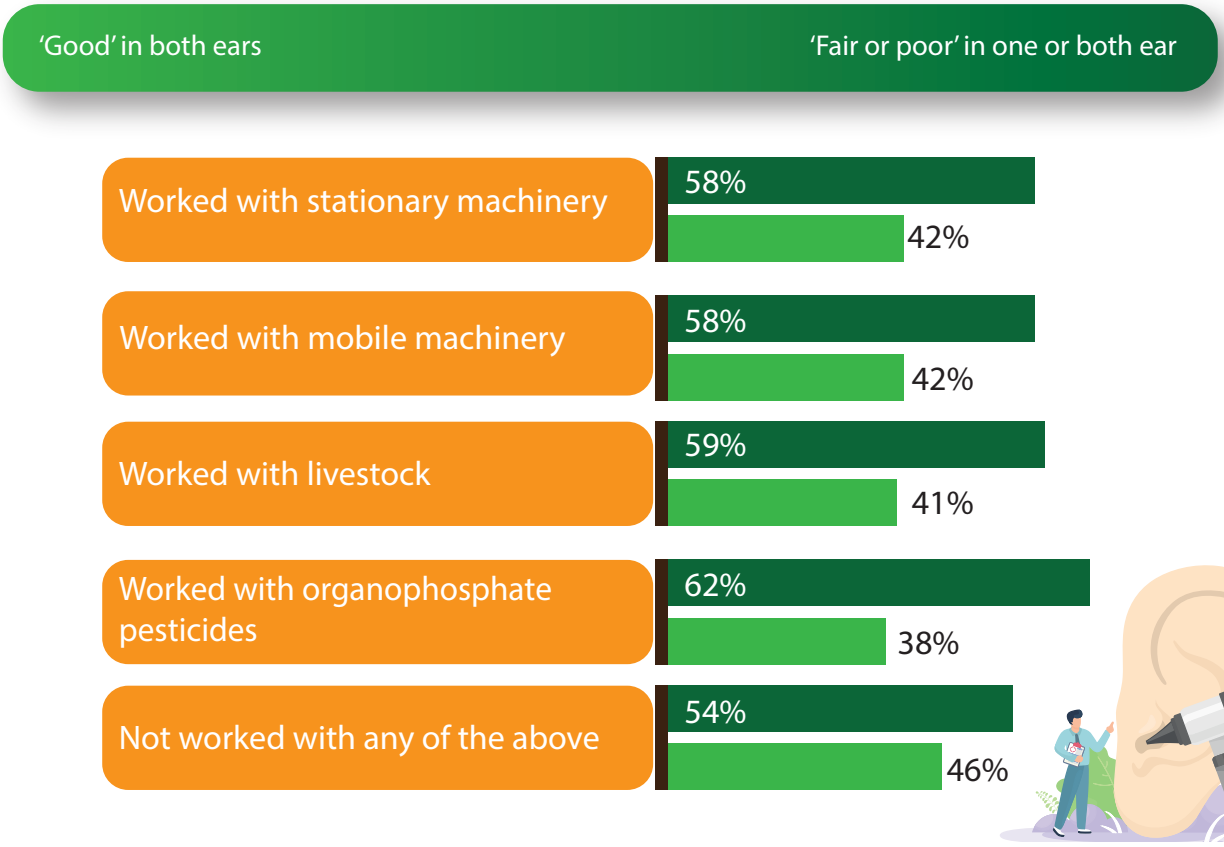


Figure 3 – Years spent in noisy jobs by hearing status

