



Hormonal Changes During and After Pregnancy and Climacteric: An Insight in the Practical Experience and Perception of Voice Professionals

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“Our hormones allow us to be who we are. They allow us to feel and think, to love ourselves, to reproduce, to nourish ourselves, to defend ourselves, or to protect ourselves when we are attacked. To sleep and eat, to relax and push ourselves, to build muscle and keep bones strong.”¹

This quote of Harald J. Schneider aptly describes how hormones influence and control human life in many ways. It does not seem surprising that hormones also control our voices. Many medical studies in the recent past for instance showed the effects of steroids on the human voice.² The study of Kirgezen et al. detected receptors for sex steroid hormones on the vocal folds a few years ago.³ As voice teachers mutation in puberty is a very well known issue in the voice lessons especially with young men. The larynx, as a secondary sexual characteristic, responds to the onset of gonadal function at puberty. This causes the laryngeal skeleton to grow and the length and width of the vocal folds to increase. The female voice also changes during puberty and a smaller mutation (often by a third lower) takes place.⁴ After puberty, the female hormonal system differs significantly from the male hormonal system. It is much more complex due to the menstrual cycle which causes monthly hormonal fluctuations.⁵ These hormonal fluctuations have also effects on the female voice. In addition to vocal effects due to hormonal changes during the menstrual cycle, vocal effects during pregnancy, menopause, and when taking hormonal contraceptives have also been demonstrated in various studies.⁶ However there are not many studies regarding the female singing voice at the moment.

This research, which was carried out as part of a master thesis at the Mozarteum Salzburg, aimed on the one hand to show the importance of the experiences of professional female singers for research and on the other to obtain an overview of the current state of knowledge of female professional singers in the German-speaking area on the subject of hormones. Therefore a questionnaire was designed on „<https://www.soscisurvey.de>“⁷ which was online from January 12th to January 31st, 2022. In order to be able to participate in the survey the participants had to meet the following criteria: **female professional singers from all genres** (opera/opera, oratorio, jazz/pop, musical, ...) **and all professional groups** (soloists, choir singers, singing teachers at universities/colleges or at music schools) **with a completed professional singing training or currently studying** (private, university/college, ...). All in all 256 professional female singers participated and the data sets of 171 participants were usable for the analysis.⁸ The results showed that 71% percent of the women who completed the pregnancy part of the questionnaire perceived voice changes during their pregnancy. In detail the most changes were recognizable regarding the breath during pregnancy. For instance 42% of the women noted a “restriction of breathing” and another 40% said they had “difficulties with breath control” during pregnancy. However other changes were noticed. 20% of the professional singers questioned

also lost higher pitched notes and another 20% had a clearly lower singing voice during pregnancy.⁹

In the climacteric part 63% of the professional female singers who already were in their menopause reported voice changes during the climacteric period. As the most rated changes during climacteric “Loss of higher pitched notes” with 42% and “Faster voice fatigue” with 38% of all the participants were mentioned. A similar amount of participants (37%) felt a “reduced vocal flexibility” during menopause and 31% complained about a lower resilience of the singing voice in that time period.¹⁰

To find out more about how many professional singers have experienced negative consequences while singing during pregnancy and menopause, the following question was asked in the survey: “Which of your perceived voice changes had negative impact on your singing?”. The most surprising result was that, in pregnancy as well as in climacteric, less women perceived voice changes and negative consequences on their singing voice. This means that there are perceivable voice changes during these time periods, however, it does not automatically imply that these changes have negative consequences on the singing of the professional female singer.¹¹

In another part of the survey the participants could share their personal voice experiences during pregnancy and climacteric period. The outcome of these experiences matched with the quantitative results of the survey and there were also some interesting and new perspectives which did not emerge purely from the quantitative survey. This part of that study showed clearly how important it is also to consider the experiences from the singers. The experiences of professional female singers regarding the voice and hormones should be taken seriously and should be also purposive incorporated into research in the future.¹²

As already mentioned the knowledge of the participants about hormones and the female voice were also obtained in one part of the study. All in all the results showed that the professional female singers who took part in that study knew shockingly little about hormones and the female singing voice. Only 2-4% of all participants had a very good knowledge in all subject areas and the majority (over 50%) evaluated their knowledge as “insufficient.” Only in the specific topic hormones and the menstrual cycle the knowledge was a little bit higher rated. 90% of the participants in that study had their singing education at universities. In this context it seems important to show the role and the importance of the universities and educational institutions.

