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Research Article

A novel motivation tool to encourage smoking cessation in Iraq

Alaa Alsajri [1,2], *,

[1] Department of Pharmacy, Alrasheed University College, Baghdad, Iraq.

[2] School of Pharmaceutical Sciences, University of Sains Malaysia, Penang, Malaysia

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ABSTRACT

Introduction: Smoking is one of the most important causes of diseases and affects the health of the body in general and the health of the lungs in particular. There is a significant increase in smoking rates among Iraqi adults after 2003 until now. The term lung age is a term that can be inferred from it about the extent to which the lungs are affected by causes of diseases such as smoking. Objective: To create knowledge about the importance of using lung age concept in order to encourage smoking cessation.
Methodology: A comprehensive search was conducted for many studies on several sites including Google Scholar, Scopus and PubMed in order to find out whether using the concept lung age can encourage smoking cessation or not.
Results: Studies have shown that using lung age concept can contribute to motivating smokers to quit smoking twice compared with non-motivated smokers.
Conclusion: Smokers knowing their lung age can motivate them to quit smoking and it is important to use this term in developing countries after conducting a spirometer test.

1. INTRODUCTION

The lungs are the breathing organ in humans. Humans have a pair of lungs on either side of the heart, and their function is breathing. The two rings are filled with air due to their flexible, spongy, balloon-like shape. In addition to the primary role it plays by providing the body with oxygen, the lungs also play an effective role in the process of metabolism and eliminating waste in the human body(Comroe, 1966). Indeed, the lungs are elastic, and this elasticity is crucial for their proper functioning, as it enables them to expand and contract during the breathing process. Elasticity enables the lungs to expand seamlessly when inhaled and recoil effectively when exhaled, thereby ensuring optimal ventilation and gas exchange. However, as individuals age, the elasticity of their lungs tends to decrease, potentially leading to a decline in lung function and efficiency in the long run(Turner et al., 1968). Smoking has a significant impact on the elasticity of the lungs. It's important to understand how smoking affects lung elasticity and overall lung health. Smoking introduces destructive substances, such as tar, into the lungs, which can damage the elastic fibers in lung tissue and diminution their ability to stretch and recoil. The chemicals in cigarette smoke also cause chronic inflammation in the airways and lung tissue, which can lead to the destruction of alveolar walls and the elastic fibers that support them over time. This inflammation can also result in the destruction of alveoli, which are small air sacs where gas exchange takes place. As a result, the overall surface area available for gas exchange is reduced, and lung elasticity is diminished. Additionally, smoking can disturb the production of surfactant, a substance that reduces surface tension in the alveoli and helps keep them open. A reduction in surfactant production can lead to alveolar collapse and additional decline lung elasticity(Hanley et al., 1991)(Hogg et al., 1994)(Lai-Fook & Hyatt, 2000). Spirometry is a widely used and vital pulmonary function test that measures both the amount of air you can inhale and exhale, as well as the speed at which someone can exhale. This test offers crucial information about lung function and assists in diagnosing and monitoring lung conditions. Spirometry is particularly useful in detecting respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), and other breathing disorders. Additionally, it helps in tracking lung function over time, especially for individuals with known respiratory conditions. Spirometry is also instrumental in evaluating the effectiveness of treatment for respiratory conditions and guiding adjustments in therapy(Liou & Kanner, 2009)(Barreiro & Perillo, 2004). Pulmonary parameters measured with spirometry; Forced Vital Capacity (FVC) refers to the maximum amount of air that can be expelled forcefully after taking a deep breath. This is measured in liters. Forced Expiratory Volume in One Second (FEV1) is the amount of air that can be exhaled forcefully in the first second of the FVC test. It is usually measured in liters. FEV1/FVC

*Corresponding author email: Alaa94@student.usm.my
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Ratio is the percentage of FEV1 to FVC. A lower ratio indicates a higher likelihood of obstructive airway diseases such as asthma or chronic obstructive pulmonary disease (COPD). Peak Expiratory Flow (PEF) is the fastest rate at which air can be expelled from the lungs. It is commonly used in asthma management to evaluate the severity of the condition(Knox-Brown et al., 2022). Spirometry plays a crucial role in detecting the early signs of lung disease before they become severe and lead to noticeable symptoms. This enables healthcare professionals to intervene and manage their condition promptly. Through regular spirometry tests, disease progression can be monitored and the efficacy of treatments assessed, allowing healthcare providers to modify medications and treatment plans accordingly. The effective identification and management of respiratory conditions through spirometry not only enhances the quality of life for individuals with lung diseases but also helps to prevent worsening of the condition(Eaton et al., 1999)(Bye et al., 1992).

