



Improving the Quality of Life of Women Living with Asthma: A Clarion Call for Nurse Entrepreneurs (Nursepreneuers)

Chukwu Chinenye Chituru Chichi^{1*}, Oladapo Rasheed Olawale², Gbekumo Gloria³, Ozu Obhosamologi Frederick³

¹Department of Nursing, Madonna University, Elele 511101, Rivers, Nigeria

²School of Nursing, Babcock University, Joseph Vavrineck Rd, Ilishan-Remo 121103, Ogun State, Nigeria

³Fedreal University Otuoke, Federal University, Iga, Otuoke 562103, Bayelsa, Nigeria

*Corresponding Author

Chukwu Chinenye Chituru Chichi

Department of Nursing, Madonna University, Elele 511101, Rivers, Nigeria

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Abstract: Asthma is a chronic lung disease with episodes of wheezing, breathlessness, tightness in the chest, or coughing etc. Among the general population, asthma prevalence is higher in women than men. However, several clinical studies point to distinctive changes in the prevalence and severity of asthma with age. Male children have asthma more frequently. However, in and around the time of puberty, there is a reversal of this incidence and a female predominance exists. Women with asthma may have more symptoms during certain times in the menstrual cycle and it may cause problems also during pregnancy. Evidence from several studies suggests the role of anatomical structure and sex hormones in exacerbation of asthma in females. With the knowledge of the role of anatomical structure and hormones of adult female in asthma flare-ups, exacerbation and quality of life, it should be assumed that there should be a clear difference in the management of asthma in the both genders. However, this is not so, as there is no difference in the management of asthma in male and female. There is need for policy making that will enhance the quality of life of female living with asthma and need for nursepreneuers to take up this challenge of relieving the burden of adult female living with asthma through social support by establishing female base asthma organizations or liaising with existing ones to establish a female unit that will improve the quality of life of adult females living with asthma.

Keywords: Asthma, women, entrepreneur, quality of life, management.

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INTRODUCTION

Accumulating evidence suggests that gender impacts the incidence, susceptibility and severity of several lung diseases. It also influences lung development and physiology (Michelle *et al.*, 2017). Though it is largely unrecognized that the impacts of asthma in men are different in female asthma suffers. This has impacted negatively on the outcome of adult female living with asthma as Clinicians tend to manage asthma in men and women in the same way

not paying attention to the burden nature imposes on women living with asthma (Science daily, 2017). Women are twice as likely as men to have asthma, and this gender difference is as a result of female respiratory anatomical structure (Zein & Erzurum, 2015), and effect of female sex hormones on lung cells, female sex hormones also play a vital role (Almqvist *et al.*, 2018). Asthma is particularly challenging for women compared with men; women are more likely to have severe asthma with poor

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quality of life (Chhabra, 2015). Part of the problem is that female biology makes breathing harder—normally and at all ages—than does male biology. Women have smaller lungs, smaller airways, and smaller breathing muscles. They also have smaller rib cages, which limits the amount of air that can enter the lungs, and smaller chest wall muscles. These differences affect air flow, lung volume, and the amount of effort required to breathe (Torres-Tamayo *et al.*, 2018).

On the other hand, researchers have found that testosterone hindered an immune cell linked to asthma symptoms, such as inflammation and mucus production in the lungs of men. Dawn Newcomb, of the Vanderbilt University Medical Center stated that testosterone was more important in reducing inflammation (Science daily, 2017). Prior to puberty, boys have approximately 1.5 times higher rate of asthma than girls. However, this trend is reversed after puberty, when women are twice likely to have asthma as men. This pattern continues until women hit menopause, and then the asthma rates in women start to decline (Science daily, 2017).

Up to 40% of female living with asthma report perimenstrual worsening of asthma (Rao *et al.*, 2013). Many studies link deviations in levels of progesterone and/or estrogen to premenstrual asthma. For example, Rubio and colleagues examined the blood concentrations of estradiol, progesterone and cortisol on the 5th day and 21st day of the menstrual cycle and found that at least one hormone was out of range in 80% of the female living with asthma (Shah & Newcomb, 2018). Other studies have linked sex hormones with premenstrual asthma via their effects on cells and cytokines involved in inflammation and the asthmatic response. A limited number of studies have associated oral contraceptive or exogenous estrogen use with improvement in lung function and asthma symptoms. One theory suggested to explain this beneficial effect is that hormonal contraceptives reduce the degree of hormonal fluctuation during the menstrual period thereby eliminating the cyclical fluctuations in lung function and symptomology (Shah & Newcomb, 2018).

