

# **MENOPAUSE**

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**The effects on the ageing female classical singer**



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## **ABSTRACT**

This research study looks at the effects of menopausal symptoms and vocal difficulties experienced by professional and amateur classical singers in England. Existing research focuses primarily on the perceptions or acoustic analysis of vocal difficulties suffered by professional singers. Limited research has considered the effects of menopausal symptoms on the female singer as a performer. Equally, little research has compared the similarities and differences of menopausal experiences of professional and amateur singers. Questionnaires were used to obtain data on the perceptions and degree of severity of both menopausal symptoms and vocal difficulties, before and after Menopause. Broad findings from this study concluded that menopausal symptoms indirectly affect the performance ability of a singer and that perceptions of vocal changes, during and after Menopause, directly affected vocal quality. Results indicate that professional singers are more commonly affected by menopausal symptoms. Biological explanations are beyond the scope of this study but it is proposed that menopausal symptoms indirectly effect a female singers' performance. Amateur singers were found to be more greatly affected by vocal difficulties than professionals. In the absence of acoustic analysis, it was suggested that differences in vocal changes potentially related to technical understanding and ability. Interestingly, both professional and amateur singers choose not to take any form of medication or natural/herbal supplements to reduce the severity of menopausal symptoms and potentially prolong vocal quality. This research has also highlighted several avenues for potential further investigation.

**KEY WORDS:** Menopause, Singing, Hormones, Professional, Amateur

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## **INTRODUCTION**

It is widely accepted that the voice is sensitive to aging, vocal misuse, drugs, allergies, infection and hormone fluctuations (D'haeseleer, Claeys, Bettens, Leemans, Van Calster, Damme, Thijs, Daelman, Leyns, & Van Lierde, 2016; Sovani & Mukundan, 2010; Sataloff, Rosen, Hawkshaw & Spiegel, 1997). Understanding the impact of hormonal changes on female singers is notoriously difficult due to limitations in acoustic analysis and broad variations in symptoms and severity amongst women. Currently, there is no definitive evidence that has identified exactly how hormone changes and/or Menopause directly affects the voice. Much of the existing research chooses to focus on professional singers, as they are thought to have a better awareness of changes in their voice in comparison to non-professionals (amateurs) (Elliott, 2017; Boulet & Oddens, 1996). Furthermore, little research compares the differences and impact of menopausal experiences of professional and amateur singers.

The purpose of this research is to determine: firstly, whether a singer's performance ability is indirectly affected by menopausal symptoms; and secondly, to investigate the perceptions of vocal changes, and the degree of severity, experienced before and after Menopause. It is hoped that this research will contribute to the current understanding of the effects of Menopause on the voice in the UK. In addition, that it opens new opportunities for further research in order to improve vocal quality and performance ability of aging singers. This research will attempt to answer the following research questions:

1. Are menopausal symptoms affecting the female classical singers' ability to perform?
2. Are vocal changes, before and after Menopause, affecting the female classical singers' vocal quality?
3. What are the most common menopausal symptoms and vocal changes affecting female classical singers?
4. Are amateur classical singers affected more than professional classical singers?
5. What action do female classical singers take to overcome menopausal symptoms and vocal changes during and after Menopause?

# **CHAPTER ONE: LITERATURE REVIEW**

## **1.1 The Menopause**

A female's reproductive life starts at puberty (normally between the ages of eight and 13), where hormones, such as oestrogen and progesterone fluctuate to stimulate the ovaries to release one or more eggs each month. This is known as ovulation. Once released the egg(s) travels down the fallopian tube and waits for one of two scenarios: either for male sperm to fertilise the egg, resulting in pregnancy; or if fertilisation does not take place, the egg(s) continues down the fallopian tube, into the womb and leaves the body, along with the lining of the womb, through a period. This action is known as menstruation. The process is cyclic, occurring typically every 28 days between puberty and Menopause, and is commonly referred to as the menstrual cycle (Johnson, 2016; National Health Service, 2016; Horwood, 2001).

The transition from reproductive life to non-reproductive life is a gradual process, spanning over a decade, and is separated into two distinct stages; perimenopause and menopause<sup>1</sup>. Before the complete cessation of menstruating a woman first enters the perimenopause stage. This stage, lasting two to five years, is when the body first begins to show signs of reproductive failure. It is usually marked by irregular menstruating and physiological and psychological symptoms, such as hot flushes/flushes, night sweats, palpitations, vaginal dryness, urinary urgency, headaches, depression, anxiety, insomnia, irritability, tiredness, fatigue, weight gain, digestive problems, loss of concentration, mental clarity, loss of confidence, mood swings and loss of libido. The range and severity of symptoms experienced widely varies amongst women. It is estimated that 80% of menopausal women in the UK experience one or more of the above symptoms. Symptoms are generally considered not to be severe enough to impact on day to day life (Barlow &

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<sup>1</sup> Confusingly, the term Menopause is used to represent the whole transition as well as a stage within the whole transition. To differentiate between the two terms, this research will use Menopause to define the whole transition and menopause in relation to the stage within.



Wren, 2005; Bain, Lumsden, Sattar & Greer, 2003; Horwood, 2001; Samsione, Dören & Lobo, 2003).

The eventual cessation of menstruation marks the beginning of the second stage, menopause and can last between ten and 15 years (Oxford Concise Medical Dictionary, 2014; Samsioe et al., 2003). Whilst the body is no longer able to reproduce offspring, the ovaries are still able to produce hormones, although in much smaller quantities (Horwood, 2001). Symptoms during the menopause stage are reported to be less severe as hormone levels decrease and begin to settle down, although 5% of women continue to experience menopausal symptoms (Samsioe et al., 2003).<sup>2</sup>

Natural Menopause can start as early as the mid-30s or as late as the mid-50s. The timing of when a woman starts to transition through Menopause is believed to be inherited and based on ethnicity (Oxford Concise Medical Dictionary, 2014; Bain et al., 2003). According to Bain et al., (2003) ethnic groups from African or Hispanic backgrounds experience Menopause much earlier than west Caucasian or Japanese women. However, in a 20-year long, multi-million-dollar study by the US Women's Health Initiative (WHI) it was found that of the 26,630 ethnically diverse women surveyed, the majority (37.9%) ceased menstruating between the ages of 50 and 54 (Langer, White, Lewis, Kotchen, Hendrix & Trevisan, 2003). A small number of women are affected by premature Menopause. Premature Menopause refers to the cessation of menstruating before the age of 45 and may take place naturally or because of pre-existing conditions, such as ovarian failure, chromosome abnormalities (Turner Syndrome), autoimmune diseases, infection, cancer treatment or surgery (National Health Service, 2017; Horwood, 2001).

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<sup>2</sup> Some medical literature refers to climacteric. The term is somewhat ambiguous, and has been used interchangeably with both the perimenopause and menopause stages. For simplicity and clarity of this research, the term climacteric will not be used.

## **1.2    *The role of hormones in Menopause***

Hormones are classified as a chemical substance that provide organs and tissue with specific messages from the brain. The brain/body has the ability to regulate and adapt hormone levels depending on changing circumstances to fulfil the brain/body's current needs (Nichols, 2018; Horwood, 2001). In the female reproductive system oestrogen is the most prevalent hormone and changing oestrogen levels have the greatest influence on changes in the brain and body during Menopause.

Oestrogen (along with other hormones, like progestogen) is produced by the ovaries and is vital to the female reproductive system during the reproductive years. It is primarily responsible for regulating the female menstrual cycle and preparing the body for conception and pregnancy. Oestrogen is also essential outside of the female reproductive system having an influence on bone mass and cardiovascular functioning along with the production of collagen, a protein fibre, required by muscles, joints and connective tissue. Fluctuating oestrogen levels have been found to influence changes in the vagina, bladder, skin, hair, heart, bones, breasts, stomach and cognitive functioning (Nichols, 2018; Cutter, Norbury & Murphy, 2003; Horwood, 2001).

Fluctuating hormone levels and the influence of hormones on the voice is becoming more frequently researched by vocal pedagogues and voice specialists, although mentions of voice changes remain largely omitted by general medical literature surround Menopause. Hormone related research, during different life stages, has demonstrated that the voice is strongly influenced by hormonal changes. Research has covered puberty (Hacki & Heitmüller, 1999), menstrual cycles (Çelik, Çelik, Ateşpare, Boyacı, Çelebi, Gündüz, Aksungar & Yelken, 2013), contraceptives (Lă, Ledger, Davidson, Howard & Jones, 2007; Morris, Gorham-Rowan & Harmon, 2009), pregnancy (Cassiraga, Castellano, Abasolo, Abin & Izbizky, 2011) and Menopause (Elliott, 2017; Abitbol, Abitbol & Abitbol, 1999). However, although still widely under researched, hormone and voice related research appears to be restricted by technological advances. In a recent study by Çelik et al., (2013) that investigated vocal

changes during menstruation in adolescent females found acoustic analysis did not reveal any notable changes in vocal quality whereas participant perceptions detected changes in vocal quality. Participant perceptions of vocal changes correlated with the findings during the mid-menstrual cycle, when oestrogen levels were highest. The differences in the results of acoustic analysis and participant perception suggests that acoustical analysis techniques in current use are unable to provide reliable and valid data consistent or comparable with participant perceptions. Çelik et al., (2013) acknowledges the discrepancies between acoustic analysis and self-evaluation reporting on vocal changes and suggests that future research should try more formally to address this issue.

The reason vocal cords are thought to be affected by hormonal changes is largely linked to their construction. Vocal cords are known to be made of striated muscle fibres, mucosal epithelium and elastic fibres of collagen, which, as previously stated, are affected by fluctuating and reducing oestrogen levels. As oestrogen levels fluctuate, and eventually decrease during Menopause, it is unsurprising that female singers perceive changes in vocal quality (Çelik et al., 2013; Abitbol et al., 1999). Furthermore, the effects of Menopause, directly and indirectly, on the voice has greater implications on a female singers' mental and emotional well-being.

### **1.3 *Physiological Changes***

#### **1.3.1 *Menopausal Symptoms***

Physiological menopausal symptoms include, hot flushes/flashes, palpitations, night sweats, insomnia, tiredness, fatigue, headaches, weight gain and/or digestive problems. According to Horwood (2001) the most common physiological menopausal symptom, experienced by 80% of women in the UK, is hot flushes/flashes. One of the many functions of oestrogen is to help regulate body temperature and it is believed that changes in oestrogen levels during menopause causes the brain to receive mixed messages. Hot flushes/flashes can also be brought on by physical or emotional exertion. In some circumstances, hot flushes/flashes are likely to cause embarrassment as they affect the whole body either reddening the face

and neck or causing perspiration. Some women also experience palpitations and/or headaches. However, the most common complaint amongst menopausal women is that hot flushes/flashes are unpredictable (Horwood, 2001).

Equally, night sweats, like hot flushes/flashes occur spontaneously but are reported to be more severe. Whilst easier to manage than hot flushes/flashes, one of the side-effects is lack of sleep. Evidence suggests that depleting levels of oestrogen has an effect on the quality of sleep experienced by menopausal women. Lack of sufficient REM sleep can increase the likelihood of tiredness, irritability, lack of confidence, stress, depression, and anxiety, impacting on a woman's quality of life (Horwood, 2001).

### **1.3.2 Vocal Symptoms**

Recently, in a study by Elliot (2017) which investigated the effects of Menopause on 130 singers in the US, UK and Australia found that participants perceived vocal changes after Menopause. 10-15% of these participants reported experiencing vocal changes in the upper range, flexibility, agility, power and sound quality all of the time. 70-80% said that they experienced changes in power, flexibility, upper range, stiffness, vibrato and colour, on occasion. Overall, Elliott's findings were consistent with previous studies by Abitbol et al., (1999) and Boulet and Oddens (1996). Elliott's (2017) findings also reported that all voice types had issues with the high range, power and flexibility, although high sopranos suffered more with difficulties with the high range and flexibility whereas lower mezzo-sopranos experienced more with difficulties with the lower range and lower passaggio (the transition from the middle register to either the upper or lower registers).

Elliott (2017) states that 'much of the existing literature acknowledges the difficulty of determining whether noticeable changes are due to menopause specifically or aging in general' (p.277). Research by Boulet and Oddens (1996) that looked at female vocal changes, around and after Menopause, also surveyed men for comparison. 48 female and 24 male professional singers completed questionnaires in Belgium, the Netherlands and Austria. 77% of female singers reported noticing changes in the voice around the age of 50. Female singers also reported difficulties with the upper range, huskiness, flexibility and vibrato,

correlating with the findings of both Elliott (2017) and Abitbol et al., (1999). Similarly, 71% of men also reported vocal changes around the age of 50. Boulet and Oddens (1996) findings suggest that age itself is a factor in the decline in vocal quality, although it was noted that vocal changes in female singers were reported to be more severe and possibly enhanced by Menopause. Further research is required to determine whether changes in vocal quality are specially related to age and/or hormonal changes that occur during Menopause.

Moreover, in a study by Abitbol et al., (1999) using acoustic analysis techniques on 100 postmenopausal women found that 17 participants showed signs of Menopausal Vocal Syndrome (MVS). MVS is characterised by lowered vocal intensity, vocal fatigue, decreased range with loss of the high tones and a loss of vocal quality. Abitbol et al., (1999) describes MVS as being progressive in nature and not restricted to singers but equally experienced by actors, lawyers, hostesses, and school teachers. Findings suggests that there are physical signs of vocal changes. Unfortunately, there is limited literature sources on MVS and further research is required to understand the physical and perceptual signs as well as suggestions for managing symptoms.

## **1.4 *Psychological Changes***

### **1.4.1 *Menopausal Symptoms***

Psychological menopausal symptoms include, lack of confidence, poor memory, lack of concentration, depression, anxiety, irritability and/or mental clarity (Bain et al., 2003; Samsioe et al., 2003; Horwood, 2001). It is widely accepted that oestrogen is required by the brain to function efficiently. The hippocampus, the part of the brain responsible for memory, appears most greatly affected by reducing levels of oestrogen during Menopause. Some women who have reported experiencing psychological symptoms has found them to be unsettling (Elliott, 2017; Horwood, 2001). Hallam (1997) acknowledges that memorisation skills are essential for musicians and that there is a significant amount of detail required to deliver a successful performance. Williamon (1999) argues that while memorisation is an

expectation for public performance, findings support that performing from memory does not offer any additional benefits to the overall performance. Therefore, suffering from psychological menopausal symptoms may inhibit cognitive functioning. Cutter et al., (2003) state 'that there is an increasing amount of research on the neurobiological effects of oestrogen' (p.837). As well as regulating the female reproductive system, body temperature and cognitive functioning, oestrogen also acts as an antioxidant in the brain. Antioxidants provide a defence against free-radicals responsible for destroying tissue and offers, to some degree, although limited, protection from dementia and Alzheimer's disease.

According to Barlow and Wren (2005) the reduction of oestrogen in the brain during Menopause has been linked to why more women suffer from dementia and Alzheimer's disease than men. Studies by Shumaker, Legault, Kuller, Rapp, Thal, Lane, Fillit, Stenfanick, Hendrix, Lewis, Masaki, Coker (2004) and Shumaker, Legault, Rapp, Thal, Wallace, Ockene, Hendrix, Jones, Assaf, Jackson, Kotchen, Wassertheil-Smoller and Wactawski-Wende (2003) found that 33% of women, over the age of 65, suffered from dementia compared to 20% of men. Over the age of 75, the risk increases by 16%, although it was noted that Alzheimer's disease occurred in only 5% of women, over the age of 75, who had taken some form of oestrogen during Menopause (cited in Barlow & Wren, 2005). There is also increasing research trialling oestrogen to treat mental disorders, such as depression and schizophrenia (Cutter et al., 2003). However, studies in both the US and the UK were terminated due to the links between oestrogen and breast cancer (see Writing group for the Women's Health Initiative, 2002).

## **1.5 Symptom Management**

There are many sources of information on Menopause and menopausal symptom management available online. Medical advice is widely accessible through the National Health Service (NHS), or through charitable organisations, such as the British Menopause Society (National Health Service, 2015a; British Menopause Society, 2018). Additionally, a small amount of information regarding aging and vocal changes can be found through the

British Voice Association's website (Harris, 2018). However, it has been noted that, in a user-generator society, there is an increasing number of non-professionals providing information, opinions and suggestions on the effects of Menopause on the voice, such as The Voice Teacher (Jones, 2004) or New Life Outlook (Willmore, 2014) without sufficient scientific support.

### **1.5.1 Medical Solutions**

Hormone Replacement Therapy (HRT) is the most common source of medication used to manage and/or reduce the severity of menopausal symptoms. HRT consists of oestrogen, progestogen and testosterone in varying strengths to suit the patient's needs. To facilitate patient preference, HRT has been produced and can be prescribed in multiple forms: tablets, patches, gel (absorbed through the skin), implant (replaceable every six months), or as a ring, cream or pessary inserted via the vagina (Horwood, 2001).

Although primarily prescribed to menopausal women to manage menopausal symptoms, the additional benefits, and lesser known advantages, include, reduces osteoporosis, coronary heart disease and the risk of developing dementia and Alzheimer's disease (Horwood, 2001; Barlow & Wren, 2005). No benefit was noted for improvements to vocal quality. However, despite the numerous other benefits, 68-88% of those who take HRT in the UK are female gynaecologists and GPs or the wives of gynaecologists and GPs. Only 20%-24% of menopausal women choose HRT, although 70% are reported to have discussed the matter with their GP (Samsioe et al., 2003; Horwood, 2001). The reason for the low number is that in recent years HRT has received negative and conflicting media coverage highlighting the risks of breast cancer and thromboembolism (blood clots). Horwood (2001) argues that the risk of dying from breast cancer affects only one in 56 women aged 50 and one in 12 women over the age of 75. Exceptions are women who have are already suffering from endometrial or breast cancer, undiagnosed vaginal bleeding, breast lumps, existing thromboembolism, or existing case of benign breast disease, liver disease, gall bladder disease, fibroids, endometriosis, varicose veins, deep vein thrombosis, thrombosis, osteosclerosis or heart disease (Horwood, 2001).

Alternative forms of menopausal symptom management include, natural/herbal supplements as well as homoeopathy, acupuncture, massage, reflexology, Tai Chi, yoga, osteopathy and Alexander Technique (Horwood, 2001). Natural/herbal supplements used in managing menopausal symptoms include, Red Clover, Black Cohosh (believed to balance hormones), dong quai (some women say that it helps with hot flushes, night sweats and vagina dryness), Hops and valerian (insomnia), St John's Wort (anti-depressant), Evening Primrose Oil (pre-menstrual stress and vagina dryness), Ginseng (increase energy levels, balance hormones), Yarrow (lowers body temperature) and motherwort (anxiety and sleep). Elliott (2017) found that 54% of the 130 participants surveyed chose not to take any form of medication to reduce the severity of symptoms, and only 30% of those that did, chose natural/herbal supplements or alternative treatments instead.