Lung age :

Factors like age, height, gender, and ethnicity can affect spirometry parameters. As children grow, their lung size and function improve, resulting in better spirometry parameters. These parameters generally reach their highest point during late adolescence or early adulthood. In healthy young and middle-aged adults, lung function remains stable. After reaching its peak, lung capacity and elasticity decline with age. The maximum amount of air that can be forcefully exhaled after taking the deepest breath, known as FVC, tends to decrease due to reduced lung elasticity and changes in chest wall mechanics. The volume of air that can be forcefully exhaled in the first second, or FEV1, also declines with age, reflecting reduced lung function and airway narrowing. Despite the decline in both FEV1 and FVC, the FEV1/FVC ratio remains relatively stable or slightly decreases with age. However, a significantly reduced ratio may indicate obstructive lung diseases(Ostrowski & Barud, 2006)(Belo et al., 2018).

Lung age is a useful metric that assesses the functional condition of an individual's lungs relative to the average lung capacity of healthy individuals of the same chronological age. This concept estimates the age of a person's lungs based on their spirometry results, particularly the Forced Expiratory Volume in one second (FEV1). If a person's lung function is significantly lower than what is expected for their age, their lung age may be older, which could signify respiratory issues or damage, often caused by factors such as smoking. Lung age is calculated using equations derived from population studies that consider spirometry results (mainly FEV1), actual age, height, gender, and sometimes ethnicity(Newbury et al., 2010)(Khelifa et al., 2018).

Lung age is commonly used as a motivational tool to encourage smokers to quit. The realization that their lung age is significantly greater than their actual age can serve as a potent incentive to stop smoking and improve lung health. A higher lung age may suggest early signs of chronic obstructive pulmonary disease (COPD), asthma, and other lung conditions, even before noticeable symptoms appear. Lung age can be useful in tracking the progression of lung function over time, especially in people with chronic respiratory conditions. Regular spirometry tests can reveal if interventions or lifestyle changes are having a positive effect. Lung age can be employed in public health campaigns to raise awareness of the impacts of smoking and environmental exposures on lung health(Yamaguchi et al., 2011).

Several factors can influence lung age, reflecting either lung function preservation or accelerated decline. Recognizing these factors is crucial for managing lung health and reducing risks associated with premature lung aging. The most significant cause of accelerated lung aging is smoking, which leads to chronic inflammation, alveolar damage, and reduced lung elasticity. As a result, smokers typically have a lung age much older than their chronological age due to decreased lung function and an increased risk of chronic obstructive pulmonary disease (COPD). Prolonged exposure to environmental pollutants, such as ozone, nitrogen dioxide, and particulate matter, can also harm lung function. In addition, exposure to indoor pollutants, including tobacco smoke, mold, and chemicals from household products, can contribute to lung aging. Workers exposed to dust, chemicals, fumes, and asbestos face a higher risk of lung damage. To mitigate these risks, proper ventilation, the use of personal protective equipment (PPE), and adherence to safety regulations are essential. Frequent respiratory infections, such as bronchitis and pneumonia, can cause temporary declines in lung function. Chronic infections like tuberculosis can lead to long-term lung damage and increased lung age. Poorly controlled asthma can result in chronic airway inflammation and remodeling, affecting lung function. This includes chronic bronchitis and emphysema, leading to significant declines in lung function and increased lung age(Lee et al., 2013)(Beaty et al., 1984). Engaging in regular physical activity can prevent weakened respiratory muscles and diminished lung capacity (Spruit et al., 2015). The benefits of exercise include maintaining lung function and enhancing respiratory muscle strength. A diet low in fruits, vegetables, and antioxidants can contribute to lung aging, whereas diets rich in these nutrients can support lung health (Romieu, 2005). Genetic predisposition can influence lung function and susceptibility to respiratory conditions, with a family history of lung diseases such as asthma or COPD being a risk factor for accelerated lung aging. Lung function naturally declines with age, typically beginning in the third decade of life, due to factors such as loss of elastic recoil, stiffening of the chest wall, and weakening of respiratory muscles. Living in high-altitude areas or places with extreme weather conditions can also affect lung function, as can persistent exposure to allergens, which can cause chronic inflammation and impact lung health (Mishra et al., 2015). Conditions such as heart failure can also affect lung function, as can excess weight, which can restrict lung expansion and reduce lung volumes (Parameswaran et al., 2006).