Although during pregnancy most women with Asthma tend to have less asthma flare-ups, many as 20% of women with asthma have exacerbations which require medical intervention during pregnancy (Science daily, 2017). The transition to menopause—called *perimenopause*—begins around age 45. During this time, women experience changes in the length, frequency, and severity of their periods. Because of fluctuations in estrogen and progesterone levels, women with

asthma often see an increase in asthma symptoms and severity (Shah & Newcomb, 2018). The changing peaks and valleys in women's hormones can trigger inflammation in the lungs. The good news is that once menopause takes place, the reduction in female hormone levels often leads to fewer and less severe asthma symptoms. Hence when women hit menopause, the asthma rates in women start to decline (Science daily, 2017), contrarily many women experience asthma symptoms for the first time around age 50 or older. Generally, asthma tends to be more severe in women who are diagnosed with asthma at over age 65, and they have higher death rates than the general population. Women in this age group are also twice as likely as men to visit emergency departments, and they have the highest rate of hospitalizations for asthma of any group. This is so because, older women are at risk for negative effects from inhaled corticosteroids (ICSs) (Shah & Newcomb, 2018). Depression can also be a challenge for older women with asthma. This can contribute to worse asthma control, lower quality of life, and less adherence taking controller medications.

Adequate understanding of how to live well with asthma will improve the quality of life of adult females living with asthma. This can only be achieved by proper health education and proper follow up of female living with asthma by establishing adult female organizations or collaborating with existing asthma organizations to create female unit of asthma organization as this is non-existence as of present. Hence the call for nursepreneurs to fill this management gap in order to improve the life quality of life of adult females living with asthma. This is also a call for the government to establish policies that will address this current care gap in asthma management.

Association between Asthma and Female Sex Hormone

The burden of asthma varies by age group and sex throughout the lifespan (Almqvist *et al.*, 2018). Many epidemiologic studies have reported sex-specific differences in asthma and asthma outcomes (Zein *et al.*, 2018).

Before age 18, boys are more likely to have asthma than girls. In fact, boys are twice as likely as girls to be hospitalized for an asthma exacerbation. But as puberty begins, there is a sex shift in asthma prevalence as male and female hormones kick in, the numbers shift—more women have asthma than men. This difference is likely associated with the male and female hormones (Chhabra, 2015). As boys reach puberty, testosterone increases, which reduces asthma reactions that lead to inflammation and mucus production in the lungs. Torres-Tamayo *et al.*,

2018) stated that conversely, estrogen and progesterone (the primary female hormones) have been shown to increase airway inflammation, leading to more asthma symptoms. It's not the female hormones themselves that trigger asthma symptoms. It's the fluctuation—the ups and downs—of these hormones that affects asthma at key points in a woman's life—puberty, periods, pregnancy, and perimenopause.

For about half of women who have asthma, asthma symptoms worsen right before (4 to 5 days) and during their periods (Shah & Newcomb, 2018). That's because estrogen and progesterone levels decrease to their lowest levels in the reproductive cycle the final week before your period (Paulo, 2017). Chhabra, (2015) opined that estimated 19–40% of women experience worsening of asthma symptoms in relation to the menstruation, defined as perimenstrual asthma. The decline in female hormones narrows the airways or affects cells in the immune system, which can cause an asthma attack. (Marta *et al.*, 2021), concluded that most hospitalizations for women with asthma happen in the days before their periods begin.