### **1.5.2 Lifestyle Solutions**

According to Horwood (2001) dietary changes can also help to manage menopausal symptoms. For example, reducing the consumption of spicy food, alcohol, caffeinated drinks, sugar and salt can improve the severity of hot flushes/flushes. Eating a high fibre diet that consists of large quantities of fruit and vegetables and drinking more water can reduce digestive problems, such as bloating and gas. Increasing vitamin B intake by eating meat, dairy, wholegrains, green vegetables and fruits like bananas, dried apricots, figs and dates can help to combat signs of depression. Oestrogen also occurs in a plant form, known as phyto-oestrogens. Phyto-oestrogens include, soya, red clover, linseed, beans, seeds, nuts, vegetables, such as broccoli, red onion, celery, sweet red peppers, tomatoes, garlic, fruits especially berries, grapes, citrus, plums, cereals like barley, couscous, rye, oats, polenta, seeds and pulses, such as sunflower, sesame, pumpkin seeds, chickpeas, haricot, kidney and broad beans and lentils.

Additional information regarding maintaining a healthy lifestyle can be obtained through the NHS (National Health Service, 2015b; National Health Service, 2018). The main reasons for maintaining a healthy lifestyle are that aging and hormone changes slow metabolism and can result in weight gain (Horwood, 2001). The health risks of being



overweight include, higher risks of diabetes and obesity. Also, fat cells can store oestrogen increasing the risks of womb and/or breast cancer (National Health Service, 2015b; Horwood, 2001). The importance of continuing to exercise in later life is strongly emphasised by the NHS (National Health Service, 2018). For some women, this may be difficult as oestrogen affects collagen production. The decrease in the production of oestrogen, required by muscles and joints, may cause aches and pains and discourage menopausal women from exercising. However, it is recommended that exercise during Menopause is important to prevent excessive weight gain and osteoarthritis. Endorphins released during regular exercise has can also help to combat negative thoughts and signs of depression. Exercise is, however, not recommended in the evening for menopausal women as this may increase the likelihood of experiencing insomnia (Horwood, 2001). Vocal health advice typically follows the general health principles described above (Duey,1951). Issues relating to vocal abuse and vocal technique are not considered as these are beyond the scope of this research.

## **1.6 Social Perceptions**

Historically, life expectancy was lower than current estimates and most women did not reach menopausal age. As life expectancy increased, views and opinions on Menopause have altered. During the Victorian period, women felt a sense of freedom as menstruating women were considered 'to be limited in their ability to function, requiring bed-rest or, at least, refraining from normal activities' (Bain et al., 2003, p.2). In more recent times, Menopause has had more negative associations. Many medical sources refer to Menopause as a deficiency disease rather than a natural life-transition (Herzig, 2012). This negative view has left many women feeling that Menopause should be treated with a sense of secrecy or shame (Herzig, 2012). Similar to the findings of Herzig (2012), Elliott (2017) found that participants reported feeling a sense of loss, sadness, fear, surprise, frustration, anger, grief, shame and embarrassment. To break negative social views, Horwood (2001) and Herzig (2012) agree that discussing issues increases knowledge and understanding, helped women come to terms with Menopause and the symptoms and reduced the likelihood of depression, stress and anxiety. Herzig's (2012) study also found that women who openly discussed the

topic felt a sense of connection that provided support and a feeling of belonging, and broke any previously felt isolation.

However, social perceptions regarding vocal changes remains a sensitive subject. Strong (1988) claims that professional opera singers do not feel uncomfortable raising vocal health issues for fear of being dismissed. This leads to serious vocal issues being concealed, mistreated or left untreated and potentially shortening careers. Boulet and Oddens (1996) believe that vocal difficulties experienced because of aging and Menopause is the main reason female opera singers retire between the ages of 55 and 60 while male opera singers continue to sing until they are over the age of 60. In a study by Cohen, Noordzij, Garrett and Ossoff (2008) that investigated the factors associated with vocal problems found that amateur singers suffered more from vocal problems than professional singers and was the result of the lack of vocal health education. In contrast, popular music artists, such as Adele appear to find it easier to openly discuss vocal problems (Schneider, 2011). It appears that there are less professional consequences against popular music artists than professional opera singers. Both industries would benefit from further research that attempted to resolve vocal health issues.

## **CHAPTER TWO: METHODOLOGY**

### **2.1 Ethics**

Ethical approval was granted by the Arts and Humanities Ethics Committee (AHEC) at the University of York in July 2018 (see Appendix A for a copy of the completed AHEC submission form). The researcher identified no potential risks to participants. Ethical considerations included the participant's psychological, mental, emotional and personal wellbeing. A link to the British Menopausal Society (BMS) was provided should any of the participants required further information about Menopause. Participants were also encouraged to consult professional advice from a GP, should they be concerned by any of the issues raised during the study.

In accordance with AHEC's ethical policy, the researcher explained the purpose of the study to potential participants. Participants were then requested to give informed consent (see Appendix B). The informed consent provided the contact details for the researcher should participants wish to raise any queries or concerns. Informed consent also notified participants that they had the right to withdraw from the research, at any time, for any reason, should they wish.

### **2.2 Participants**

Potential participants were identified through Google searches for professional and amateur vocal organisations within England. For the purposes of this research, opera companies or professional choirs were selected for professional participants and choral societies for amateur participants. Participants were also sought from the British Voice Association and Association of Teachers of Singing (AOTOS) (see Table 1 for full list of vocal organisations approached).

**Table 1:** List of vocal organisations approached for participants.

<u>Professional</u>	<u>Amateur</u>	<u>Professional and Amateur</u>
BBC Singers	Bingham & District Choral Society	Association of Teachers of Singing
Glyndebourne	Cantar Community Choir	British Voice Association
Garsington Opera	Chapter House Choir (York)	Military Wives Choir
Neville Holt	Grantham Choral Society	
Opera North	Lincoln Choral Society	
Opera Holland Park	Mansfield Choral Society	
The Royal Opera House	Nottingham Harmonic Choir	
The Grange Festival	Southwell Choral Society	
	York Choral Society	
	University of York	

Participants were recruited using a snow-ball sampling method, where vocal organisation administrators were asked to forward an invite to participate to all staff and/or members. Within the invitation, it was also suggested that participants could, if willing, forward the invite to other singers. This was to increase the potential number of responses. Unfortunately, using the snow-ball sampling technique has made it difficult to determine how many potential participants received the questionnaire link.

The invitation to participate was sent to a total of 21 vocal organisations: eight professional, ten amateur and three that potentially incorporated both professional and amateur singers. Invitations were sent electronically via email, online contact forms (websites) or posts to Facebook pages. To maintain the confidentiality of participants, no personal information was requested. For reporting purposes, all participants were kept

anonymised by using pseudonyms and/or numbers. For the purposes of this study, only participants that confirmed that they had or were currently experiencing Menopause were used for analysis.

### **2.3 Data Collection**

A semi-structured questionnaire, comprising of 48 closed, multiple-choice, Likert-scale and open text box questions was created using online survey software Qualtrics. The questionnaire was developed based on existing literature sources and revisions arising from a pilot study (see Appendix C & D for copies of both questionnaires). The questionnaire was structured to extract the following information from participants (Table 2):

**Table 2:** Questionnaire breakdown.

<b>Question No.</b>	<b>Section</b>	<b>Topic</b>
1 - 5	General Participant Information	<ul style="list-style-type: none"> <li>• Demographic details, i.e., participant location and age.</li> <li>• Menopause status.</li> </ul>
6 - 23	General Vocal Information	<ul style="list-style-type: none"> <li>• Status (professional or amateur)</li> <li>• Length of singing experience</li> <li>• Voice type (before and after menopause)</li> <li>• Singing activities</li> <li>• Rehearsal and practice activities</li> <li>• Genres of singing</li> <li>• Singing lesson details</li> </ul>
24 - 31	Vocal Symptoms	<ul style="list-style-type: none"> <li>• Physical changes in the voice</li> <li>• Duration of physical changes</li> <li>• Information sources</li> </ul>
32 - 38	Menopause Symptoms	<ul style="list-style-type: none"> <li>• Degree and severity of Menopausal symptoms</li> <li>• Sources of help</li> </ul>
39 - 41	Management/Treatment	<ul style="list-style-type: none"> <li>• Medications and Supplements</li> </ul>
42 - 47	General Health Information	<ul style="list-style-type: none"> <li>• Diet</li> </ul>

		<ul style="list-style-type: none"> <li>• Exercise and Activity</li> </ul>
48	Additional Comments	<ul style="list-style-type: none"> <li>• Provided an opportunity for additional comments</li> </ul>

A pilot study was carried out between 27 July 2018 and 3 August 2018. The questionnaire link was sent to two vocal organisations: one professional (Garsington Opera) and one amateur (Lincoln Choral Society). Both organisations were selected at random from those listed in Table 1 above. In total, 24 responses were received. 16 participants were immediately eliminated from the results: one was a test response; nine as the participant indicated that they were not currently going through Menopause and six were disregarded as incomplete. In response to the pilot study, the following changes were made to the questionnaire:

1. An additional question was added to confirm that participants were domicile in England, as per Section C, recruitment of participants, as stipulated in the AHEC submission form (Appendix A).
2. The pilot study revealed that nine participants responded that they were not currently going through Menopause as they were older than 60 years of age and had already experienced Menopause. To ensure that these results were not excluded from the study, an additional question was added to ask whether they had already been through Menopause.
3. For clarity purposes, the following amendments were made:
  - a . the study's definitions of professional and amateur was more clearly defined.
  - b . as voice type classifications vary between opera and choral, vocal ranges using the scientific pitch notation system was added to each voice type categories.

Following these amendments, the study was carried out between 6 August 2018 and 15 August 2018. An invitation to complete the questionnaire was sent to 19 vocal organisations: seven professional, nine amateur and three vocal organisations comprising of both professional and amateur singers. Of the 19 vocal organisations approached, two informed the researcher that they would be unable to ask their members to participate: one

due to technical limitations of being able to contact a large number of members (Nottingham Harmonic Choir); and one due to seeing the questionnaire invitation after the deadline of 15 August 2018 (British Voice Association). A total number of 39 participants responded to the questionnaire. Only 27 were selected for analysis because 16 were immediately disregarded because 12 participants failed to fully complete the questionnaire and a further four as they confirmed that they had not yet experienced Menopause.

All data was collected and stored using Qualtrics, a password-protected online survey platform. Data was then downloaded onto a password-protected laptop and the University of York Google drive for data analysis purposes. In accordance with the AHEC submission form (Appendix A), only the researcher and supervisors had access to the raw data. In addition, all data was held in accordance with the University of York's Research Data Management (RDM) policy for taught postgraduate students, and will be stored for a minimum period of two years.

## **2.4 Data Analysis**

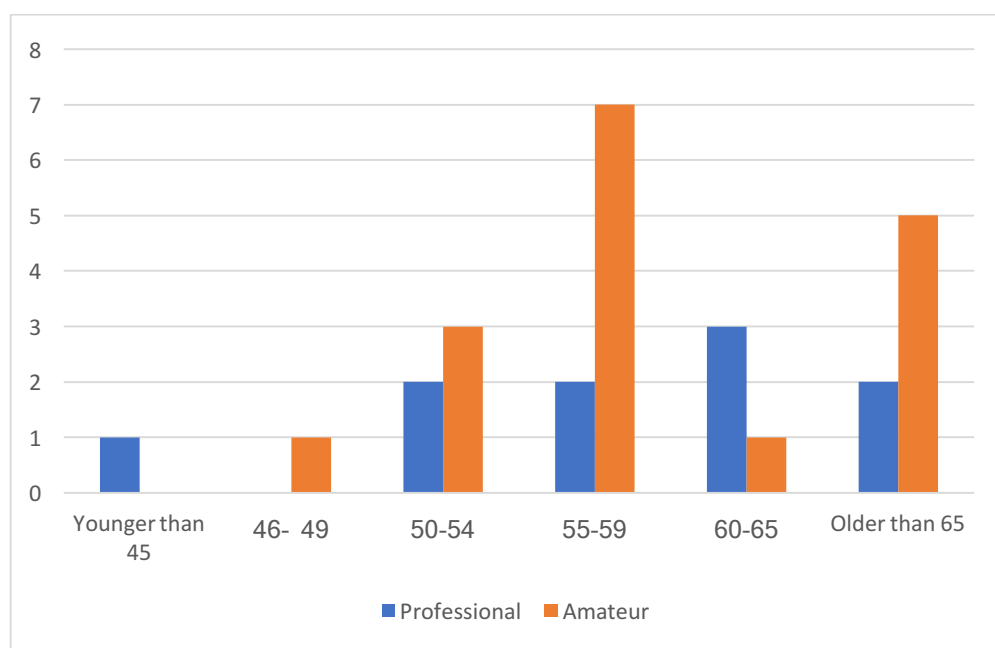
The quantitative data was exported from Qualtrics into Microsoft Excel for analysis. The data underwent two phases of analysis: firstly, data was tabulated (see Appendix E) by question and analysed using eyeballing techniques and descriptive statistics (Thomas, 2011); secondly, thematic analysis was applied using Braun and Clarke's (2006) technique, which included, generating initial codes and searching, reviewing and defining themes. Through thematic analysis, three major themes emerged: physiological limitations; psychological limitations; and social limitations.

## CHAPTER THREE: RESULTS

### 3.1 Participant Information

Participants were asked to identify themselves as either a professional or amateur singer. Professional singers were defined as a singer who are paid. Ten participants classified themselves as a professional singer and 17 as an amateur singer.

Participants age ranged from younger than 45 to older than 65 (Figure 1). Professional singers, except for one, were aged over the age of 50, with the majority (30%,  $n=3$ ) indicating that they were between 60 and 65. The one professional singer aged younger than 45 provided no comment whether they were experiencing premature menopause. Amateur singers were aged between 46 and older than 65. 41% ( $n=7$ ) were recorded to be between the ages of 55 and 59.



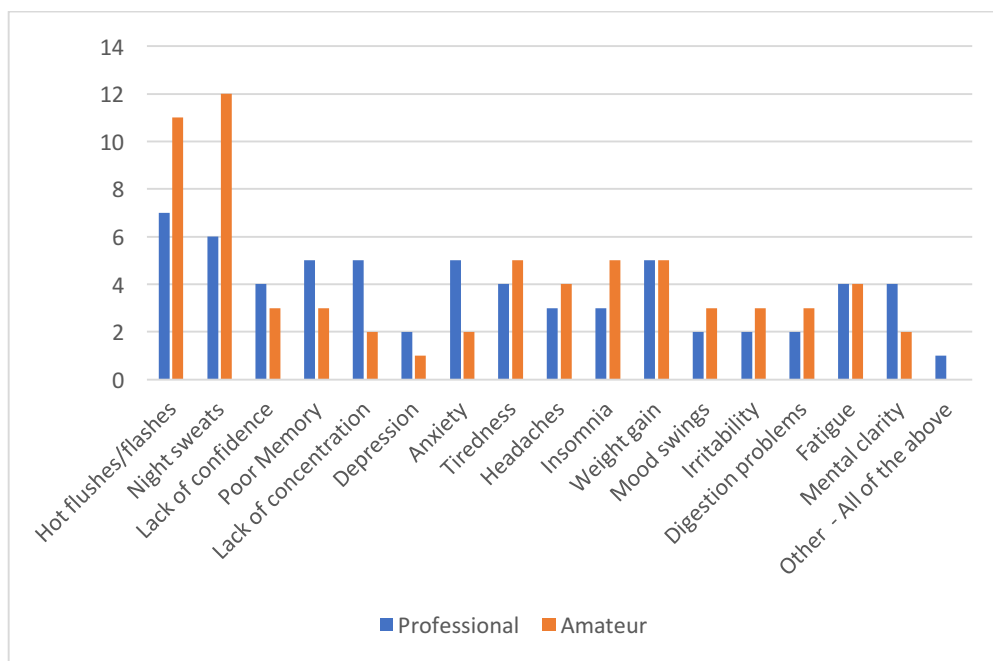
**Figure 1:** Question two; participant age.



## 3.2 Perceived Menopausal Changes

### 3.2.1 Physiological Symptoms

Participants were asked to indicate which physiological menopausal symptoms they had experienced, such as hot flushes/flushes, night sweats, tiredness, headaches, insomnia, fatigue, weight gain and/or digestive problems. The most common physiological menopausal symptom reported by participants was hot flushes/flushes and night sweats (see Figure 2). 67% ( $n=18$ ) of all participants indicated that they experienced hot flushes/flushes: 70% ( $n=7$ ) of professional singers and 64% ( $n=11$ ) of amateur singers. Night sweats were also reported by 67% ( $n=18$ ) of all participants: 70% ( $n=12$ ) by amateur singers and 60% ( $n=6$ ) by professional singers. In addition, professional singers more frequently reported experiencing weight gain (50%,  $n=5$ ), tiredness (40%,  $n=4$ ), and fatigue (40%,  $n=4$ ) in comparison to amateur singers. Insomnia was equally experienced by both professional (30%,  $n=3$ ) and amateur singers (29%,  $n=5$ ).