The results regarding education were clear: 63% of the participants noted that none of the topics questioned regarding voice and hormones were covered in their singing program and even 96% of all women wished for more education regarding hormones and the female singing voice.¹³

The outcome of that study showed clearly that “hormones and the female (singing) voice” is an important subject for professional singers. More education and preparation for all singers female and male (especially voice pedagogues) and at all ages are necessary. In the future courses and lessons at universities and also further education outside universities would be desirable. Furthermore more research in that area is required especially research which includes the experiences of professional singers.

Hormones and the female singing voice and also everything which comes with it should no longer be a taboo subject in the singing world. Let us make a change and inform as many people as possible about it!

¹ Harald J. Schneider, Nicola Jacobi, et al.: *Hormone-ihir Einfluss auf mein Leben: Wie kleine Moleküle Liebe, Gewicht, Stimmung und vieles mehr steuern.* (Berlin: Springer 2020), 294.

² J. Abitbol, P. Abitbol, et al., “Sex hormones and the female voice,” *Journal of Voice*, 13/3 (1999), 424–446; T. Kirgezen, A.V. Sunter, et al., “Sex Hormone Receptor Expression in the Human Vocal Fold Subunits,” *Journal of Voice* 4 (2017), 476-482; A. Nacci, B. Fattori, et al., “Sex hormone receptors in vocal fold tissue: a theory about the influence of sex hormones in the larynx,” *Folia Phoniatrica et Logopaedica* 63/2 (2011), 77-82; J.P. Rodney, R.T. Sataloff, “The Effects of Hormonal Contraception on the Voice: History of Its Evolution in the Literature,” *Journal of Voice* 30/6 (2016), 726-730.

³ T. Kirgezen, A.V. Sunter, et al., “Sex Hormone Receptor Expression in the Human Vocal Fold Subunits,” *Journal of Voice* 4 (2017), 476-482.

⁴ Günther Habermann, *Stimme und Sprache: Eine Einführung in ihre Physiologie und Hygiene Für Ärzte, Sängler Pädagogen und alle Sprechberufe.* (Stuttgart: Thieme 2003), p.146.

⁵ Harald J. Schneider, Nicola Jacobi, et al., *Hormone-ihir Einfluss auf mein Leben: Wie kleine Moleküle Liebe, Gewicht, Stimmung und vieles mehr steuern* (Berlin: Springer 2020).

⁶ Verónica L. Cassiraga, Andrea V. Castellano, et al., “Pregnancy and Voice: Changes During the Third Trimester,” *Journal of Voice* 26/5 (2012): 584-586; Evelien D’haeseleer, Herman Depypere, et al., “The menopause and the female larynx, clinical aspects and therapeutic options: a literature review,” *Maturitas*. 64/1 (2009): 27-32; Filipa Martins Baptista Lã and Johan Sundberg, “Pregnancy and the Singing Voice: Reports From a Case Study,” *Journal of Voice* 26/4 (2012), 431–439; Filipa Lã, William Ledger, et al., “The Effects of a Third Generation Combined Oral Contraceptive Pill on the Classical Singing Voice,” *Journal of Voice* 21/6 (2007), 754-761; Anoop Raj, Bulbul Gupta, et al., “A study of voice changes in various phases of menstrual cycle and in postmenopausal women,” *Journal of Voice* 24/3 (2010), 363–368.

⁷ D.J. Leiner, SoSci Survey (Version 3.1.06) [Computer software] <https://www.sosicisurvey.de> (2019).

⁸ Isabella Runggaldier, “Die weibliche Singstimme: eine Studie über Erfahrungen, Wissen und Auswirkungen von hormonellen Veränderungen in Schwangerschaft, Klimakterium und bei der Einnahme von hormonellen Kontrazeptiva bei Berufssängerinnen im deutschen Sprachraum.” Masterthesis, Instrumental-und Gesangspädagogik.” Universität Mozarteum Salzburg, 2022.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

¹³ Ibid.