Pregnancy and Asthma

Healthy baby development relies on oxygen delivered to the fetus from the mother's bloodstream. That means women with asthma who are pregnant need to keep their airways open and their breathing clear to ensure that the fetus gets sufficient oxygen. Zein and Erzurum (2015), concluded that fortunately, asthma affects only about 4% to 8% of pregnant women, it is also important to state that asthma in pregnancy is unpredictable. For about one-third of this group, asthma symptoms worse as almost half of pregnant women with asthma have an asthma attack during their pregnancy (Zein & Erzurum, 2015). Its exacerbation occurs during weeks 24 to 34 (Torres-Tamayo *et al.*, 2018). In another third, asthma symptoms stay the same. For another third, asthma symptoms improve, this could be as a result of the anatomical structure of the female rib cage. The higher volume capacity of the rib cage of females in relationship to the size of their lungs, which is well suited to accommodate the increased abdominal distension caused by pregnancy. In this way, the effects on lung function and abdominal pressure of the enlarging uterus may be minimized (Zein & Erzurum, 2015). Poorly controlled asthma during pregnancy carries risks. Mothers with uncontrolled asthma are more likely to develop complications, including:

- Pre-eclampsia (dangerously high blood pressure)
- High blood pressure
- Higher rate of C-section (cesarean delivery)

- Preterm or premature birth
- Low birth weight for the baby
- Bleeding during pregnancy
- Bleeding after giving birth
- Anemia
- Blood clots to the lungs (Murphy, 2016)

Though most asthma medications are safe to take during pregnancy, keeping asthma controlled during pregnancy requires careful monitoring. About 10% of women with asthma have symptoms during labor and delivery, but an asthma attack is very rare. Hence the need to have your medications on hand during labor and delivery. Research has shown that women who experience changes in their asthma during pregnancy—either worsening or improving—generally go back to their pre-pregnancy asthma levels within 3 months of birth. It is also safe to use both quick-relief and controller inhalers while breastfeeding (Murphy, 2016).

Analysis of Male and Female Living with Asthma

- Adult females are more likely to have asthma than adult men—9.8% of women in the United States have asthma, compared with 6.1% of men.
- Adult female visits the doctor for asthma twice as much as men do each year and go to the emergency department for asthma problems more often than men.
- Women are more likely than men to have uncontrolled asthma.
- Women are more likely to be hospitalized for asthma than men.
- Women have a higher death rate than men due to asthma (Fuseini & Newcomb, 2017).

The Difference in Respiratory Anatomical Structure of Man and Woman

At birth, female has smaller lungs than male with fewer respiratory bronchioles. The sex-related differences in lung growth persist from childhood to adulthood (Hirose, 2010). The fact that men have bigger lungs than women have been shown using different approaches: standard morphometric methods, chest radiographs and three-dimensional geometric morphometric methods on computed tomography scans (García-Martínez *et al.*, 2016). However, the number of alveoli per unit area, the number of alveoli per unit area volume, individual lung units and alveolar dimensions do not differ between males and females (Hirose, 2010).

The intrinsic elasticity of lung parenchyma is similar between sexes, whereas the recoil pressure differs because of the differences in lung size and in maximum distending forces. The shape of the lung differs between males and females, being more

pyramidal in male and more in female (Smith *et al.*, 2015). Women are characterized by a disproportionately smaller rib cage size than males. Specifically, the cross-sectional area, the internal anterior-posterior and the lateral diameters are lower at different lung volumes. Women show a rounder rib cage than men. The different thoracic configuration in females is also evidenced by a different relationship between rib cage cross-sectional area and the height of the diaphragm dome (Torres-Tamayo *et al.*, 2018).

The length of the diaphragm is shorter in females than males. The length of the diaphragm in the zone of apposition with the rib cage is smaller in females as well (Smith *et al.*, 2015). While the dome-shape factor on lateral projections is greater in females, the dome-shape factors on anterior-posterior films and the height of the dome of the diaphragm below the first thoracic vertebra are similar between males and females. The dome-shape factor is defined as the ratio between the length of visible contours and the length of chords intersecting the contours end-points on chest radiographs (Romei *et al.*, 2010).

Finally, an important sex-related difference characterizes the inclination of the ribs, with men's ribs being more horizontally oriented than those of females (Weaver & Schoell, 2014). This emerges both from quantification of the angle formed by the lower border of the sixth rib and the vertical on lateral films of chest radiographs and from the three-dimensional rib cage morphology using a semi-landmark approach for computed tomography reconstruction. Spinous processes are more horizontal in females and more caudal in males (Shi *et al.*, 2014). Such greater dorsal orientation of the transverse processes of men may reorient the ribs leading to greater radial ribcage diameters and this suggest the movement of the ribs to be predominantly "pump-handle" in women and "bucket-handle" type in men (Weaver & Schoell, 2014).