**Figure 2:** Question 32; participant experience of menopausal symptoms.

### **3.2.2. Psychological Symptoms**

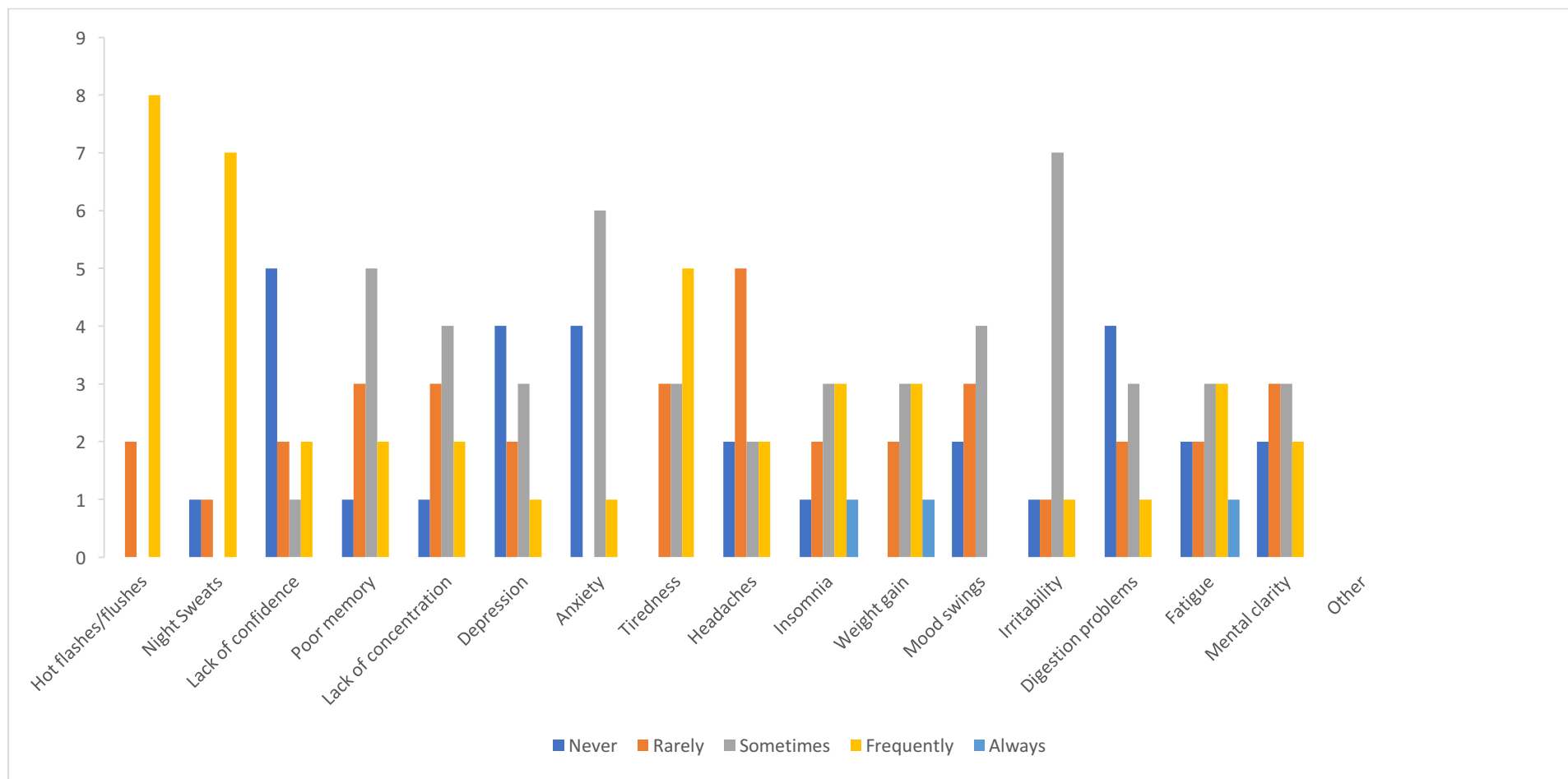
Participants were asked to state which of the following psychological menopausal symptoms they had experienced, lack of confidence, poor memory, lack of concentration, depression, anxiety, mood swings, irritability and/or mental clarity (see Figure 2). Psychological menopausal symptoms were more frequently reported by professional singers. Half of professional singers expressed that they experienced poor memory, lack of concentration and anxiety. Only 17% ( $n=3$ ) of amateur singers said that they experienced poor memory and 11% ( $n=2$ ) said that they experienced lack of concentration and anxiety.

Participants were also asked to rate the severity of their menopausal symptoms on a scale of never to always. Figure 3 shows the degree of severity of the menopausal symptoms experienced by professional singers. All professional singers reported experiencing hot flushes/flushes: frequently (80%,  $n=8$ ) or rarely (20%,  $n=2$ ). Night sweats showed to have a lesser severity than hot flushes/flushes. 70% ( $n=7$ ) said that they experienced night sweats frequently, 10% ( $n=1$ ) rarely and 10% ( $n=1$ ) never. Half of professional singers also reported frequently experiencing tiredness (50%) and to a slightly lesser degree, insomnia (30%), weight gain (30%) and fatigue (30%). The same symptoms were also said to be experienced sometimes.

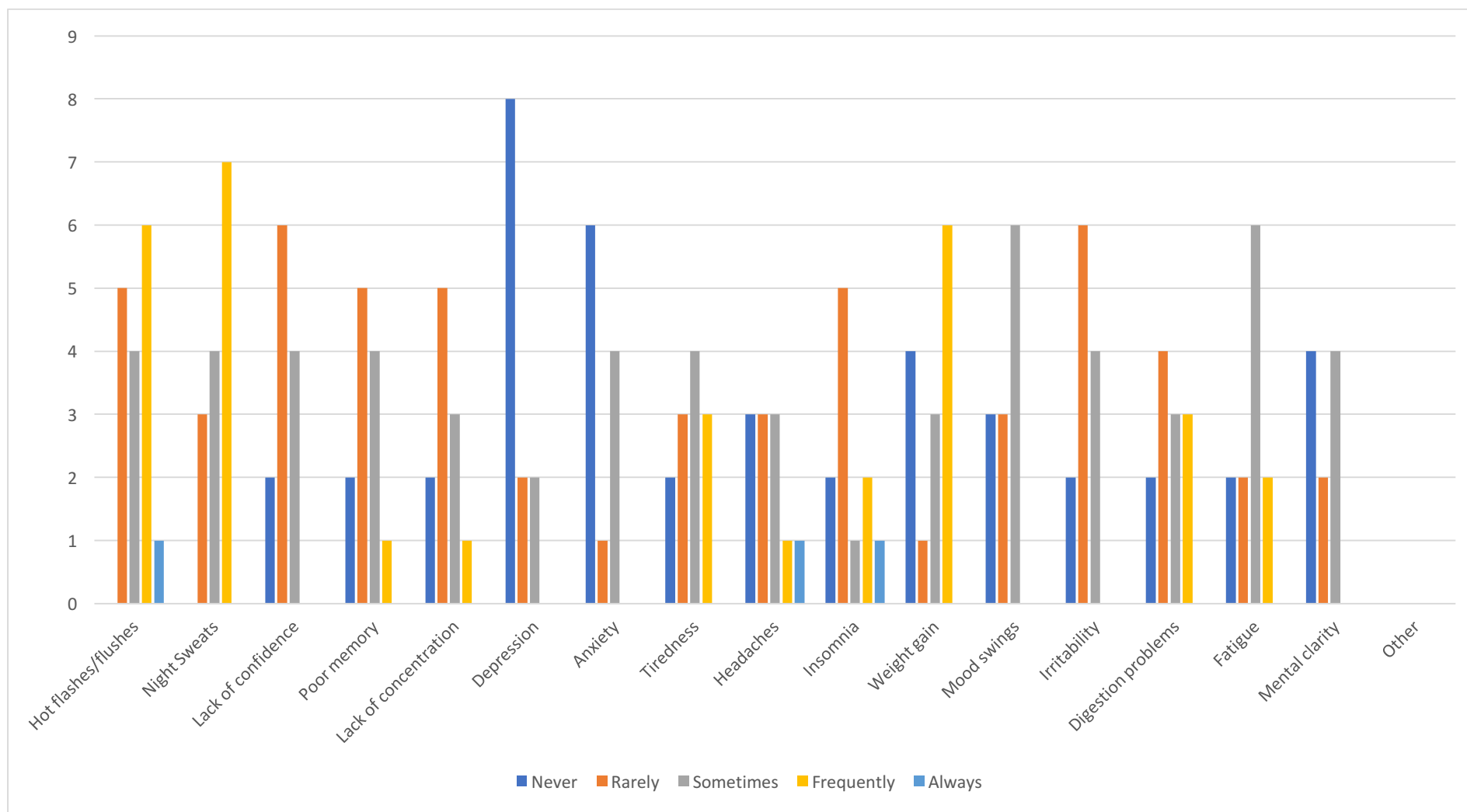
Similarly, amateur singers indicated that hot flushes/flushes and night sweats were experienced to a greater severity than any other physiological symptom (see Figure 4). The severity of hot flushes/flushes was reported to be experienced less frequently than professional singers. 35% ( $n=6$ ) of amateur singers reported experiencing hot flushes/flushes frequently. Likewise, 41% ( $n=7$ ) of amateur singers stated that they experienced night sweats frequently. Weight gain was reported to have been experienced more frequently by amateur singers (35%,  $n=6$ ) compared to professional singers (30%,  $n=3$ ).

Psychological menopausal symptoms varied in the degree of severity (see Figure 3 for professional singers and Figure 4 for amateur singers). The severity of psychological symptoms experienced 'sometimes' by professional singers included: irritability (70%,  $n=7$ ),

anxiety (60%,  $n=6$ ), poor memory (50%,  $n=5$ ), lack of concentration (40%,  $n=4$ ), mood swings (40%,  $n=4$ ), and mental clarity (30%,  $n=3$ ). The severity of psychological symptoms experienced by amateur singers were reported to a lesser extent compared to professional singers. Only 23% ( $n=4$ ) of amateur singers reported experiencing irritability sometimes. However, mood swings occurred more often in amateur singers (35%,  $n=6$ ) compared to professionals (10%,  $n=1$ ).



**Figure 3:** Question 33; professional participants, degree of severity of menopausal symptoms.

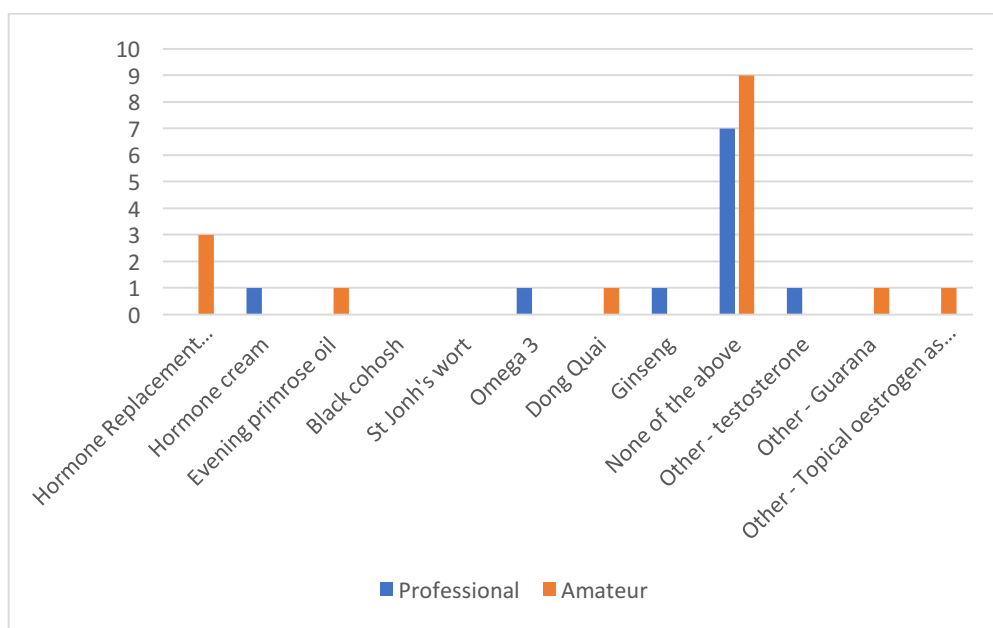


**Figure 4:** Question 33; amateur participants, degree of severity of menapausal symptoms.

### **3.3 Symptom Management**

Participants were asked a series of questions in relation to symptom management. When asked whether they had approached a GP regarding management of their menopausal symptoms 60% ( $n=6$ ) of professional singers and 53% ( $n=9$ ) of amateur singers admitted that they had not. Reasons cited for not visiting a GP included, 30% ( $n=3$ ) of professional singers and 23% ( $n=7$ ) of amateur singers considered that their symptoms were natural/normal, not requiring medical attention; 10% ( $n=1$ ) of professional singers and 11% ( $n=2$ ) of amateur singers felt unable to bother a GP, and 5% ( $n=1$ ) of amateur singers had a negative GP experience or chose literature sources instead. In addition, 60% ( $n=6$ ) of professional singers and 65% ( $n=11$ ) of amateur singers confirmed that they had not sought any other sources of professional advice to manage their menopausal symptoms.

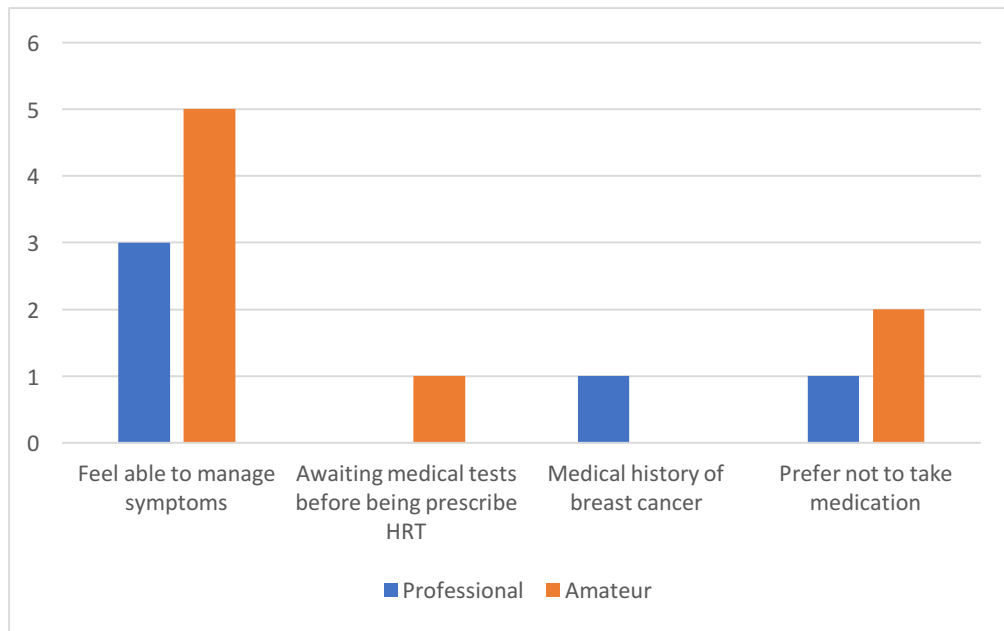
Participants were then asked about any medication they were taking to manage their symptoms. Figure 5 (below) shows that the majority, 70% ( $n=7$ ) of professional singers and 53% ( $n=9$ ) of amateur singers, choose not to take any form of treatment. Amateur singers were found to more commonly take some form of Hormone Replacement Therapy (HRT) 23% ( $n=4$ ) compared to professional singers (20%,  $n=2$ ). Interestingly, only 18% ( $n=3$ ) of amateur singers and 20% ( $n=2$ ) of professional singers chose to take natural/herbal supplements to manage symptoms. Of those taking some form of medication or natural/herbal supplements, participants indicated that no noticeable changes in vocal quality was detected.



**Figure 5:** Question 39; participant medical or natural/herbal supplements used for treatment or management of menopausal symptoms.

Figure 6 shows the reasons participants chose not to take medication or natural/herbal supplements to manage their symptoms. Just over a quarter of participants: 30% ( $n=3$ ) of professional singers and 29% ( $n=5$ ) of amateur singers, felt that their symptoms were manageable without medication or supplements; 10% ( $n=1$ ) of professional singers and 12% ( $n=2$ ) of amateur singers chose not to take any form of medication or natural supplements; 6% ( $n=1$ ) of amateur singers indicated that they are awaiting HRT prescription. Only one professional singer (10%,  $n=1$ ) indicated that they were not eligible for HRT due to a history of breast cancer.

Participants were also asked about their lifestyle; including dietary changes and activity levels but no significant results were found and participants indicated that changes made to either diet or activity levels had no significant impacted vocal quality.



**Figure 6:** Question 41; participant reasons for not taking medication or natural/herbal supplements to manage menopausal symptoms.

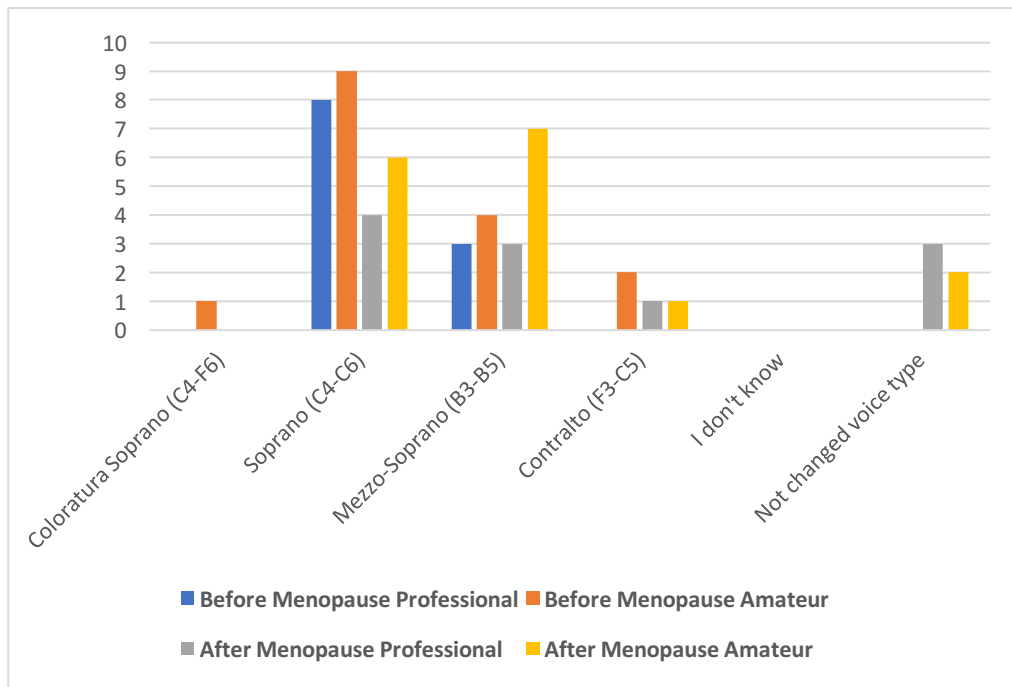
### 3.4. *Perceived Vocal Changes*

To understand professional and amateur singers' perceptions of vocal changes, before and after Menopause, a series of questions were asked about voice classification changes, types of symptoms experienced and the degree of severity of those symptoms.

#### 3.4.1 *Voice Type*

Figure 7 represents participant voice classification before and after Menopause. Before Menopause, soprano was the most common voice type amongst all participants (63%,  $n=17$ ). A high percentage of professional singers (90%,  $n=9$ ) retained their voice type after Menopause compared to amateur singers (65%,  $n=11$ ).