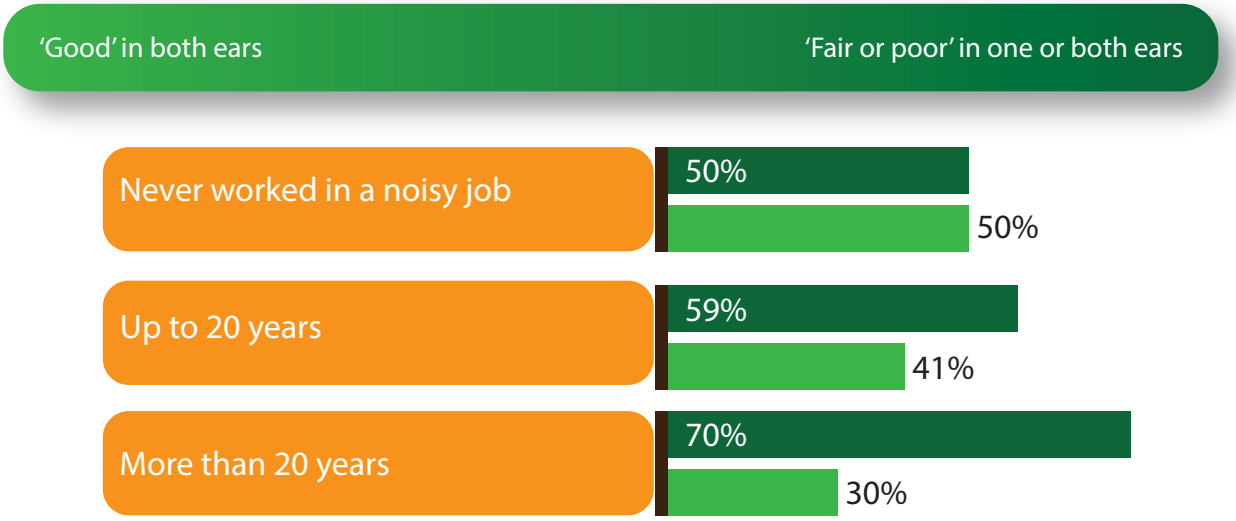
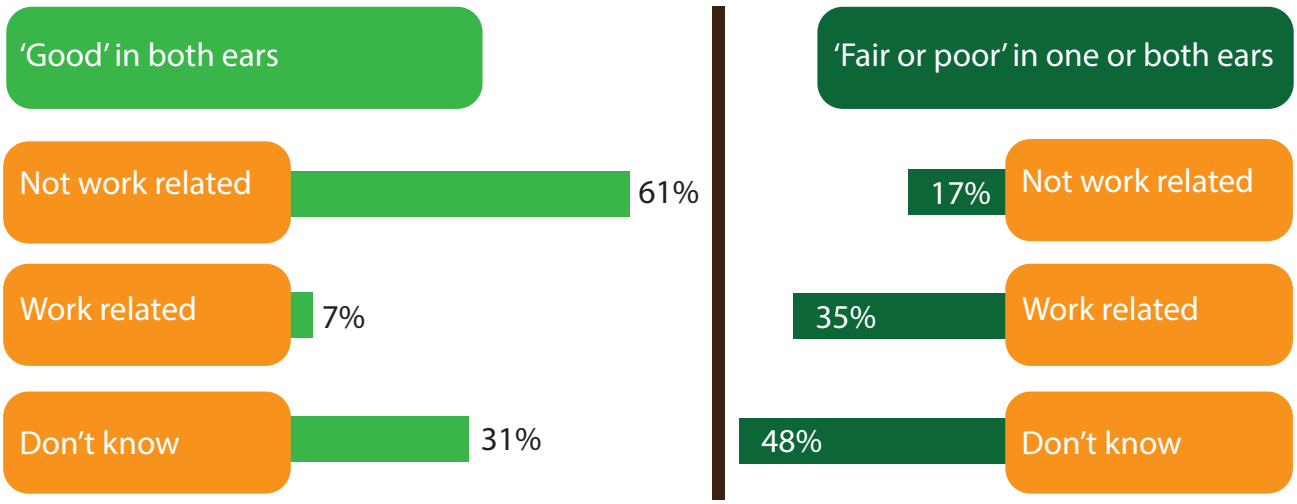


