



Clinical

Snoring in Pregnancy: Risks, Reasons and Remedies

Tess Graham, Physiotherapist and Breathing Educator (<http://TessGraham.com>)



Breathing well to optimally oxygenate herself and her baby is one way a woman can increase her chances of a healthy pregnancy and healthy baby. Unfortunately, many women do not breathe optimally. One indicator of this is snoring. Snoring used to be considered

a male thing, but it is known that many women snore, including an increasing number of pregnant women. About one in four report frequent snoring during pregnancy and by the third trimester, up to one third of women may be habitual snorers (O'Brien, Bullough, Owusu, Tremblay, Incat, Chames et al., 2012).

Snorers are more likely to have problem pregnancies

A woman's breathing during pregnancy can affect not only her own health and wellbeing but also that of her baby. Research has suggested habitual snoring in pregnancy may be linked with increased risk of hypertension, pre-eclampsia, C-sections, low birth weight babies and low Apgar scores. Overall, habitual snoring during pregnancy was associated with double the risk for high blood pressure and more than three times the risk for decreased fetal

growth, compared with non-snorers. Chronic snorers are twice as likely to need a C-section. For some women, the snoring may be a symptom of obstructive sleep apnea (OSA), a serious condition where blood oxygen levels drop and sleep is disrupted many times at night through intermittent stoppages in breathing (Franklin, Jönsson, Holmgren, Poromaa & Stenlund, 2000).

Why do people snore?

Snoring can be related to weight gain, which is part of a normal pregnancy, however that does not make snoring in pregnancy normal. Along with weight gain, other risk factors such as nasal congestion, narrow nasal passages, small lower jaw, and alcohol consumption are often thought of as primary causes of snoring, but you can have some, or all of these risk factors and not snore, as well as have none and yet snore.

The factor that is invariably present with snoring and OSA (also referred to as *sleep disordered breathing* – SDB) is a dysfunctional baseline (awake and asleep) breathing pattern. Disordered or dysfunctional breathing is a general term to describe a physiologically abnormal respiratory pattern – that is, where the parameters of breathing are outside the accepted range or medical norms for breathing.

Snoring is fundamentally a dysfunctional breathing pattern.

Physiologic normal breathing

Physiologically normal breathing in adults is nasal, silent, slow, and rhythmic, as well as light and diaphragmatic (both awake and asleep). It is inaudible and virtually invisible. The adult norm for resting tidal volume is 400-600 mls /breath with a respiration rate of 8-12 breaths/min a minute volume of 4-6 L/min and an alveolar carbon dioxide tension (PaCO₂) at 40-46 mmHg (Vander, Sherman & Luciano, 1990).

When asleep, our metabolic rate is reduced and oxygen requirements are less. During normal physiological sleep, tidal and minute volumes reduce significantly in both REM (rapid eye movement) and non-REM sleep. CO₂ normally increases in sleep by 3-7 mmHg. That is, healthy breathers breathe less air when asleep than when awake (Anderson Price & McCarty Wilson, 1992).

Dysfunctional breathing

Dysfunctional breathing patterns are characteristic in the daytime as well as during sleep, in people with SDB. Breathing when awake and asleep, is controlled by the same chemoreceptors in the respiratory centre in the medulla (Graham, 2012).

The typical baseline dysfunctional breathing pattern is a combination of nose and mouth breathing, thoracic breathing, as well as heavy, audible, fast, and dysrhythmic breathing – with sighing, yawning and breath-holding in the day, and snoring, snorting, and apnea during sleep. The commonly overarching condition is hyperventilation or overbreathing.

Hyperventilation is classically defined as a condition in which the minute ventilation exceeds metabolic demands, and excessive quantities of CO₂ are exhaled, resulting in chronic or transient hypocapnia (low CO₂) and hemodynamic and chemical changes (Kern & Rosh, 2014).

Consequences of hyperventilation and hypocapnia

The noise of snoring is created by turbulence and the vibration of soft tissues in the throat – the more mls of air you breathe per second through your airway, the greater the turbulence and vibration. High velocity airflow also narrows the aperture of the glottis and increases resistance to airflow, increases negative pressure (suction) on the upper airway (Bernoulli Effect, Venturi Effect) and contributes to narrowing and collapse of the upper airway and OSA (Downey, 2012).

In addition, when you overbreathe the tissues lining your nasal passages and upper airway can get dehydrated, swollen and inflamed via histamine release from mast cell degranulation, further narrowing your airway. The consequences of hypocapnia includes narrowing of blood vessels, elevation of blood pressure, reduced tissue oxygenation (Bohr Effect), and anxiety states (Laffey & Kavanagh, 2002).

Breathing physiology during pregnancy

Significant changes in respiratory physiology are normal during pregnancy. Minute ventilation increases to 50% above non-pregnant level at term. Oxygen consumption and CO₂ production increase 20-30% by the third trimester, necessitating increased minute ventilation to maintain normal acid base status. In addition, progesterone directly stimulates the central respiratory centre causing a further increase in minute ventilation. The net effect is a mild chronic respiratory alkalosis (slightly elevated pH) and a decrease in the arterial PaCO₂ of up to 10mmHg. As such a degree of hyperventilation is normal in pregnancy.

If a woman already has a degree of hyperventilation/hypocapnia pre-pregnancy as a consequence of, habitual mouth breathing or snoring, chronic anxiety, or asthma then, a further increase in minute ventilation during pregnancy, particularly if exaggerated by heavier snoring, increased stress levels or anxiety, may have adverse effects on the fetus such as decreased fetal oxygen tension, increased base deficit, lower Apgar scores, and delayed onset of rhythmic neonatal breathing

Hypocapnia affects tissue oxygenation, blood chemistry, metabolism, and function of the smooth-muscle of the gastrointestinal tract, so can also impact nutrient absorption and utilisation. This may have implications for mineralisation, bone formation, and skeletal development amongst other things. Hypocapnia is also a consistent feature of systemic inflammatory response (Laffey & Kavanagh, 2002).