Nursepreneur Role in Improving the Quality of Life of Women Living with Asthma

In view of the role of anatomical and physiological female structure in asthma, it is imperative to state that there is a gap in asthma management in Nigeria. And this gap calls for social support.

Social support is defined as Support accessible to an individual through social ties to other individuals, groups, and the larger community (Primary Health Care, 2017). The term "social support" often appears in discussions of relationships. Social support means having friends

and other people, including family, to turn to in times of need or crisis to give you a broader focus and positive self-image. Social support enhances quality of life and provides a buffer against adverse life events (Primary Health Care, 2017). Asthma been a stressful disease condition requires social strategies to enhance positive outcome. The gap in management of asthma among females requires a social approach to enhance their health outcome. For positive asthma care among adult female living with asthma there is need for total understanding of the anatomical and physiological structure of women in their asthma management.

Nursepreneur getting involved in the social support of female adult suffers will not only help in reducing asthma flare-ups among female but improve their quality of life. As they will use their knowledge to health educate the patient on the effect of their body structure on their disease condition. The women will also have access to such nursepreneur as at when needed. It will also create a platform for social gathering to enable each patient to share lived experience for the benefit of others. Establishment of female asthma-based organizations or collaborating with existing organizations to have a unit for female asthma suffers having the burden nature places on them in view definitely reduce asthma flare-ups, severity and improve their quality of life.

METHODOLOGY

The study was performed as an overview using matrix method allowing a review of literature across methodological approach. The literature search which includes relevant articles published between 2010 and 2021. The reader carefully articulates the overview of literature in a specific area in an up-to-date well -structured manner that will add value, identify gaps and also compare the methods used in carrying out the articles under review. The study also identifies topics or questions requiring more investigation, discuss the findings and summarize the findings.

Literature search was not basically a review of research work carried out by others but rather review of ideas and opinions by organizations and individuals and online anatomy test books to have better understanding of the subject matter.

CONCLUSION

With the knowledge of the role of anatomical and physiological structure of adult female in asthma flare-ups, exacerbation and quality of life, it should be assumed that there should be a clear difference in the management of asthma in the both genders. However, this is not the case, as there is no difference in the management of asthma in male and female. The

limited hospital resources in terms of man power and resources as hospitals are short staffed and tight in budget could be excused for this in healthcare institutions. It is obvious that some other organizations have also stepped in to assist in asthma management however, there is still care gap as such organizations do not pay attention to the special need of female asthma suffers which has a special burden imposed on them by nature. There is need for policy making that will enhance the quality of life of female living with asthma and need for nurses entrepreneurs to take up this challenge of relieving the burden of adult female living with asthma through social support by establishing female base asthma organizations or liaising with existing ones to establish a female unit that will improve the quality of life of female adults living with asthma.

RECOMMENDATIONS

Healthcare policymakers should apply practical steps to scrutinize current care gaps in the management of asthma among adult females. A policy should be established for gender base management of asthma that will enhance best practices. Healthcare systems globally should take decisive political action to challenge this existing gap in asthma management. Gender base asthma organizations is a grey area for entrepreneurs to showcase their professionalism and contribute to the welfare of female patients living with asthma.