Figure 4 – Work-relatedness of hearing problem

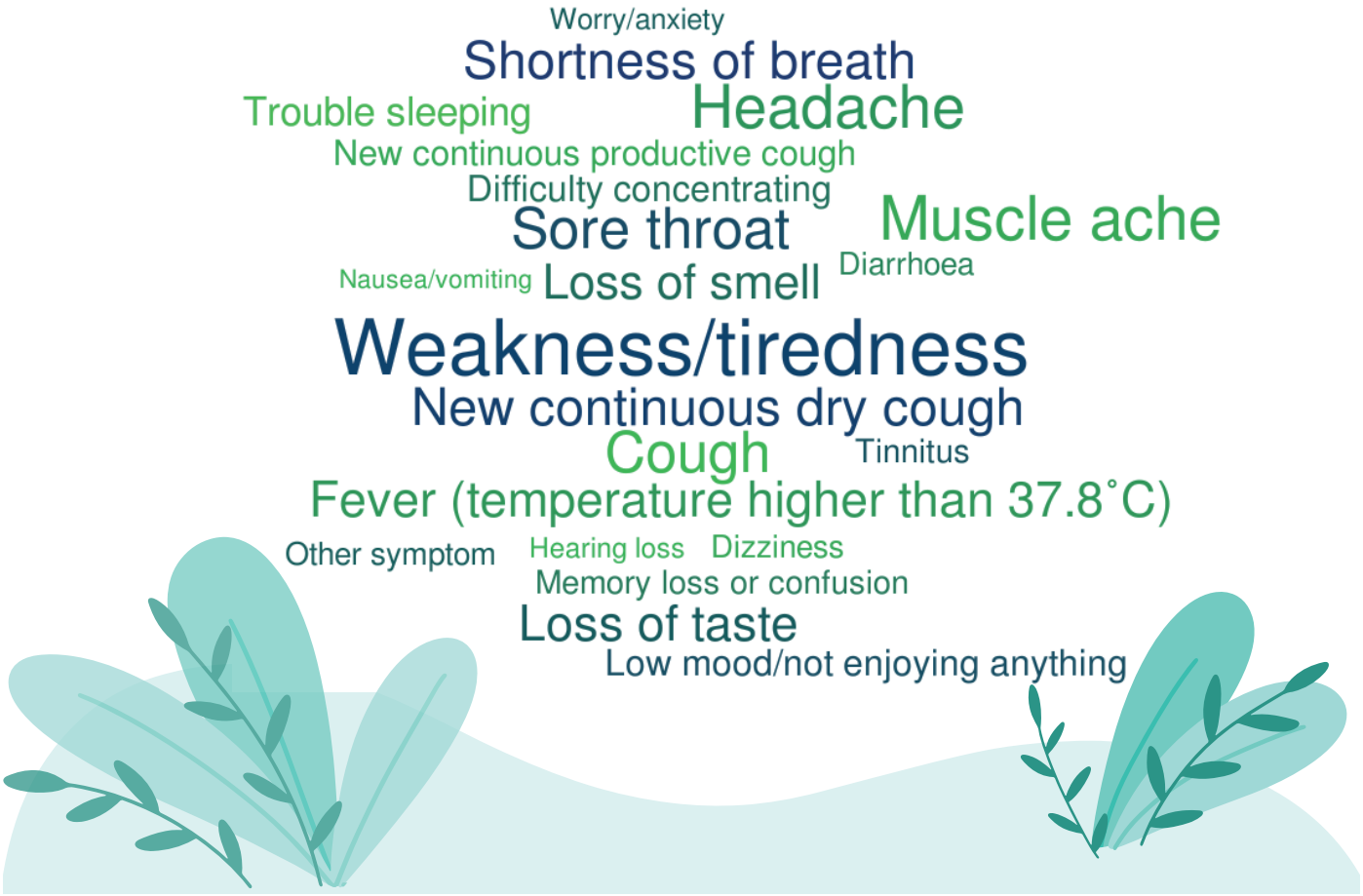


It is important to note that all of the data presented are simple summary statistics, and the summaries have not taken into account factors such as age, which could explain some of the differences seen. Further analysis of the data will involve more complex analyses which will take such factors into account. However, these simple statistics suggest that there may be more hearing loss among our study participants than in the general UK population.