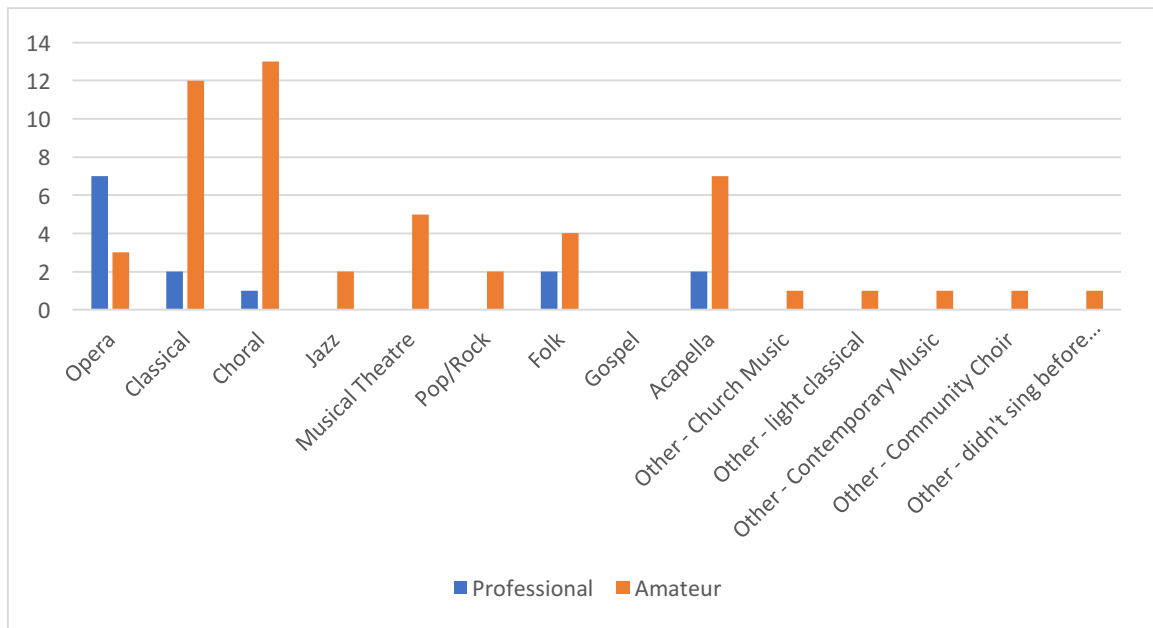




**Figure 7:** Questions 8 and 9; participant voice type before and after Menopause.

### 3.4.2 Repertoire

Figure 8 shows the results of what repertoire professional and amateur singers sang. Results shows that amateur singers were more likely to explore a wider range of singing repertoire than professional singers. Professional singers said that they mostly sang opera (70%,  $n=7$ ), and were less likely to engage in classical (20%,  $n=2$ ), folk (20%,  $n=2$ ), acapella (20%,  $n=2$ ) or choral (10%,  $n=2$ ). On the other hand, amateur singers largely engaged in choral (76%,  $n=13$ ) or classical (70%,  $n=12$ ) but also indicated that they also sang other types of repertoire which included, opera (18%,  $n=3$ ), jazz (12%  $n=7$ ), musical theatre (29%,  $n=5$ ), pop/rock (18%,  $n=2$ ), Folk (24%,  $n=5$ ), acapella (41%,  $n=7$ ), church music (6%,  $n=1$ ), light classical (6%,  $n=1$ ), and contemporary music (6%,  $n=1$ ).



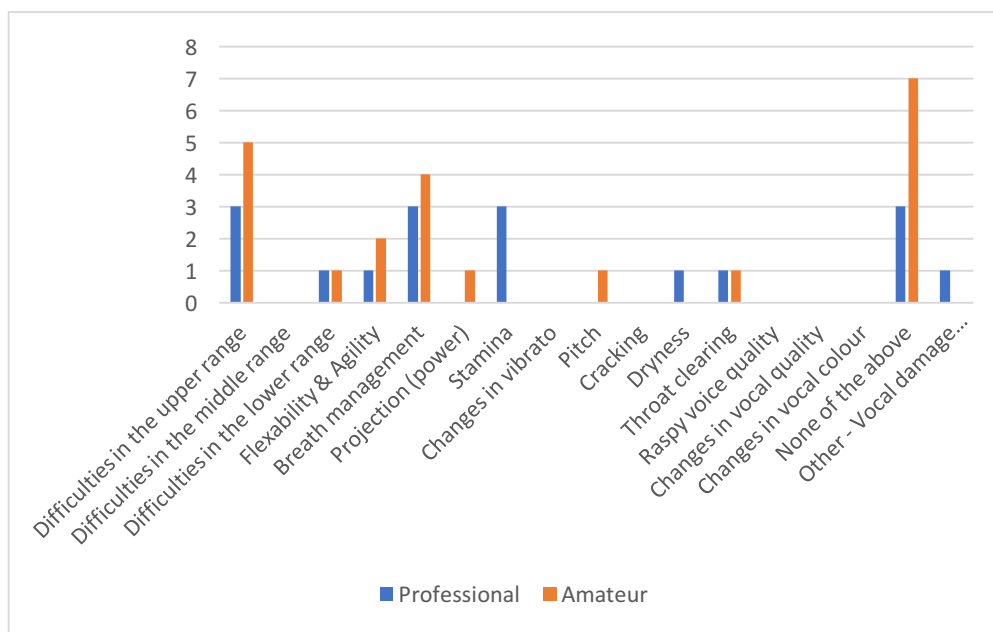
**Figure 8:** Question 13; participant repertoire.

### 3.4.3. Experience

100% ( $n=10$ ) of professional singers and 88% ( $n=15$ ) of amateur singers confirmed that they had been singing for more than ten years'. Two amateur singers said that they had been singing less than 10 years': one said that they had been singing for five to ten years'; and one stated that they had been singing for one to four years and had taken singing up after Menopause. No further comment was made as to why singing was taken up later in life.

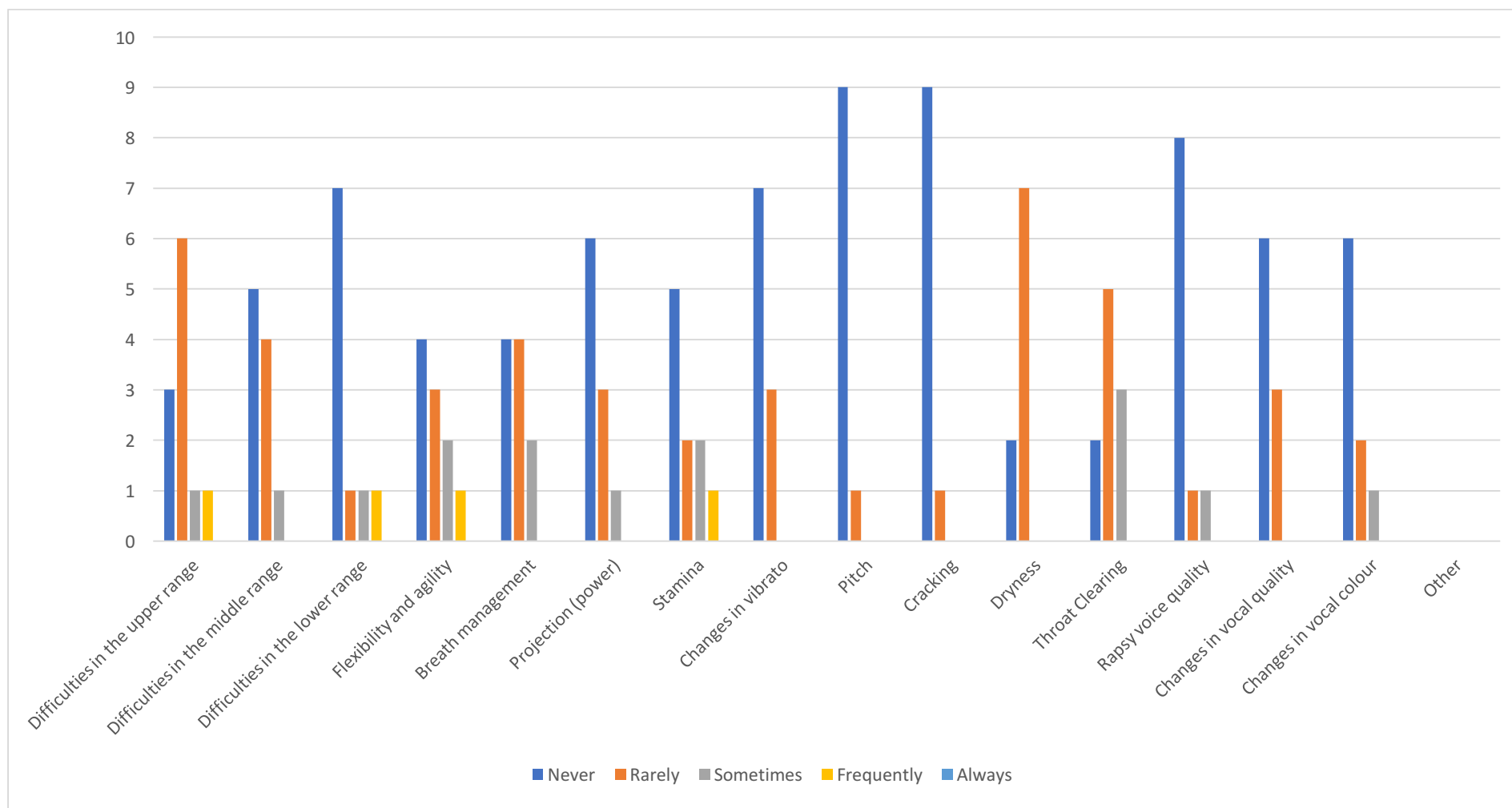
### 3.4.4. Vocal Difficulties

Figure 9 (below) shows participant perceptions of vocal issues experienced before Menopause. The most commonly reported issue was difficulties with the upper range. Both professional (30%,  $n=3$ ) and amateur (29%,  $n=5$ ) singers indicated that they had suffered from difficulties with the upper range before Menopause. In addition, amateur singers also reported difficulties with breath management (24%,  $n=4$ ). Similarly, professional singers reported difficulties with both breath management (30%,  $n=3$ ) and stamina (30%,  $n=3$ ). Interestingly, a high proportion of professional (30%,  $n=3$ ) and amateur (41%,  $n=7$ ) singers stated that they had not experienced any vocal difficulties before Menopause.

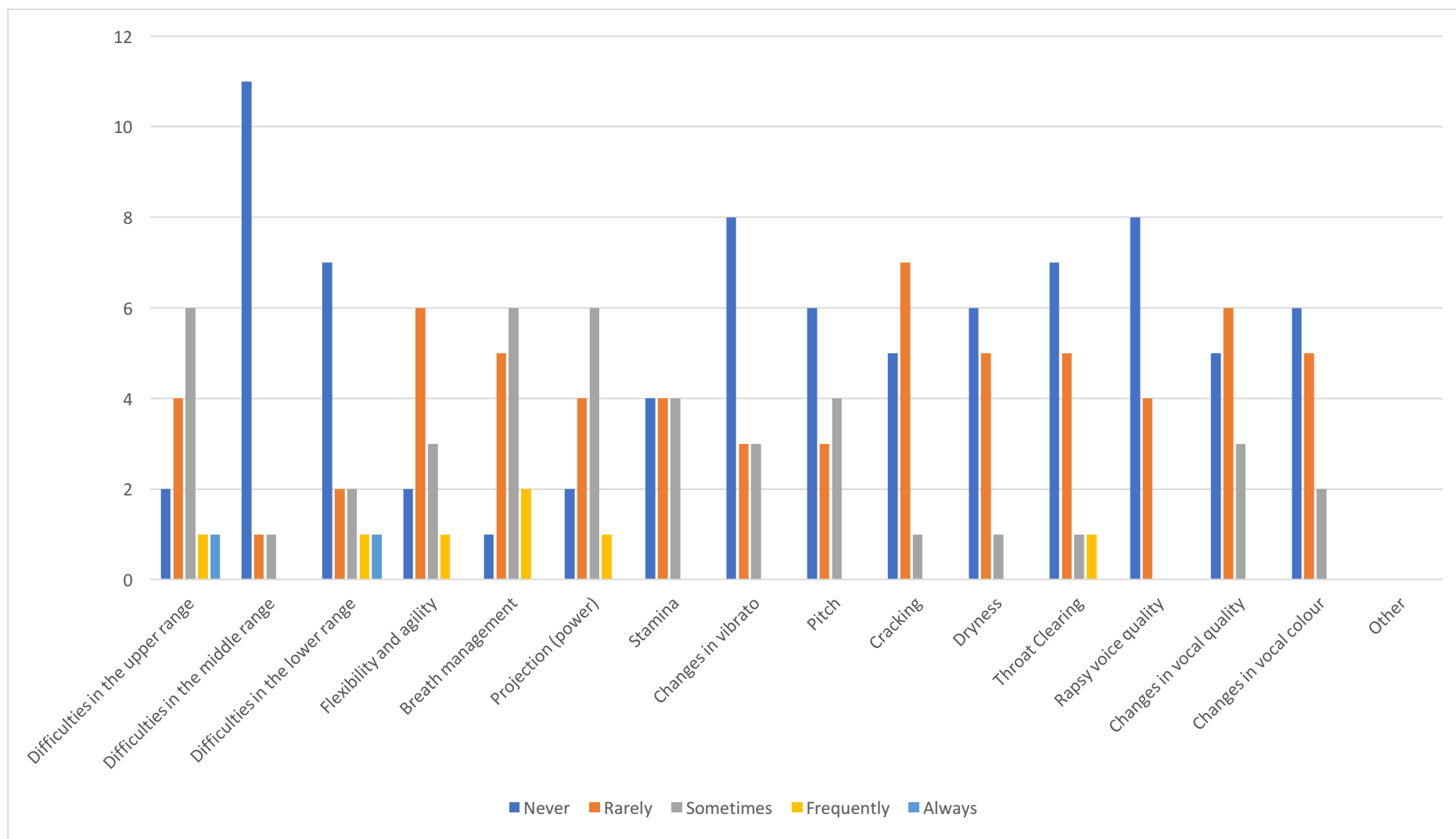


**Figure 9:** Question 24; participant perceived vocal difficulties before Menopause.

Figure 10 (professionals) and Figure 11 (amateurs) show the degree of severity of vocal problems before Menopause. Whilst 30% ( $n=3$ ) of professional singers reported that they had experienced difficulties in the upper range, only 10% ( $n=1$ ) reported that difficulties were experienced frequently. 10% ( $n=1$ ) said they experienced difficulties sometimes and 60% ( $n=6$ ) stated that this was rarely. In comparison, of the 29% ( $n=5$ ) of amateur singers that said that they experienced difficulties with the upper range, 6% ( $n=1$ ) of amateurs said that this was frequently, 35% ( $n=6$ ) said sometimes and 24% ( $n=4$ ) said rarely.

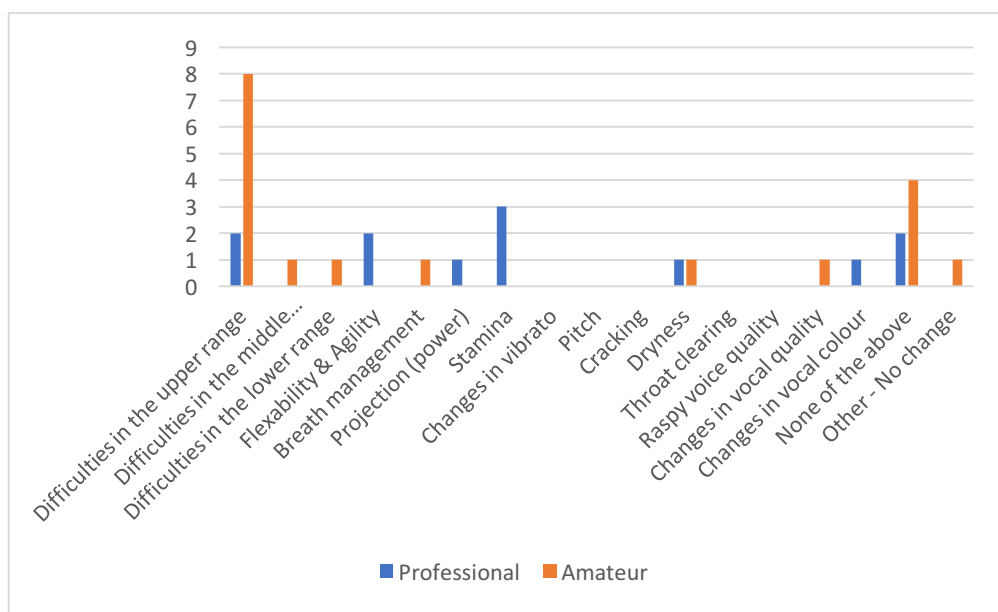


**Figure 10:** Question 25; professional participants, degree of severity of vocal difficulties before Menopause.



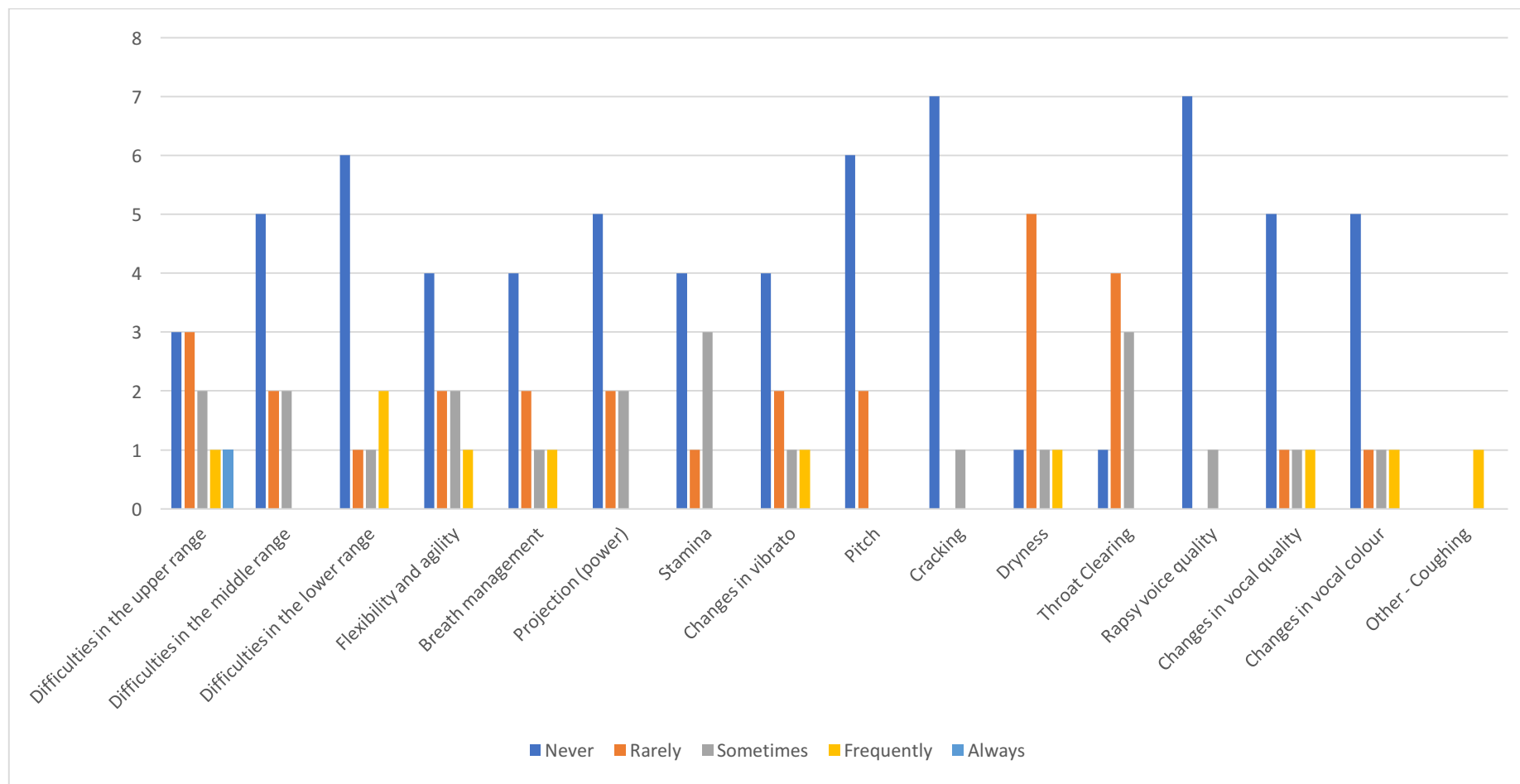
**Figure 11:** Question 25; amateur participants, degree of severity of vocal difficulties before Menopause.