REFERENCES

- Hirose, H., Hardcastle, W. J., Laver, J., & Gibbon, F. E. (2010). Investigating the Physiology of Laryngeal Structures *In: The Handbook of Phonetic Sciences*. 2nd Edn Oxford, Wiley-Blackwell, [https://doi: 10.1183/20734735.000318](https://doi.org/10.1183/20734735.000318)
- Carey, M. A., Card, J. W., Voltz, J. W., Arbes, S. J., Germolec, D. R., Korach, K. S., & Zeldin, D. C. (2007). It's all about sex: gender, lung development and lung disease. *Trends in Endocrinology & Metabolism*, 18(8), 308-313.
- Sciencedaily. (2017). Why do more women have asthma than men? Blame hormones. <https://www.sciencedaily.com/releases/2017/11/171128123358.htm>
- García-Martínez, D., Torres-Tamayo, N., Torres-Sanchez, I., García-Río, F., & Bastir, M. (2016). Morphological and functional implications of sexual dimorphism in the human skeletal thorax. *American Journal of Physical Anthropology*, 161(3), 467-477.
- Hibbert, M. E., Lannigan, A., Landau, L. I., & Phelan, P. D. (1989). Lung function values from a longitudinal study of healthy children and adolescents. *Pediatric pulmonology*, 7(2), 101-109.
- Torres-Tamayo, N., García-Martínez, D., Lois Zloliniski, S., Torres-Sánchez, I., García-Río, F., & Bastir, M. (2018). 3D analysis of sexual dimorphism in size, shape and breathing kinematics of human lungs. *Journal of anatomy*, 232(2), 227-237.
- Dominelli, P. B., Molgat-Seon, Y., Bingham, D., Swartz, P. M., Road, J. D., Foster, G. E., & Sheel, A. W. (2015). Dysanapsis and the resistive work of breathing during exercise in healthy men and women. *Journal of Applied Physiology*, 119(10), 1105-1113.
- Smith, J. R., Rosenkranz, S. K., & Harms, C. A. (2014). Dysanapsis ratio as a predictor for expiratory flow limitation. *Respiratory physiology & neurobiology*, 198, 25-31.
- Thompson, B. R. (2017). Dysanapsis—once believed to be a physiological curiosity—is now clinically important. *American journal of respiratory and critical care medicine*, 195(3), 277-278.
- Romei, M., Mauro, A. L., D'angelo, M. G., Turconi, A. C., Bresolin, N., Pedotti, A., & Aliverti, A. (2010). Effects of gender and posture on thoraco-abdominal kinematics during quiet breathing in healthy adults. *Respiratory physiology & neurobiology*, 172(3), 184-191.
- Weaver, A. A., Schoell, S. L., & Stitzel, J. D. (2014). Morphometric analysis of variation in the ribs with age and sex. *Journal of anatomy*, 225(2), 246-261.
- Shi, X., Cao, L., Reed, M. P., Rupp, J. D., Hoff, C. N., & Hu, J. (2014). A statistical human rib cage geometry model accounting for variations by age, sex, stature and body mass index. *Journal of biomechanics*, 47(10), 2277-2285.
- Bastir, M., Higuero, A., Rios, L., & Garcia Martinez, D. (2014). Three-dimensional analysis of sexual dimorphism in human thoracic vertebrae: Implications for the respiratory system and spine morphology. *American journal of physical anthropology*, 155(4), 513-521.
- LoMauro, A., & Aliverti, A. (2015). Respiratory physiology of pregnancy. *Breathe*, 11, 297-301.
- Murphy, V. E., Clifton, V. L., & Gibson, P. G. (2006). Asthma exacerbations during pregnancy: incidence and association with adverse pregnancy outcomes. *Thorax*, 61(2), 169-176.
- Chhabra, S. K. (2015). Premenstrual asthma. *Indian J Chest Dis Allied Sci*, 47, 109-116.
- Rao, C. K., Moore, C. G., Bleecker, E., Busse, W. W., Calhoun, W., Castro, M., ... & Wenzel, S. E. (2013). Characteristics of perimenstrual asthma and its relation to asthma severity and control: data from the Severe Asthma Research Program. *Chest*, 143(4), 984-992.
- Almqvist, C., Worm, M., Leynaert, B., & Working Group of GA2LEN WP 2.5 'Gender'. (2008). Impact of gender on asthma in childhood and adolescence: a GA2LEN review. *Allergy*, 63(1), 47-57.

19. Zein, J. G., & Erzurum, S. C. (2015). Asthma is different in women. *Current allergy and asthma reports*, 15, 1-10.
20. Shah, R., & Newcomb, D. C. (2018). Sex bias in asthma prevalence and pathogenesis. *Frontiers in immunology*, 9, 2997.
21. Baldaçara, R. P. D. C., & Silva, I. (2017). Association between asthma and female sex hormones. *Sao Paulo Medical Journal*, 135, 04-14.
22. Kisiel, M. A., Berglund, C., Janson, C., Hasselgren, M., Montgomery, S., Nager, A., ... & Lisspers, K. (2022). Quality of life and asthma control related to hormonal transitions in women's lives. *Journal of asthma*, 59(9), 1869-1877. <https://doi.org/10.1080/02770903.2021.1963768>