Remedies

It is very important when there is evidence or concern regarding snoring and sleep apnea that a woman see her doctor to determine whether (further) medical evaluation is necessary and to discuss treatment options. The most common treatment is CPAP (continuous positive airway pressure) - a machine that uses air pressure to keep the airways open during sleep. CPAP can be highly effective in improving sleep quality and co-morbidities, but this treatment may not always be acceptable or tolerable for the person. Dental devices (e.g., mandibular advancement splints) may be another option. There are various medications (e.g., nasal sprays) and surgical procedures for snorers, but these do not always work and may not be appropriate in pregnancy.

Fortunately breathing retraining can help reduce nasal congestion, restore nasal breathing, and establish optimal posture and optimal use of the breathing muscles. It aims to establish breath control and efficiency, as well as an appropriate rate and volume of breathing during rest, sleep, speech and exercise, as well as when under stress. An improvement in symptoms, sleep quality, and general wellbeing is usually observed within the first 24 hours.

An experienced and knowledgeable breathing educator understands the special breathing physiology of pregnancy and adapts the training appropriately. Improving breathing should be comfortable, gradual, and easily applied into everyday life. Improved baseline breathing and breath

control are also valuable during labour and birthing.

Breathing retraining is substantially different from deep, diaphragm/abdominal breathing techniques.

Breathing retraining is a natural and science-based approach to the management of breathing disorders, but is often overlooked. Unfortunately, assessment of baseline breathing pattern is not part of a standard evaluation in pregnancy and for SDB, and so dysfunctional breathing remains under-diagnosed and under-treated.

Breathing retraining is complementary to pharmaceutical and appliance-based treatments. Achieving and maintaining physiological normal breathing is a preventative health initiative beyond measure.

Suggestions to reduce the likelihood or intensity of snoring

- Breathe through your nose during the day whenever it is comfortable to do so, or breathe more gently through your mouth when you cannot manage nose-breathing.
- Avoid any activity that makes you breathe heavily, puffing and panting through your mouth.
- Sleep on your side.

- Elevate your upper body slightly (not just your head) in bed, by putting a rise between mattress and base, or use a special wedge-shaped pillow.
- Try not to gain more than the recommended amount of weight.

Breathing Retraining - You can change the way you breathe.

References

- Anderson Price, S. & McCarty Wilson, L. (1992). *Physiology of Disease Processes*. 4th ed. St Louis: Mosby Year Book Inc.
- Downey R. (2012). *Obstructive sleep apnea*. Retrieved from <http://emedicine.medscape.com/article/295807>
- Franklin, K., Jönsson, F., Holmgren, P., Poromaa, N., & Stenlund, H. (2000). Snoring, pregnancy-induced hypertension, and growth retardation of the fetus. *Chest*, 117,137-141.
- Graham T. (2012). *Relief from Snoring and Sleep Apnoea*. Camberwell, VIC: Penguin Australia.
- Kern, B. & Rosh, A. (2014). *Hyperventilation syndrome*. Retrieved from <http://emedicine.medscape.com/article/807277-overview>
- Laffey, J. & Kavanagh, M. (2002). Hypocapnia. *N Engl J Med*; 347, 43-53.
- O'Brien, L., Bullough, A., Owusu, J., Tremblay, K., Incat, C., Chames, M., Kalbfleish, J., & Chervin, R. (2012). Pregnancy-onset habitual snoring, gestational hypertension, and preeclampsia: prospective cohort study. *Am J Obstet Gynecol*, 207 (6), 487, e1-9. doi: 10.1016/j.ajog.2012.08.034
- Vander, A., Sherman, J., & Luciano, D. (1990). *Human Physiology*. 5th ed. New York: McGraw Hill. ■

Obituary

Mercy Baafi 22/02/1948 - 16/10/2016

Moira Williamson and Ann Grieve, ACM Members



Mercy came to Australian midwifery from Ghana via the UK and USA. On arrival in Australia, Mercy worked as a midwife in secondary and tertiary hospitals in the Illawarra and Southern Sydney areas. After her tertiary studies, Mercy progressed to community midwifery and was a Senior Midwifery Educator and Honorary Teaching Fellow at the University of Wollongong.

Mercy was also a researcher, author, and presenter at numerous conferences. The joy and passion expressed at these events propelled many young midwives into research areas. Her passion for midwifery, as well as her mentoring and leadership inspired students at both the Wollongong University and Central Queensland campuses to successful graduation.

Mercy was a member of the Australian College of Midwives NSW Branch for over 20 years, during which time she provided valuable service to the Branch in a number of areas. For instance, she was an active member of the ACM

NSW history and archives committee. Mercy was also a very effective fundraiser amongst other things, working to sell raffle tickets to raise funds for scholarships to send midwives to conferences. Her distinctive personality and happy expectation made it impossible for people to say no to her!

2001 saw Mercy become a Fellow of the Australian College of Midwives. In 2010, she was awarded Life Membership of the Australian College of Midwives, which was one of the proudest moments in her professional life.

Her generosity and Christian charity extended to many a student function with her Ghanaian cooking as she ran the 'Hottentot Kitchen' as she liked to call it! Her joy of dancing was often seen as she danced in her national dress to her favourite Ghanaian high life music. Mercy lived life as a beautiful, true and faithful Christian.

Australian Midwifery will miss an exceptional educator and role model. Mercy's joy and passion for midwifery will live on through her much-loved students.

Our condolences and love are with her husband Ernest, sons Ryan and Jason. ■