Figure 12 shows that after Menopause, 47% ( $n=8$ ) of amateur singers confirmed that they were experiencing difficulties with the upper range; an 18% increase from before Menopause. However, professional singers indicated that only 20% ( $n=2$ ) confirmed to experience difficulties in the upper range; a reduction on 10%. Difficulties with stamina are consistent with before and after Menopause. The number of participants reporting that they had not experienced any vocal difficulties significantly reduced after Menopause: 20% ( $n=2$ ) for professionals; and 24% ( $n=4$ ) for amateur singers.

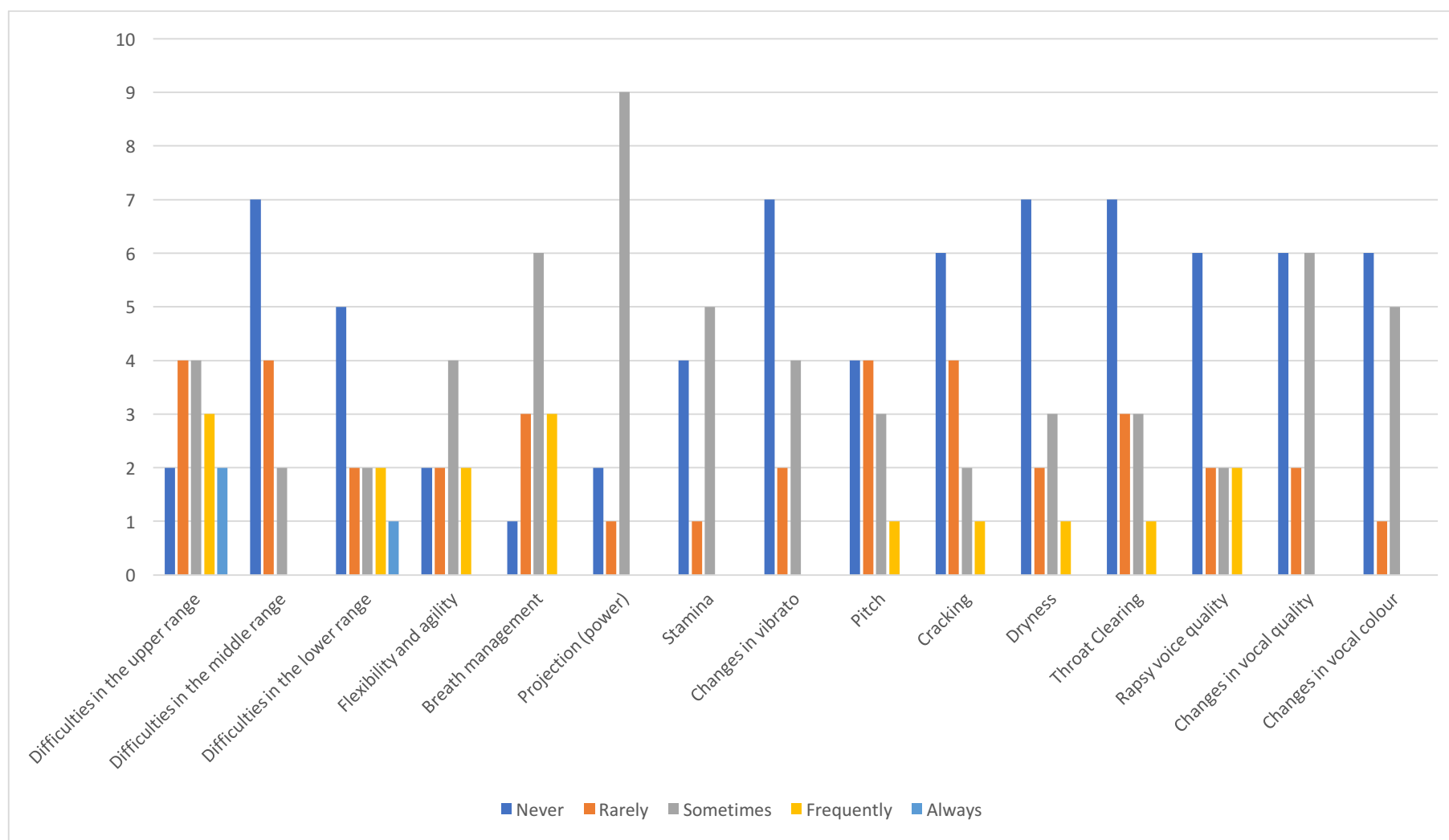


**Figure 12:** Question 26; participant perceived vocal difficulties after Menopause.

Figure 13 and figure 14 (below) show the severity of reported vocal difficulties after Menopause. In comparison to Figures 10 and 11 (above), in both professional and amateur singers, there is a general shift in the degree of severity of vocal difficulties. Overall, amateur singers reported a greater change in severity than professional singers. Less than half of participants reported to have started to experience changes/difficulties with their voice more than 18 months after the Menopause transition began. 40% ( $n=4$ ) of professional and 29% ( $n=5$ ) of amateur singers said that symptoms lasted longer than 18 months.



**Figure 13:** Question 27; professional participants, degree of severity of vocal difficulties after Menopause.

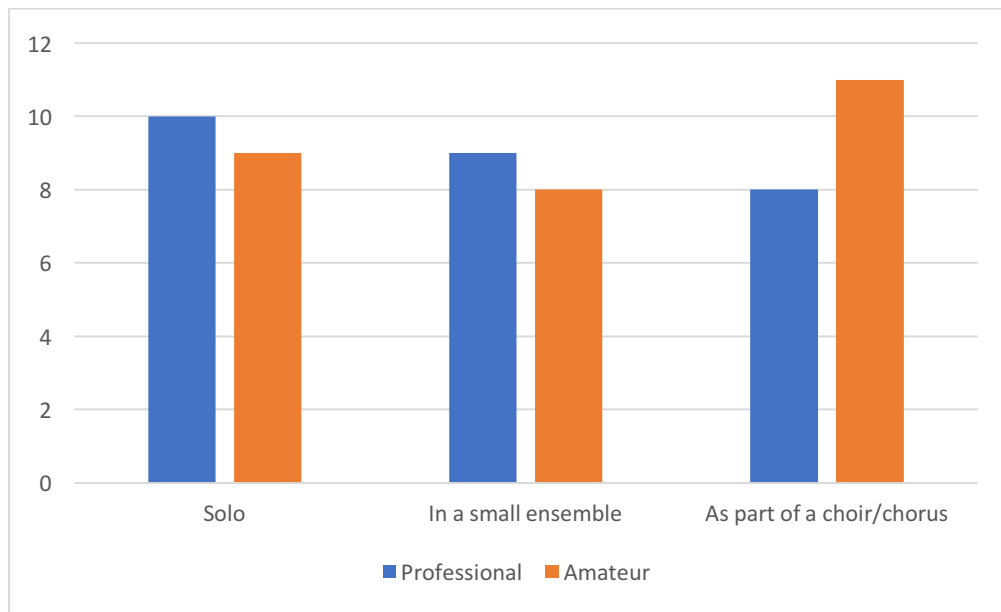


**Figure 14:** Question 27; amateur participant, degree of severity of vocal difficulties after Menopause.



### 3.4.5. Performance

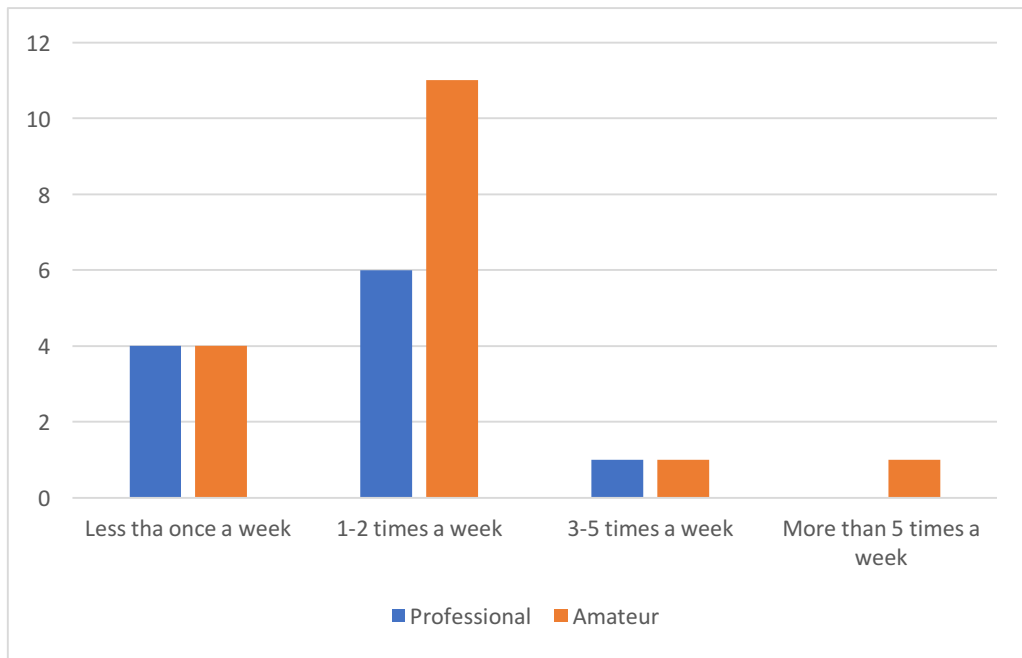
100% of professional singers said that they performed solo, 90% ( $n=9$ ) as part of an ensemble and 80% ( $n=8$ ) as part of a choir or chorus. Likewise, 53% ( $n=9$ ) of amateur singers stated that they had performed solo, although the greater majority (64%,  $n=11$ ) said that they performed as part of a choir or ensemble (see Figure 15).



**Figure 15:** Question 10; participant performance activities.

### 3.4.6. Rehearsal

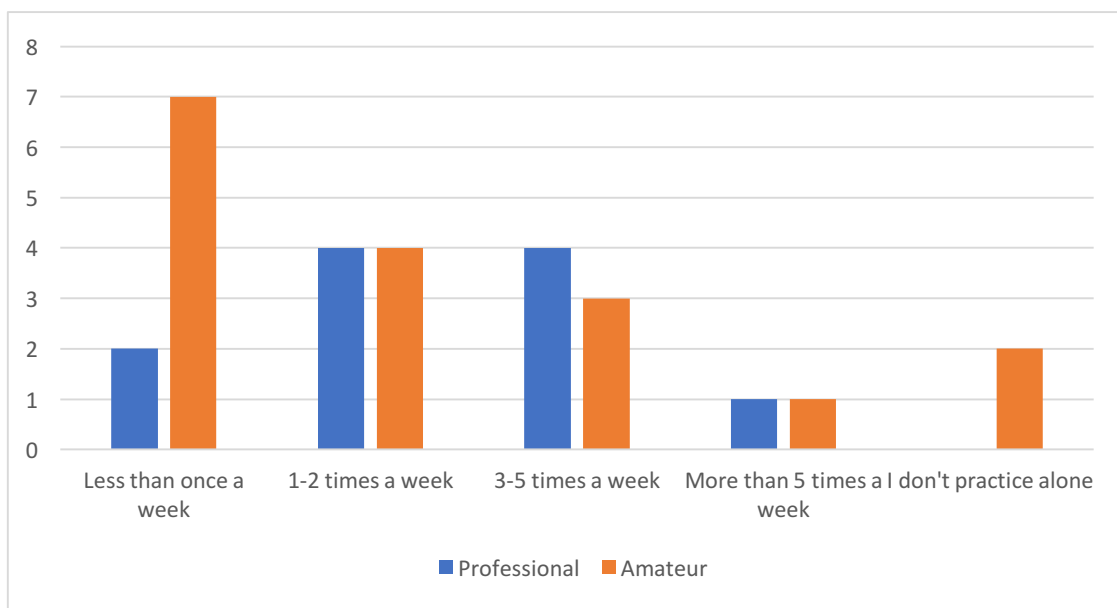
Most participants indicated that they rehearsed on average one to two times per week: 60% ( $n=6$ ) professional and 65% ( $n=11$ ) of amateur singers. Only one amateur singer suggested that they rehearsed more than five times per week (see Figure 16).



**Figure 16:** Question 11; participant rehearsal activities.

#### **3.4.7. Practice**

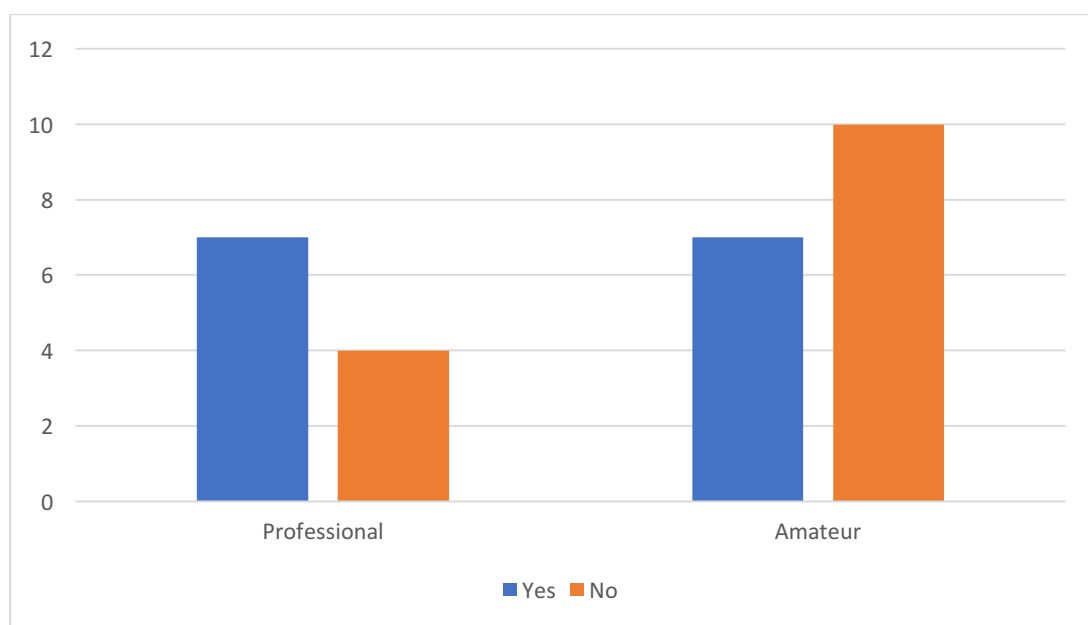
Participants were asked how often they practiced alone. Figure 17 shows that the greater proportion (53%,  $n = 9$ ) of amateur singers admitted that they practiced less than once a week or not at all; 18% ( $n=3$ ) said that they practiced three to five times per week; and only one (6%) said that they practiced more than five times per week. In contrast, 80% ( $n=8$ ) professional singers stated that they practiced on average one to five times per week; 39% more than amateurs. 40% ( $n=4$ ) said that they practiced three to five times per week; and 10% ( $n=1$ ) said that they practiced more than five times per week. Only 20% ( $n=2$ ) of professional singers indicated that they practice less than once a week; 33% less than amateur singers.



**Figure 17:** Question 12 ; participant practice activities.

### 3.4.8. Lessons

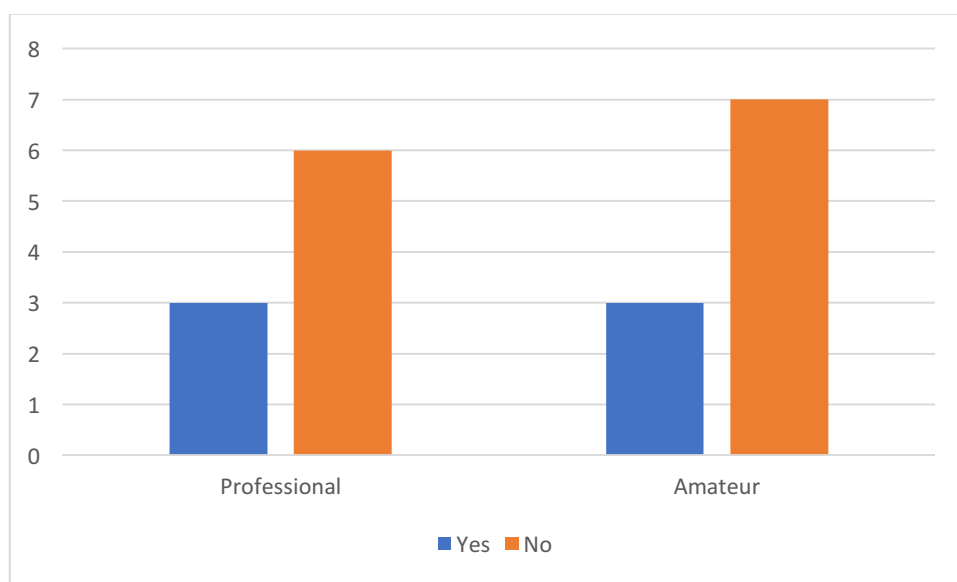
Participants were asked whether before or after Menopause they had taken singing lessons and how often. Figure 18 shows participants that took lessons before Menopause.