COVID-19 among PIPAH study participants

The second health topic in the January 2022 questionnaire covered your experience with COVID-19. The COVID-19 pandemic dominated our lives for several years after the virus was first identified in December 2019 and the pandemic was declared in March 2020. A vaccination programme to reduce the severity of COVID-19 illness was implemented in December 2020 and enabled the relaxation of many of the restrictions put in place during the pandemic. By March 2022, approximately 92% of the British population aged 12 years and over had received the first vaccine, 85% had received the second vaccine, and 72% in Scotland and Wales and 66% in England had received a booster vaccine[8]. The hospitalisation rates have changed over time and the number of patients in mechanical ventilation beds has decreased dramatically since 2020. Up to September 2022, the hospital admission rate for COVID-19 patients in England was 0.9% for 18-64 year olds, 3.7% for 65-84 year olds, and 12.1% for those over 84 years of age[9]. The rates were similar in Scotland and Wales. Although COVID-19 is still circulating in Britain, all COVID-19 legal restrictions were lifted during the first half of 2022. Up to February 2022, which is roughly the period covered by the January 2022 questionnaire, an estimated 71% of the population in England, 56% in Scotland and 52% of the population in Wales had COVID-19 at some time during the pandemic[10]. The January 2022 questionnaire asked whether you had COVID-19, if you had symptoms, whether these symptoms lasted for a long time and if you received the COVID-19 vaccine. About a fifth (21%) of respondents reported that they had or thought they had COVID-19 by January 2022. There were three small spikes when the majority of COVID-19 cases occurred amongst the PIPAH study participants. A fifth (20%) of all the cases occurred from January to June 2020, 14% from October 2020 to March 2021, and 57% of all cases and the biggest spike occurred from July 2021 to March 2022. The biggest spike coincided with the period during which the total number of COVID-19 cases nationally doubled and was associated with the spread of the OMICRON variant which was first detected in late November 2021. The uptake of the first vaccine amongst the PIPAH study respondents who completed the questions was 98%, of the second vaccine was 96%, and of the booster vaccine was 94%.

Figure 5 – Reported COVID-19 symptoms



Of those reporting having COVID-19 and who tested positive in a lateral flow or PCR test, about four fifths (84%) had symptoms and nearly a fifth (16%) did not have any COVID-19 related symptoms. Less than 5% of respondents with COVID-19 were admitted to hospital. **Figure 5** shows a word cloud of the symptoms reported where the size of the text represents how common the symptom was. Amongst our respondents, weakness/tiredness was the most frequently reported symptom, followed by muscle ache and headache. Although much less common, some participants reported the onset, or worsening, of tinnitus and or hearing loss when suffering one and twelve months off work.

It is clear that a substantially smaller proportion of PIPAH study participants who responded to the questionnaire had COVID-19 than the general population in Britain. This may reflect the nature of the work many of you are engaged in. Spending much of the time working outdoors, wearing personal protective equipment, and the cleaning regimes required surrounding the use of pesticides may have helped to keep the virus transmission risk lower. Vaccine uptake was higher among PIPAH study participants than in the general population. Although many were lucky and had few if any symptoms, and did not suffer with COVID-19 for a long period, for some COVID-19 had a significant impact on their health and livelihood in the short and in the longer term. from COVID-19. For most people, their COVID-19 related symptoms went within a few days or weeks but for a small number their symptoms persisted for up to two years. Symptoms reduced the ability to work for about 70% of respondents who had COVID-19: 50% were affected ‘a little’ and 20% were affected ‘a lot’. Overall, 54% did not need to take time off work because of COVID-19 and 41% took less than one month off work. However, the remaining 5% had to take between one and twelve months off work.

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References

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January 2023

Once again, we would like to thank you for taking part in the PIPAH study and hope you continue to remain members of it. We certainly can't do without you and we look forward to sending you another update. In the meantime, please don't hesitate to contact us either by email PIPAH@hse.gov.uk or by freephone 0800 093 4809 if you have any queries, want to discuss any aspect of the PIPAH study with us, or if you would like to update your current contact information.

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