**Figure 18:** Question 15; singing lessons before Menopause.

Before Menopause, 70% ( $n=7$ ) of professional singers and 41% ( $n=7$ ) of amateur signers stated that they took singing lessons (see Figure 18). Reportedly these were: 15% ( $n=4$ ) once a week; 4% ( $n=1$ ) every two weeks; 15% ( $n=4$ ) once a month; 4% ( $n=1$ ) every six months; 4% ( $n=1$ ) every few months; and 4% ( $n=1$ ) irregularly. One participant indicated that they had not taken lessons before Menopause because they are a singing teacher.

Of the 40% ( $n=4$ ) professional and 59% ( $n=10$ ) amateur singers that were not taking singing lessons the main reasons included: time constraints (18%,  $n=2$  professional;  $n=3$  amateur); happy with how voice was working (4%,  $n=1$  professional); performing less (8%,  $n=1$  professional and  $n=1$  amateur); teacher availability (8%,  $n=1$  professional;  $n=1$  amateur), cost (11%,  $n=1$  professional;  $n=2$  amateur), laziness (4%,  $n=1$  professional), and losing voice (4%,  $n=1$  professional).



**Figure 19:** Question 21; singing lessons after menopause.

After Menopause, 30% ( $n=3$ ) of professionals (a decrease of 40%) and 17% ( $n=3$ ) amateurs (a decrease of 24%) stated that they were taking singing lessons (see Figure 19). The main cause for not taking singing lessons was: cost (11%,  $n=2$  professionals and  $n=1$  amateur). Other reasons included: seen as unessential (4%,  $n=1$  professional), time constraints (8%,  $n=1$  professional;  $n=1$  amateur), performing less (4%,  $n=1$  amateur), age (4%,

*n*=1 amateur), illness (4%, *n*=1 professional) and an active singing teacher (4%, *n*=1 professional). Overall, amateur singers were less likely to take singing lessons before or after Menopause than professional singers.

Participants were also asked, if they have not taken lessons before or after menopause what were the main reasons, these included, laziness, took lessons earlier in life/career, costs, time constraints, and received adequate training through ensemble/choir/chorus. The most common reasons for amateurs to not take singing lessons was costs (35%, *n*=6) and time constraints (41%, *n*=7).

## **CHAPTER FOUR: DISCUSSION**

### **4.1 *Physiological Limitations***

#### **4.1.1 *Perceived Menopausal Symptoms***

This study found that female classical singers were affected by both menopausal and vocal symptoms. The most common menopausal symptoms reported by all participants were hot flushes/flushes and night sweats, which is consistent with the literature by Horwood (2001) and the findings of Elliott (2017). Professional singers indicated that they were more affected by hot flushes/flushes whereas amateur singers were more likely to experience night sweats. Whilst the relationship of aging and Menopause on vocal quality has been discussed amongst vocal pedagogues, the influence of menopausal symptoms on a female singer as a performer have not. Results from this study suggest that menopausal symptoms indirectly impact the female singer in several ways. Hot flushes/flushes are unpredictable and likely to occur during physical exertion, i.e. during a performance. The unpredictable nature of hot flushes/flushes means that they can occur without warning or without an opportunity to recover. There is the potential that redness, sweating/perspiring, palpitations and/or headaches caused hot flushes/flushes could make a female singer feel uncomfortable, anxious, embarrassed or unable to continue (Horwood, 2001). It could be argued that soloist are more likely to be affected as the risk of exposure is greater than performing as part of a choir/chorus.

Night sweats are unlikely to impact a singers' performance to the same extent as hot flushes/flushes but a consequence of night sweats is that a sufferer may more than likely experience insomnia (Horwood, 2001). Lack of sleep increases the likelihood of tiredness, irritability, issues with self-confidence, stress and depression. This may make the physical exertion of performing more difficult. It is unclear from this study whether menopausal symptoms have deterred female singers' from continuing to perform. Further research should consider whether menopausal symptoms affect a singers' ability to continue performing.

#### **4.1.2. *Perceived Vocal Symptoms***

Broad findings suggest that female singers, both professional and amateur, recognise vocal changes during and after Menopause. Previous research has chosen to focus on professional singers as they are considered to have more awareness of vocal changes (Boulet & Oddens, 1996). This study has found that more than three quarters of amateur singers have been singing for more than ten years', equal to the length of experience of professional singers. Results suggest that amateur singers are equally capable of reporting vocal changes as professional singers. However, it is likely that professional singers are more knowledgeable. Further research could investigate the extent and ability of professional and amateur singers to detect vocal problems.

The results of this study found that the most common vocal changes experienced by all participants were difficulties with the upper range, followed by breath management and stamina. Difficulties with the upper range are consistent with the research conducted by Elliott (2017), Boulet and Oddens (1996) and Abitbol et al., (1999). Despite both professional and amateur singers reporting difficulties with the upper range, amateur singers were more likely to move down a voice type. Reasons for this could include, professionals have more technical understanding which allows them to adjust technique in response to vocal changes or consistency in repertoire choice. This study found that amateur singers are more likely to explore a wider range of repertoire than professionals. According to Fuchs (1973) too much versatility increases the likelihood of vocal problems. It is not clear from the results of this study whether differences in vocal difficulties are related to technical expertise. Future research could consider whether vocal changes during and after Menopause are influenced by technical ability.

This study has not found any of the participants to be suffering from Menopausal Vocal Syndrome (MVS) (Abitbol et al., 1999). Whilst many participants reported difficulties with lowered vocal intensity, vocal fatigue, difficulties with the upper range and vocal quality these were not reported together. This study also only took into consideration perceived vocal problems and not physical examination by vocal specialists. Future research should

investigate vocal symptoms during and after Menopause using both participant perception as well as acoustic analysis.

## **4.2 *Psychological Limitations***

All participants indicated that they had suffered from psychological issues caused by Menopause. Symptoms included, as lack of confidence, poor memory, lack of concentration, depression, anxiety, mood swings, irritability and/or mental clarity. This study found that professional singers were more commonly affected by psychological symptoms. Half of the professional singers said that they had experienced poor memory, lack of concentration and anxiety, in varying degrees of severity. Whilst literature sources indicate that psychological symptoms are influenced by the reduction in oestrogen levels, it is beyond the scope of this study to determine the biological reasons why professional singers were more affected by menopausal symptoms than amateur singers.

The impact for a professional singer suffering from psychological menopausal symptoms could potentially be career changing. As noted by Hallam (1997) and Willmore (2014) there is an expectancy for professional musicians to perform from memory. Experiencing poor memory, lack of concentration or mental clarity may not directly affect vocal quality but could prevent or inhibit a singer's ability to effectively memorise new repertoire, recall old repertoire and increase feelings of anxiety and lack of confidence. Suffering from psychological menopausal symptoms may also be a contributing factor of why female opera singers retire earlier from public performance, as discussed by Boulet & Oddens (1996). As amateur singers are unlikely to be consistently expected to perform from memory, this could explain why psychological menopausal symptoms are experienced to a lesser extent than professionals. It is not clear from the results of this study to what extent participants felt that psychological menopausal symptoms affected their performance ability. It would be worth future research exploring the impact of psychological menopausal symptoms on career longevity. Additionally, further research investigating whether



psychological menopausal symptoms has an effect on muscle memory, and consequently vocal technique, would be beneficial.

### **4.3 Social Limitations**

#### **4.3.1 Perceived Menopause Symptoms**

More than half of participants admitted that they had not seen a GP or sought any other form of professional advice in relation to management of their menopausal symptoms. The majority of participants felt that their menopausal symptoms were natural/normal and were manageable without intervention. In addition, more than two thirds of professional singers and more than half of amateur singers said that they were not currently taking any medication or natural/herbal supplements to alleviate menopausal symptoms. The number of participants in this study not taking any form of medication or natural/herbal supplement is significantly higher than the findings reported by Elliott (2017). The difference in results may be related to participant source. Elliott's (2017) participants were largely recruited from vocal educational institutions, which may suggest that participants were more likely to be knowledgeable about the benefits of taking medication and/or natural/herbal supplements to prolong vocal quality. There may also have been cultural/societal differences. Elliott's (2017) research was conducted across the US, UK and Australia.

Participants in this study taking medication and/or natural/herbal supplements recognised improvements in the severity of menopausal symptoms. No comments were received that indicated that vocal quality was also improved. Again, this studies results were inconsistent with the findings of Elliott (2017). Elliott (2017) reported that participants had suggested that taking medication had a positive effect on vocal quality and their ability to continue to perform. However, Elliott's (2017) results also found that there was no tangible link between taking medication and improvements in vocal quality. Further research and wider public education regarding the advantages and disadvantages of taking medication and/or natural/herbal supplements to prolong vocal quality would greatly benefit active

singers. Findings may influence whether future professional female singers retire early from public performance.

Moreover, this study found that most participants chose not to take medication or natural/herbal supplements to reduce the severity of menopausal symptoms because they felt able to self-manage or did not like taking medication. It is unclear from participant responses whether decisions not to take medication were the result of lack of knowledge of the advantages and disadvantages, confusing media reports, peer/family pressure or societal acceptance or opinion. Both Herzig (2012) and Horwood (2001) argued that one solution to improving awareness is to openly discuss and share issues relating to Menopause. Suggestions for further research include, determining whether taking medication and/or natural/herbal supplements improves vocal quality and longevity, addressing the factors that influence female singers to take medication and/or natural/herbal supplements to reduce the severity of menopausal symptoms and improve vocal quality and longevity, and exploring potential opportunities to supply singers with quality advice in relation to taking medication and/or natural/herbal supplements during Menopause.

#### ***4.3.2. Perceived Vocal Symptoms***

The results of this study found that participants recognised vocal changes before and after Menopause. Amateur singers were found to be more likely to not practice alone or take singing lessons compared to professionals. The most common reasons related to cost and time constraints. Some amateur singers felt that they received sufficient tuition during weekly choir/chorus rehearsal. Whilst Bauman (2018) argues it is the responsibility of the conductor to provide adequate vocal technique training during rehearsals De Castro Coelho, Daroz, Silvério and Brasolotto (2013) suggest that vocal issues amongst choral singers relates to voice classification rather than problems with vocal technique. It is beyond the scope of this study to comment whether sufficient vocal technique is taught during choir/chorus rehearsals.

Reasons amateur singers do not practice alone or take singing lessons could be related to insufficient knowledge as well as cost and time constraints. Amateur singers may

be unaware of good practice and vocal health habits or the benefits of taking regular one to one lessons with a singing teacher. Fuchs (1973) points out that it is common for most singers to only seek professional help when something is wrong. It is unclear from the results and beyond the scope of this study to determine the extent of amateur singers' musical, technical and vocal health knowledge and beliefs. Future research could try to identify the factors that lead amateur singers to not practice alone or take singing lessons. It would also be beneficial for future research to explore opportunities to promote healthy vocal practices amongst amateur communities.

This study also found that the number of professionals taking singing lessons decreased after Menopause. The majority of professional singers in this study indicated that they were over the age of 50, which, according to Boulton and Oddens (1996), is around the age female opera singers typically retire from performing. Whilst it is reasonable to assume Menopause may be a contributing factor, professional singers in this study confirmed that they were performing less after Menopause and ceased taking lessons. It is not clear from this research whether professional singers discontinue singing after Menopause due to societal pressures. Further research could investigate societal perceptions of professional singers before and after Menopause. This could provide an insight into employer and audience expectations of older singers.

## **CONCLUSION**

Overall, the results of this study found two distinct findings: firstly, that physiological and psychological menopausal symptoms indirectly affect a singers' ability to perform; and secondly, that vocal changes occurring during and after Menopause directly influence vocal quality.

Findings suggest that professionals are more likely to experience and be affected by physiological and psychological menopausal symptoms. The most common menopausal symptoms reported were hot flushes/flushes, night sweats, poor memory, lack of concentration and anxiety. Biological explanations were beyond the scope of this study but it was proposed that professional singers are more likely to be affected due to higher performance demands and societal expectations.

Broad findings suggest that both professional and amateur singers are able to perceive vocal changes during and after Menopause. Amateur singers were found to suffer from more vocal changes, and to a greater degree of severity, than professionals. The most commonly reported vocal changes, and consistent with the findings of other research, was difficulties with the upper range (Elliott, 2017, Abitbol et al., 1999; Boulton & Odden, 1996). Whilst this study focused on perceptions rather than acoustic analysis, it has been suggested that amateur singers may be more prone to vocal abuse and lack of technical knowledge, providing a reasonable explanation for the differences compared to the professional singers.

Additionally, the results of this study have shown that the majority of singers do not seek medical or professional advice in relation to management of menopausal symptoms and vocal changes. Most participants considered symptoms natural/normal and were content to self-manage. Participants were equally found to be reluctant to take any medication and/or natural/herbal supplements to reduce the severity of menopausal symptoms. The majority of participants felt able to cope with menopausal symptoms without assistance. Participants taking medication and/or natural/herbal supplements reported that the severity of menopausal symptoms were reduced. However, no results

were found to suggest that participants taking medication and/or natural/herbal supplements noticed any improvements in vocal quality.

The purpose of this study was to address a gap and contribute to the existing research on the effects of Menopause on the aging female classical singer in England. It is believed that this study has provided further insights into the perceptions and experiences of vocal changes during and after menopause. It is also hoped that considerations for the physiological and psychological menopausal symptoms that indirectly affect a singer's ability to continue to perform have provided further insights into the impact of Menopause on female singers. In addition, this research intended to compare the experiences of professional and amateur singers in an effort to gain a greater understanding of the different perceptions and effects.

Limitations identified in the research design include restrictions on participant recruitment, questionnaire design and research constraints. Participants were recruited from English based opera and choral companies/societies. The research was conducted during the month of August, whilst many people were coincidentally on summer holiday. Trying to recruit participants during this period may have contributed to the total low number of responses and high number of incomplete questionnaires. Also, by approaching English based opera and choral companies/societies may have reduced and/or limited the ethnical and socioeconomic diversity within the results. Future research should consider approaching vocal organisations that have a wider ethnical and socioeconomic backgrounds to establish whether ethnicity and/or socioeconomic status influences changes in vocal quality and/or perceptions of menopausal symptoms on performance.

Questionnaires were chosen as part of the research design to provide a greater quality and volume of results. However, using questionnaires with a high percentage of closed and Likert-scale questions has potentially restricted participant responses and narrowed the quality of results for analysis purposes. Future research should consider conducting semi-structure interviews in an effort to provide participants with the opportunity to expand answers and discuss issues in greater depth. Also, using semi-structured interviews may provide greater insights into issues affecting menopausal singers.

The limited scope and time constraints of this research study has meant that the researcher was unable to conduct acoustic analysis for comparison with participant perceptions. Limitations also meant that considerations for participants' technical knowledge, understanding and ability were not explored. Future research would benefit from a larger scaled, longitudinal investigation documenting vocal changes in relation to significant life events and evaluating the influence and change on vocal quality. Research would benefit from consideration for ethnical and socioeconomic diversity, overall general health, vocal health and technical ability in connection with vocal changes experienced during and after Menopause. In particular, professional singers, employers and audiences would benefit from further understanding of the social implications and effects of menopausal symptoms and vocal changes in aging female singers.

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## ***APPENDICES***

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## **Appendix A: Participant Informed Consent.**

### **INFORMED CONSENT FORM**

#### **THE RESEARCH**

Menopause: The effects on the aging female classical singer?

You are being invited to participate in a research study for a Postgraduate Masters student at the University of York. It is important that you understand why the research is being carried out. Please read the following information carefully: The purpose of this study is to determine the effects of menopausal symptoms on the voices of professional and amateur female classical singers. You are being asked to complete an online questionnaire that should take approximately 15-20 minutes to complete.

#### **ETHICAL APPROVAL RISKS**

There are no perceived risks for participating in this research study. However, you have the right to decline to answer any or all questions and you may withdraw from the research study at any time, without providing a reason. If you feel that you have been affected by the issues raised, please seek help from your GP or alternatively the British Menopause Society (BMS) <https://www.thebms.org.uk>

#### **BENEFITS**

There is no perceived direct benefit to participants. It is hoped that the data and information obtained from this research study will provide a better understanding of the effects of menopause symptoms on both professional and amateur female classical singers.

## **CONFIDENTIALITY**

You will not be asked to confirm any personal information and therefore your responses to the questionnaire will be anonymous. For reporting purposes, the researcher will use pseudonym and/or numbers for participants.

## **THE RESEARCHER**

Rebecca Spratt

Department of Music

University of York

Heslington

YO10 5DD

If you have any queries or concerns about the research, please contact the researcher directly at [rs1667@york.ac.uk](mailto:rs1667@york.ac.uk)

## **CONSENT**

I have read and understand the following:

I understand that I have been given the opportunity to ask questions about the research study and my participation.

I understand that I can withdraw from the research study at any time without giving reasons.

I understand that my participation is voluntary.

**Appendix B:** Pilot study questionnaire.

# **Menopause: The effects on the ageing female classical singer**

Q1 What is your age?

- ☐ Younger than 45 (1)
- ☐ 45 - 49 (2)
- ☐ 50 - 54 (3)
- ☐ 55 - 59 (4)
- ☐ 60 - 65 (5)
- ☐ Older than 65 (6)

Q2 Are you currently going through Menopause?

- ☐ Yes (1)
- ☐ No (2)
- ☐ I don't know (3)

Q3 Do you know what stage of Menopause you are in?

- ☐ Perimenopause (1)
- ☐ Menopause (2)
- ☐ Climacteric (3)
- ☐ I don't know (4)

Q4 How would you classify yourself?

- ☐ Professional singer (1)
- ☐ Amateur singer (2)

Q5 How long have you been singing?

- ☐ Less than 1 year (1)
- ☐ 1 - 4 years (2)
- ☐ 5 - 10 years (3)
- ☐ More than 10 years (4)



Q6 What voice type do you consider yourself?

- ☐ High Soprano (1)
- ☐ Soprano (2)
- ☐ Mezzo-Soprano (3)
- ☐ Contralto (4)
- ☐ I don't know (5)

Q7 Do you sing (please tick all that apply)

- ☐ Solo (1)
- ☐ In a small ensemble (2)
- ☐ As part of a choir/chorus (3)

Q8 How often do you rehearse with others (i.e in a choir or with a pianist)?

- ☐ Less than once a week (1)
- ☐ 1 -2 times a week (2)
- ☐ 3 -5 times a week (3)
- ☐ More than 5 times a week (4)

Q9 How often do you practice alone?

- ☐ Less than once a week (1)
- ☐ 1 - 2 times a week (2)
- ☐ 3 - 5 times a week (3)
- ☐ More than 5 times a week (4)
- ☐ I don't practice alone (5)

Q10 **BEFORE** Menopause, what type of repertoire did you normally sing?

- ☐ Opera (1)
- ☐ Classical (2)
- ☐ Choral (3)
- ☐ Jazz (4)
- ☐ Musical Theatre (5)
- ☐ Pop/Rock (6)
- ☐ Folk (7)
- ☐ Other (please specify) (8) \_\_\_\_\_

Q11 Has this changed since Menopause started?

☐ Yes (1)

☐ No (2)

☐ Comments (3) \_\_\_\_\_

Q12 **BEFORE** Menopause, were you taking singing lessons?

☐ Yes (1)

☐ No (2)

Q13 If yes, how often did you have lessons?

☐ Once a week (1)

☐ Every two weeks (2)

☐ Every month (3)

☐ Other (please specify) (4) \_\_\_\_\_

Q14 Are you still taking singing lessons?

☐ Yes (1)

☐ No (2)

Q15 If you were not taking singing lessons before Menopause started, have you taken up singing lessons after Menopause started?

☐ Yes (1)

☐ No (2)

Q16 If yes, how often do you have lessons?

☐ Once a week (1)

☐ Every two weeks (2)

☐ Every month (3)

☐ Other (please specify) (4) \_\_\_\_\_

Q17 Are you still taking singing lessons?

☐ Yes (1)

☐ No (2)

Q18 If you have not taken singing lessons, why not?

☐ Please explain (1) \_\_\_\_\_

Q19 **PRIOR** to the onset of Menopause, did you suffer from any of the following:

- ☐ Difficulties in the upper range (1)
- ☐ Difficulties in the middle range (2)
- ☐ Difficulties in the lower range (3)
- ☐ Flexibility and agility (4)
- ☐ Breath management (5)
- ☐ Projection (power) (6)
- ☐ Stamina (7)
- ☐ Changes in vibrato (8)
- ☐ Pitch (9)
- ☐ Cracking (10)
- ☐ Dryness (11)
- ☐ Throat clearing (12)
- ☐ Raspy voice quality (13)
- ☐ Changes in vocal quality (14)
- ☐ Changes in vocal colour (15)
- ☐ Other (please specify) (16) \_\_\_\_\_

Q20 To what degree did you experience these symptoms before Menopause?

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Difficulties in the upper range (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the middle range (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the lower range (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility and agility (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breath management (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projection (power) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stamina (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vibrato (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pitch (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cracking (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dryness (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Throat clearing (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raspy voice quality (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal quality (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal colour (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21	Other (please specify) (16)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**AFTER** the onset of Menopause, have you experienced any of the following:

- ☐ Difficulties in the upper range (1)
- ☐ Difficulties in the middle range (2)
- ☐ Difficulties in the lower range (3)
- ☐ Flexibility and agility (4)
- ☐ Breath management (5)
- ☐ Projection (power) (6)
- ☐ Stamina (7)
- ☐ Changes in vibrato (8)
- ☐ Pitch (9)
- ☐ Cracking (10)
- ☐ Dryness (11)
- ☐ Throat clearing (12)
- ☐ Raspy voice quality (13)
- ☐ Changes in vocal quality (14)
- ☐ Changes in vocal colour (15)
- ☐ Other (please specify) (16) \_\_\_\_\_



Q22 To what degree did you experience these symptoms after Menopause?

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Difficulties in the upper range (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the middle range (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the lower range (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility and agility (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breath management (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projection (power) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stamina (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vibrato (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pitch (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cracking (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dryness (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Throat clearing (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raspy voice quality (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal quality (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal colour (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q23 If you experienced any vocal changes **AFTER** Menopause started, when did you first notice these changes?

- ☐ Less than 3 months (1)
- ☐ 3 - 5 months (2)
- ☐ 6 - 11 months (3)
- ☐ 12 - 18 months (4)
- ☐ More than 18 months (5)
- ☐ I don't know (6)
- ☐ Other (please specify) (7) \_\_\_\_\_

Q24 How long have the vocal changes lasted for?

- ☐ Less than 6 months (1)
- ☐ 7 - 11 months (2)
- ☐ 12 - 18 months (3)
- ☐ More than 18 months (4)
- ☐ I don't know (5)
- ☐ Other (please specify) (6) \_\_\_\_\_

Q25 Have you read any material on singing and the Menopause?

- ☐ Yes (1)
- ☐ No (2)
- ☐ If yes, please indicate the publication (3)  
\_\_\_\_\_

Q26 Did you find the information useful?

- ☐ Yes (1)
- ☐ No (2)
- ☐ Not relevant (3)

Q27 During Menopause have you ever experienced any of the following symptoms?

- ☐ Hot flashes/flushes (1)

- ☐ Night sweats (2)
- ☐ Lack of confidence (3)
- ☐ Poor memory (4)
- ☐ Lack of concentration (5)
- ☐ Depression (6)
- ☐ Anxiety (7)
- ☐ Tiredness (8)
- ☐ Headaches (9)
- ☐ Insomnia (10)
- ☐ Weight gain (11)
- ☐ Mood swings (12)
- ☐ Irritability (13)
- ☐ Digestion problems (14)
- ☐ Fatigue (15)
- ☐ Mental clarity (16)
- ☐ Other (please specify) (17) \_\_\_\_\_

Q28 To what degree have you experienced these symptoms:

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Hot flashes/flushes (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Night sweats (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of confidence (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor memory (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of concentration (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Depression (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anxiety (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tiredness (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Headaches (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insomnia (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weight gain (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mood swings (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritability (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digestion problems (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fatigue (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mental clarity (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please  
specify) (17)

☐☐☐☐☐

Q29 Have you consulted your GP about your symptoms?

☐ Yes (1)

☐ No (2)

Q30 If not, why?

☐ Comment (1) \_\_\_\_\_

Q31 Have you discovered any other sources of professional help?

☐ Yes (1)

☐ No (2)

Q32 If yes, please provide details:

☐ Comment (1) \_\_\_\_\_

Q33 If you have not sought any other sources of professional help, why not?

☐ Please explain (1) \_\_\_\_\_

Q34 Are you currently taking any of the following medication or supplements to improve your symptoms?

- ☐ Hormone Replacement Therapy (HRT) (1)
- ☐ Hormone cream (2)
- ☐ Evening Primrose oil (3)
- ☐ Black Cohosh (4)
- ☐ St John's Wort (5)
- ☐ Omega 3 (6)
- ☐ Dong Quai (7)
- ☐ Ginseng (8)
- ☐ Other (please specify) (9) \_\_\_\_\_

Q35 Do you have any comments on whether any changes you have made to taking medication or supplements has affected your voice?

- ☐ Comment (1) \_\_\_\_\_



Q36 If you are not taking any medication or supplements, why not?

☐ Please explain (1) \_\_\_\_\_

Q37 Since Menopause started, have you made any changes to your diet?

☐ Yes (1)

☐ No (2)

Q38 If yes, have you made any of the following changes?

- ☐ Eating less meat (1)
- ☐ Eating more meat (2)
- ☐ Eating less fish (3)
- ☐ Eating more fish (4)
- ☐ Eating less sugar (5)
- ☐ Eating more sugar (6)
- ☐ Eating less fat (7)
- ☐ Eating more fat (8)
- ☐ Eating less dairy products (9)
- ☐ Eating more dairy products (10)
- ☐ Eating less processed foods (11)
- ☐ Eating more processed foods (12)
- ☐ Drinking less caffeinated drinks (including tea, coffee & fizzy drinks) (13)
- ☐ Drinking more caffeinated drinks (including tea, coffee & fizzy drinks (14)
- ☐ Drinking less alcohol (15)
- ☐ Drinking more alcohol (16)
- ☐ Drinking less water (17)
- ☐ Drinking more water (18)
- ☐ Other (please specify) (19)

Q39 Do you have any comments on whether any changes you have made to your diet has affected your voice?

☐ Comment (1) \_\_\_\_\_

Q40 Since Menopause started, how often do you exercise?

- ☐ Less than once a week (1)
- ☐ 1 - 2 times a week (2)
- ☐ 3 - 5 times a week (3)
- ☐ More than 6 times a week (4)

Q41 What type of physical activities do you do?

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Gym (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise classes (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yoga (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pilates (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Walking (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Swimming (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
None (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q42 Do you have any comments on whether any changes you have made to your activity levels has affected your voice?

☐ Comment (1) \_\_\_\_\_

Q43 Do you have any other comments relating to your voice and Menopause?

☐ Comments (1) \_\_\_\_\_

## **Appendix C: Study questionnaire.**

### **Menopause: The effects on the ageing female classical singer**

Q1 Do you live in England?

☐ Yes (4)

☐ No (5)

Q2 What is your age?

☐ Younger than 45 (1)

☐ 45 - 49 (2)

☐ 50 - 54 (3)

☐ 55 - 59 (4)

☐ 60 - 65 (5)

☐ Older than 65 (6)

Q3 Are you currently going through Menopause?

☐ Yes (1)

☐ No (2)

☐ I don't know (3)

Q4 If you answer no to Q3, have you already been through Menopause?

☐ Yes (1)

☐ No (2)

Q5 Do you know what stage of Menopause you are in?

☐ Perimenopause (1)

☐ Menopause (2)

☐ Climacteric (3)

☐ I don't know (4)

Q6 How would you classify yourself?

☐ Professional singer (someone who is paid to sing) (1)

☐ Amateur singer (2)

Q7 How long have you been singing?

☐ Less than 1 year (1)

☐ 1 - 4 years (2)

☐ 5 - 10 years (3)

☐ More than 10 years (4)

Q8 **BEFORE** Menopause, what voice type did you consider yourself?

- ☐ Coloratura Soprano (C4-F6) (1)
- ☐ Soprano (C4-C6) (2)
- ☐ Mezzo-Soprano (B3-B5) (3)
- ☐ Contralto (F3-C5) (4)
- ☐ I don't know (5)

Q9 **AFTER** Menopause started, what voice type do you now consider yourself?

- ☐ Coloratura Soprano (C4-F6) (1)
- ☐ Soprano (C4-C6) (2)
- ☐ Mezzo-Soprano (B3-B5) (3)
- ☐ Contralto (F3-C5) (4)
- ☐ I don't know (5)
- ☐ Not changed voice type (6)

Q10 Do you sing (please tick all that apply):

- ☐ Solo (1)
- ☐ In a small ensemble (2)
- ☐ As part of a choir/chorus (3)

Q11 How often do you rehearse with others (i.e in a choir or with a pianist)?

- ☐ Less than once a week (1)
- ☐ 1 -2 times a week (2)
- ☐ 3 -5 times a week (3)
- ☐ More than 5 times a week (4)

Q12 How often do you practice alone?

- ☐ Less than once a week (1)
- ☐ 1 - 2 times a week (2)
- ☐ 3 - 5 times a week (3)
- ☐ More than 5 times a week (4)
- ☐ I don't practice alone (5)

Q13 **BEFORE** Menopause, what type of repertoire did you normally sing? (Please tick all that apply)

- ☐ Opera (1)
- ☐ Classical (2)
- ☐ Choral (3)
- ☐ Jazz (4)
- ☐ Musical Theatre (5)
- ☐ Pop/Rock (6)



☐ Folk (7)

☐ Gospel (8)

☐ Acapella (9)

☐ Other (please specify) (10) \_\_\_\_\_

Q14 Has this changed since Menopause started?

☐ Yes (1)

☐ No (2)

☐ Comments (3) \_\_\_\_\_

Q15 **BEFORE** Menopause, were you taking singing lessons?

☐ Yes (1)

☐ No (2)

Q16 If yes, how often did you have lessons?

☐ Once a week (1)

☐ Every two weeks (2)

☐ Every month (3)

☐ Other (please specify) (4) \_\_\_\_\_

Q17 Are you still taking singing lessons?

☐ Yes (1)

☐ No (2)

Q18 If no, why not?

☐ Please explain (1) \_\_\_\_\_

Q19 If you were not taking singing lessons before Menopause started, have you taken up singing lessons after Menopause started?

☐ Yes (1)

☐ No (2)

Q20 If yes, how often do you have lessons?

☐ Once a week (1)

☐ Every two weeks (2)

☐ Every month (3)

☐ Other (please specify) (4) \_\_\_\_\_

Q21 Are you still taking singing lessons?

☐ Yes (1)

☐ No (2)

Q22 If not, why not?

☐ Please explain (1) \_\_\_\_\_

Q23 If you have not taken singing lessons, Before or After Menopause, why not?

☐ Please explain (1) \_\_\_\_\_

Q24 **PRIOR** to the onset of Menopause, did you suffer from any of the following:

☐ Difficulties in the upper range (1)

☐ Difficulties in the middle range (2)

☐ Difficulties in the lower range (3)

☐ Flexibility and agility (4)

☐ Breath management (5)

☐ Projection (power) (6)

☐ Stamina (7)

☐ Changes in vibrato (8)

☐ Pitch (9)

☐ Cracking (10)

☐ Dryness (11)

☐ Throat clearing (12)

☐ Raspy voice quality (13)

- ☐ Changes in vocal quality (14)
- ☐ Changes in vocal colour (15)
- ☐ None of the above (16)
- ☐ Other (please specify) (17) \_\_\_\_\_

Q25 To what degree did you experience these symptoms before Menopause?

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Difficulties in the upper range (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the middle range (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the lower range (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility and agility (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breath management (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projection (power) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stamina (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vibrato (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pitch (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cracking (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dryness (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Throat clearing (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raspy voice quality (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal quality (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal colour (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q26 **AFTER** the onset of Menopause, have you experienced any of the following:

- ☐ Difficulties in the upper range (1)
- ☐ Difficulties in the middle range (2)
- ☐ Difficulties in the lower range (3)
- ☐ Flexibility and agility (4)
- ☐ Breath management (5)
- ☐ Projection (power) (6)
- ☐ Stamina (7)
- ☐ Changes in vibrato (8)
- ☐ Pitch (9)
- ☐ Cracking (10)
- ☐ Dryness (11)
- ☐ Throat clearing (12)
- ☐ Raspy voice quality (13)
- ☐ Changes in vocal quality (14)
- ☐ Changes in vocal colour (15)
- ☐ None of the above (16)
- ☐ Other (please specify) (17) \_\_\_\_\_

Q27 To what degree did you experience these symptoms after Menopause?

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Difficulties in the upper range (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the middle range (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties in the lower range (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility and agility (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breath management (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Projection (power) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stamina (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vibrato (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pitch (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cracking (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dryness (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Throat clearing (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raspy voice quality (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal quality (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in vocal colour (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q28 If you experienced any vocal changes **AFTER** Menopause started, when did you first notice these changes?

- ☐ Less than 3 months (1)
- ☐ 3 - 5 months (2)
- ☐ 6 - 11 months (3)
- ☐ 12 - 18 months (4)
- ☐ More than 18 months (5)
- ☐ I don't know (6)
- ☐ Other (please specify) (7) \_\_\_\_\_

Q29 How long have the vocal changes lasted for?

- ☐ Less than 6 months (1)
- ☐ 7 - 11 months (2)
- ☐ 12 - 18 months (3)
- ☐ More than 18 months (4)
- ☐ I don't know (5)
- ☐ Other (please specify) (6) \_\_\_\_\_

Q30 Have you read any material on singing and the Menopause?

- ☐ Yes (1)
- ☐ No (2)

☐ If yes, please indicate the publication (3)

Q31 Did you find the information useful?

☐ Yes (1)

☐ No (2)

☐ Not relevant (3)

Q32 During Menopause have you ever experienced any of the following symptoms? (please tick all that apply)

☐ Hot flashes/flushes (1)

☐ Night sweats (2)

☐ Lack of confidence (3)

☐ Poor memory (4)

☐ Lack of concentration (5)

☐ Depression (6)

☐ Anxiety (7)

☐ Tiredness (8)

☐ Headaches (9)

☐ Insomnia (10)

☐ Weight gain (11)

☐ Mood swings (12)

- ☐ Irritability (13)
- ☐ Digestion problems (14)
- ☐ Fatigue (15)
- ☐ Mental clarity (16)
- ☐ Other (please specify) (17) \_\_\_\_\_

Q33 To what degree have you experienced these symptoms:

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Hot flashes/flushes (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Night sweats (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of confidence (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor memory (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of concentration (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Depression (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anxiety (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tiredness (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Headaches (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insomnia (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weight gain (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mood swings (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritability (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digestion problems (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fatigue (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mental clarity (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please  
specify) (17)

☐☐☐☐☐

Q34 Have you consulted your GP about your symptoms?

☐ Yes (1)

☐ No (2)

Q35 If not, why?

☐ Please explain (1) \_\_\_\_\_

Q36 Have you discovered any other sources of professional help?

☐ Yes (1)

☐ No (2)

Q37 If yes, please provide details:

☐ Comment (1) \_\_\_\_\_

Q38 If you have not sought any other sources of professional help, why not?

☐ Please explain (1) \_\_\_\_\_

Q39 Are you currently taking any of the following medication or supplements to improve your symptoms? (please tick all that apply)

- ☐ Hormone Replacement Therapy (HRT) (1)
- ☐ Hormone cream (2)
- ☐ Evening Primrose oil (3)
- ☐ Black Cohosh (4)
- ☐ St John's Wort (5)
- ☐ Omega 3 (6)
- ☐ Dong Quai (7)
- ☐ Ginseng (8)
- ☐ None of the above (9)
- ☐ Other (please specify) (10) \_\_\_\_\_

Q40 Do you have any comments on whether any changes you have made to taking medication or supplements has affected your voice?

☐ Comment (1) \_\_\_\_\_

Q41 If you are not taking any medication or supplements, why not?

☐ Please explain (1) \_\_\_\_\_

Q42 Since Menopause started, have you made any changes to your diet?

☐ Yes (1)

☐ No (2)

Q43 If yes, have you made any of the following changes? (Please tick all that apply)

☐ Eating less meat (1)

☐ Eating more meat (2)

☐ Eating less fish (3)

☐ Eating more fish (4)

☐ Eating less sugar (5)

☐ Eating more sugar (6)

☐ Eating less fat (7)

☐ Eating more fat (8)

☐ Eating less dairy products (9)

☐ Eating more dairy products (10)

☐ Eating less processed foods (11)

☐ Eating more processed foods (12)

☐ Drinking less caffeinated drinks (including tea, coffee & fizzy drinks) (13)

☐ Drinking more caffeinated drinks (including tea, coffee & fizzy drinks) (14)

- ☐ Drinking less alcohol (15)
- ☐ Drinking more alcohol (16)
- ☐ Drinking less water (17)
- ☐ Drinking more water (18)
- ☐ Other (please specify) (19)

Q44 Do you have any comments on whether any changes you have made to your diet has affected your voice?

☐ Comment (1) \_\_\_\_\_

Q45 Since Menopause started, how often do you exercise?

- ☐ Less than once a week (1)
- ☐ 1 - 2 times a week (2)
- ☐ 3 - 5 times a week (3)
- ☐ More than 6 times a week (4)



Q46 What type of physical activities do you do?

	Never (1)	Rarely (2)	Sometimes (3)	Frequently (4)	Always (5)
Gym (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise classes (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yoga (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pilates (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Walking (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Swimming (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cycling (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q47 Do you have any comments on whether any changes you have made to your activity levels has affected your voice?

☐ Comment (1) \_\_\_\_\_

Q48 Do you have any other comments relating to your voice and Menopause?

☐ Comments (1) \_\_\_\_\_

## Appendix D: Study results.

SECTION 1				
General Participant Information				
			Professional	Amateur
Q1.	Do you live in England?	Yes	10	17
		No	0	0
Q2.	What is your age?	Younger than 45	1	0
		45 - 49	0	1
		50 - 54	2	3
		55 - 59	2	7
		60 - 65	3	1
		Older than 65	2	5
Q3.	Are you currently going through Menopause?	Yes	2	2
		No	8	15
		I don't know		
Q4.	If you answered no to Q3, have you already been through Menopause?	Yes	8	15
		No	0	0
Q5.	Do you know what stage of Menopause you are in?	Perimenopause	2	
		Menopause	1	1
		Climacteric	0	1
		I don't know	7	11

SECTION 2				
General Vocal Information				
			Professional	Amateur
Q6.	How would you classify yourself?	Professional	10	0
		Amateur	0	17
Q7.	How long have you been singing?	Less than 1 year	0	0
		1 - 4 years	0	1
		5 - 10 years	0	1
		More than 10 years	10	15
Q8.	BEFORE Menopause, what voice type did you consider yourself?	Coloratura Soprano (C4-F6)	0	1
		Soprano (C4-C6)	8	9
		Mezzo-Soprano (B3-B5)	3	4
		Contralto (F3-C5)	0	2
		I don't know	0	0
Q9.	AFTER Menopause started, what voice type do you now consider yourself?	Coloratura Soprano (C4-F6)	0	0
		Soprano (C4-C6)	4	6
		Mezzo-Soprano (B3-B5)	3	7
		Contralto (F3-C5)	1	1
		I don't know	0	0

		Not changed voice type	3	2
Q10.	Do you sing (please tick all that apply):	Solo	10	9
		In a small ensemble	9	8
		As part of a choir/chorus	8	11
			Professional	Amateur
Q11.	How often do you rehearse with other (i.e. in a choir or with a pianist)?	Less than once a week	4	4
		1 -2 times a week	6	11
		3 - 5 times a week	1	1
		More than 5 times a week	0	1
Q12.	How often do you practice alone?	Less than once a week	2	7
		1 - 2 times a week	4	4
		3 - 5 times a week	4	3
		More than 5 times a week	1	1
		I don't practice alone	0	2
Q13.	BEFORE Menopause, what type of repertoire did you normally sing? (please tick all that apply)	Opera	7	3
		Classical	2	12
		Choral	1	13
		Jazz	0	2
		Musical Theatre	0	5
		Pop/Rock	0	2
		Folk	2	4
		Gospel	0	0
		Acapella	2	7
		Other - Church music	0	1
		Other - light classical	0	1
		Other - contemporary music	0	1
		Other - community choir	0	1
		Other - didn't sing before Menopause	0	1
Q14.	Has this changed since Menopause started?	Yes	3	0
		No	8	17
		Comments - I now sing choral music	0	1
Q15.	BEFORE Menopause, were you taking singing lessons?	Yes	7	7
		No	4	10
Q16.	If yes, how often did you have lessons?	Once a week	2	2
		Every two weeks	1	0
		Every month	2	2
		Other - every six months	1	0
		Other - every few months	0	1
		Other - less than once a month	0	1
		Other - irregularly	0	1
		Other - I was teaching singing	1	0
	Other - whenever possible	1	0	
	Are you still taking singing lessons	Yes	2	2

Q17.		No	8	12
Q18.	If no, why not?	I'm happy with how my voice is working	1	0
		Time constraints	2	3
		Performing less	1	1
		Teacher availability	1	1
		Cost	1	2
		Laziness	1	0
			<b>Professional</b>	<b>Amateur</b>
		Have almost lost my voice	1	0
		Able to monitor own voice	1	0
Q19.	If you were not taking singing lessons before Menopause started, have you taken up singing lessons after Menopause started?	Yes	0	2
		No	6	12
Q20.	If yes, how often do you have lessons?	Once a week	0	1
		Every two weeks	0	1
		Every month	0	0
		Other - irregularly	0	1
		Other - whenever possible	0	1
		Other - N/A	0	1
Q21.	Are you still taking singing lessons	Yes	3	3
		No	6	7
Q22.	If not, why not?	Seen as unessential	1	0
		Time constraints	1	1
		I perform less now	0	1
		Age	0	1
		Cost	2	1
		Illness	1	0
		Voice teacher	1	0
Q23.	If you have not taken singing lessons, BEFORE or AFTER Menopause, why not?	Laziness	1	0
		Took lessons earlier in life/career	1	2
		Cost	0	2
		Time constraints	0	3
		Adequate training through ensemble/choir/chorus	0	3

SECTION 3				
Vocal Symptoms				
			Professional	Amateur
Q24.	Prior to the onset of	Difficulties in the upper range	3	5

	Menopause, did you suffer from any of the following:	Difficulties in the middle range	0					0				
		Difficulties in the lower range	1					1				
		Flexibility & Agility	1					2				
		Breath management	3					4				
		Projection (power)	0					1				
		Stamina	3					0				
		Changes in vibrato	0					0				
		Pitch	0					1				
			Professional					Amateur				
		Cracking	0					0				
		Dryness	1					0				
		Throat clearing	1					1				
		Raspy voice quality	0					0				
		Changes in vocal quality	0					0				
		Changes in vocal colour	0					0				
		None of the above	3					7				
		Other - Vocal damage resulting in surgery	1					0				
			Professional					Amateur				
			Never	Rarely	Sometimes	Frequently	Always	Never	Rarely	Sometimes	Frequently	Always
Q25.	To what degree did you experience these symptoms	Difficulties in the upper range	3	6	1	1	0	2	4	6	1	1
		Difficulties in the middle range	5	4	1	0	0	11	1	1	0	0
		Difficulties in the lower range	7	1	1	1	0	7	2	2	1	1

	before Menopause?	Flexibility and agility	4	3	2	1	0	2	6	3	1	0
		Breath management	4	4	2	0	0	1	5	6	2	0
		Projection (power)	6	3	1	0	0	2	4	6	1	0
		Stamina	5	2	2	1	0	4	4	4	0	0
		Changes in vibrato	7	3	0	0	0	8	3	3	0	0
		Pitch	9	1	0	0	0	6	3	4	0	0
		Cracking	9	1	0	0	0	5	7	1	0	0
		Dryness	2	7	0	0	0	6	5	1	0	0
		Throat clearing	2	5	3	0	0	7	5	1	1	0
		Raspy voice quality	8	1	1	0	0	8	4	0	0	0
			<b>Professional</b>					<b>Amateur</b>				
		Changes in vocal quality	6	3	0	0	0	5	6	3	0	0
		Changes in vocal colour	6	2	1	0	0	6	5	2	0	0
Q26.	AFTER the onset of Menopause, have you experienced any of the following:	Difficulties in the upper range	2					8				
		Difficulties in the middle range	0					1				
		Difficulties in the lower range	0					1				
		Flexibility & Agility	2					0				
		Breath management	0					1				
		Projection (power)	1					0				
		Stamina	3					0				
		Changes in vibrato	0					0				
		Pitch	0					0				
		Cracking	0					0				
		Dryness	1					1				
		Throat clearing	0					0				
		Raspy voice quality	0					0				
		Changes in vocal quality	0					1				
		Changes in vocal colour	1					0				

		None of the above	2					4				
		Other - No change	0					1				
			<b>Professional</b>					<b>Amateur</b>				
			<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Always</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Always</b>
Q27.	To what degree did you experience these symptoms after Menopause	Difficulties in the upper range	3	3	2	1	1	2	4	4	3	2
		Difficulties in the middle range	5	2	2	0	0	7	4	2	0	0
		Difficulties in the lower range	6	1	1	2	0	5	2	2	2	1
			<b>Professional</b>					<b>Amateur</b>				
		Flexibility and agility	4	2	2	1	0	2	2	4	2	0
		Breath management	4	2	1	1	0	1	3	6	3	0
		Projection (power)	5	2	2	0	0	2	1	9	0	0
		Stamina	4	1	3	0	0	4	1	5	0	0
		Changes in vibrato	4	2	1	1	0	7	2	4	0	0
		Pitch	6	2	0	0	0	4	4	3	1	0
		Cracking	7	0	1	0	0	6	4	2	1	0
		Dryness	1	5	1	1	0	7	2	3	1	0
		Throat clearing	1	4	3	0	0	7	3	3	1	0
		Raspy voice quality	7	0	1	0	0	6	2	2	2	0
		Changes in vocal quality	5	1	1	1	0	6	2	6	0	0
		Changes in vocal colour	5	1	1	1	0	6	1	5	0	0
		Other - Coughing	0	0	0	1	0	0	0	0	0	0
Q28.	If you experienced any vocal changes AFTER Menopause	Less than 3 months	1					0				
		3 - 5 months	0					2				
		6 - 11 months	0					0				
		12 - 18 months	0					0				
		More than 18 months	0					6				

	started, when did you first notice these changes	I don't know	0	0
		Other - Not changed	1	2
Q29.	How long have the vocal changes lasted for?	Less than 6 months	0	0
		7 - 11 months	1	1
		12 -18 months	0	1
		More than 18 months	4	5
		I don't know	0	0
		Other - N/A	0	2
Q31.	Have you read any material on singing and the Menopause?	Yes	1	0
		No	8	15
		If yes, please indicate the publication - General internet articles	1	0
Q31.	Did you find the information useful?	Yes	1	1
		No	0	0
		Not relevant	6	10

SECTION 4				
Menopause Symptoms				
			Professional	Amateur
Q32.	During Menopause have you ever experienced any of the following symptoms? (please tick all that apply)	Hot flushes/flashes	7	11
		Night sweats	6	12
		Lack of confidence	4	3
		Poor Memory	5	3
		Lack of concentration	5	2
		Depression	2	1
		Anxiety	5	2
		Tiredness	4	5



		Headaches	3					4				
		Insomnia	3					5				
		Weight gain	5					5				
		Mood swings	2					3				
		Irritability	2					3				
		Digestion problems	2					3				
		Fatigue	4					4				
		Mental clarity	4					2				
		Other - All of the above	1					0				
			Professional					Amateur				
			Never	Rarely	Sometimes	Frequently	Always	Never	Rarely	Sometimes	Frequently	Always
Q33.	To what degree have you experienced these symptoms:	Hot flashes/flushes	0	2	0	8	0	0	5	4	6	1
		Night sweats	1	1	0	7	0	0	3	4	7	0
		Lack of confidence	5	2	1	2	0	2	6	4	0	0
		Poor memory	1	3	5	2	0	2	5	4	1	0
		Lack of concentration	1	3	4	2	0	2	5	3	1	0
		Depression	4	2	3	1	0	8	2	2	0	0
		Anxiety	4	0	6	1	0	6	1	4	0	0
		Tiredness	0	3	3	5	0	2	3	4	3	0
		Headaches	2	5	2	2	1	3	3	3	1	1
Insomnia	1	2	3	3	1	2	5	1	2	1		

		Weight gain	0	2	3	3	1	4	1	3	6	0
		Mood swings	2	3	4	1	0	3	3	6	0	0
		Irritability	1	1	7	1	0	2	6	4	0	0
		Digestive problems	4	2	3	1	0	2	4	3	3	0
		Fatigue	2	2	3	3	1	2	2	6	2	0
		Mental clarity	2	3	3	2	0	4	2	4	0	0
Q34.	Have you consulted your GP about your symptoms?	Yes	3					7				
		No	6					9				
Q35.	If not, why?	Considered symptoms normal/natural	3					4				
		Felt unable to bother a GP	1					2				
		Negative GP experience	0					1				
		Still menstruation	0					1				
		Literature	0					1				
Q36.	Have you discovered any other sources of professional help?	Yes	3					3				
		No	6					11				
Q37.	If yes, please provide details	Literature sources	1					2				
		Voice professionals	1					1				
		Life coach	1					0				
			<b>Professional</b>					<b>Amateur</b>				
Q38.	If you have not sought any other sources of professional help, why not?	Considered symptoms normal/natural	2					7				
		Medical professional	0					1				
		Made lifestyle changes	1					0				
		Medication	0					1				
		Self-help	1					0				

SECTION 5		
Management/Treatment		
	Professional	Amateur

Q39.	Are you currently taking any of the following medication or supplements to improve your symptoms? (please tick all that apply)	Hormone Replacement Therapy (HRT)	0	3
		Hormone cream	1	0
		Evening primrose oil	0	1
		Black cohosh	0	0
		St John's wort	0	0
		Omega 3	1	0
		Dong Quai	0	1
		Ginseng	1	0
		None of the above	7	9
		Other - Testosterone	1	0
		Other - Guarana	0	1
		Other - Topical oestrogen as vaginal pessary	0	1
Q40.	Do you have any comments on whether any changes you have made to taking medication or supplements has affected your voice?	No noticeable change	1	4
Q41.	If you are not taking any medication or supplements, why not?	Feel able to manage symptoms	3	5
		Awaiting medical tests before being prescribed HRT	0	1
		Medical History of breast cancer	1	0
		Prefer not to take medication	1	2

SECTION 6				
General Health Information				
			Professional	Amateur
Q42.	Since Menopause started, have you	Yes	7	8
		No	2	6

	made any changes to your diet?			
Q43.	If yes, have you made any of the following changes? (please tick all that apply)	Eating less meat	5	3
		Eating more meat	0	0
		Eating less fish	0	0
		Eating more fish	3	3
		Eating less sugar	6	6
		Eating more sugar	0	0
		Eating less fat	1	1
		Eating more fat	0	1
		Eating less dairy products	2	1
		Eating more dairy products	0	1
		Eating less processed foods	3	5
		Eating more processed foods	0	0
		Drinking less caffeinated drinks (including tea, coffee & fizzy drinks)	2	1
			<b>Professional</b>	<b>Amateur</b>

		Drinking more caffeinated drinks (including tea, coffee & fizzy drinks)	0	0
		Drinking less alcohol	2	3
		Drinking more alcohol	0	0
		Drinking less water	1	0
		Drinking more water	6	6
		other - Wheat		1
Q44.	Do you have any comments on whether any changes you have made to your diet has affected your voice?	Drinking sufficient fluid is even more essential now than it was prior to Menopause	1	0
		No noticeable difference	2	1
		No changes but weight affected	0	1
Q45.	Since Menopause started, how often do you exercise?	Less than once a week	0	6
		1 ~ 2 times a week	5	2
		3 ~ 5 times a week	4	6
		More than 6 times a week	0	1

			Professional					Amateur				
			Never	Rarely	Sometimes	Frequently	Always	Never	Rarely	Sometimes	Frequently	Always
Q46.	What type of physical activities do you do?	Gym	6	1	1	2	0	13	1	0	0	0
		Exercise classes	7	2	0	2	0	7	3	2	1	0
		Yoga	5	3	0	2	0	10	2	2	1	0
		Pilates	6	2	2	0	0	8	1	2	2	0
		Running	5	1	4	2	0	8	2	4	0	0
		Walking	0	0	0	8	3	0	1	2	5	5
		Swimming	3	5	2	1	0	6	2	1	3	0
		Cycling	6	0	4	0	0	5	2	1	3	1
		Other - Horse Riding	0	0	0	0	1	0	0	0	0	0
		Other - Squash	0	0	1	0	0	0	0	0	0	0
		Other - Rowing	0	0	0	0	0	0	0	2	0	0
		Other - Dance	0	0	0	0	0	0	0	1	0	0
		Other - Gardening	0	0	0	0	0	0	0	0	1	0
		Other - Tai chi	0	0	0	0	0	0	0	1	0	0
Q47.	Do you have any comments on whether any changes you have made to your activity levels has affected your voice?	No noticeable change	0					3				
		Positively affected on voice	1					0				
		Positively effect on self	1					0				

SECTION 7				
<i>Additional Comments</i>				
			Professional	Amateur
Q48.	Do you have any other comments relating to your voice and Menopause?	I am taking Tamoxifen which stops me producing oestrogen altogether, and was very worried that my voice would be affected. I've been taking it for 8 months now and feel that my voice is actually in better shape than it was before the medication, which is a total surprise! I did take 8 months off work last year, which may have affected things.	1	0
		I feel more confident generally which I think makes up for my physical decline.	1	0
		More research into this would be great. A total holistic approach would be worthwhile, i.e. nutrition, fitness, mental well-being, appropriate vocal support.	1	0

		I don't think the Menopause has affected my voice. In fact, the Menopause has not in itself affected anything (other of course than my ability to bear children) as HRT does a wonderful job. I've been on it for 22 years.	0	1
		Getting older has made me less fretful about singing generally.	0	1