2. METHODOLOGY

Several scientific sites were searched to find studies in this regard, but the number of studies that investigated the importance of lung age in smokers was small and insufficient. The scientific sites searched were Google Scholar, Sci-Space, Coherence, Scopus, and PubMed. All studies that discussed the subject summarized the most important points. No study of this type has been conducted in the Iraqi community, which could show different results based on the thinking and mentality of Iraqi citizens owing to differences in their environment and living conditions.

3. RESULTS

The concept of lung age was initially introduced by Morris and Temple to present spirometry data in a comprehensible format in order to encourage smoking cessation (Morris & Temple, 1985). A number of studies have assessed its efficacy with mixed findings. The term lung age has been used by many researchers and health care professionals to encourage smokers to quit. Whether or not this term has any significance for smokers has been studied by comparing the lung age of a smoker with that of a non-smoker of the same age and sex and by means of spirometer functions. Here in this study we review the most important things that came in previous studies to know the importance of the term lung age for smokers.
A study was conducted in Saudi Arabia to determine whether the term lung age had an effect or encouragement for smokers to quit smoking. 142 people participated in the study and were divided into two groups. The first group (71 people) was informed of their lung age while the second group was left without being informed of their lung age. The study lasted for a year and found that approximately 19% of smokers who were informed of their lung age had quit smoking, compared to only 4% of smokers who were not informed of their lung age(Abdelaal & Mousa, 2022). Another study conducted in England showed similar results in that knowing the lung age and the importance of lung age can motivate smokers to quit smoking. The study involved 561 adults and was followed for a full year. 13% of the 280 people who were informed of their lung age quit smoking, while only 6% of smokers who were not informed of their lung age quit smoking. What the study found is that using the concept of lung age can motivate smokers to quit this harmful habit (Parkes et al., 2008). In a study conducted on Japanese society, 122 people were divided into two groups, 52 of whom knew their lung age and understood the term. After being followed for a year, 42% of smokers who were told their lung age quit smoking. While 27% of smokers who were unaware of their lung age quit smoking. Based on these results, the study confirmed that the lung age principle can be used to encourage smokers to quit smoking (Takagi et al., 2017). In Tunisia, a similar study was conducted, which included 456 smokers, half of whom were informed about their lung age. The study lasted for a year and found that smokers who were informed about their lung age responded to quitting smoking better than their peers in the second group, 25% and 16% respectively. The study indicated the importance of using spirometers and lung age to encourage smokers to quit smoking (Ben Fredj et al., 2022).

4. DISCUSSION

This study was conducted to determine the importance of spirometers in general and the term lung age arising from knowledge of lung function in particular among health care providers in order to help convince smokers to quit smoking. Smoking in developing countries, including Iraq, is still on the rise, as reports from the World Health Organization indicate that approximately five million Iraqis are smokers, constituting 20% of society. Among these statistics are approximately a quarter of a million female smokers (Who, 2020). The aim of the concept of lung age as a motivational tool for smoking cessation is to utilize spirometry results to communicate a smoker's lung function in terms of "lung age." This metric personalizes the smoker's lung function by comparing it to the average lung function of a healthy person of the same chronological age. If the smoker's lung function is poorer than average, their "lung age" will be greater than their actual age. The objective of this concept is to make the health consequences of smoking more tangible and comprehensible, thereby inspiring smokers to quit. Studies have shown that lung age feedback can significantly increase smoking cessation rates. The notion of lung age stems from the notion that extended exposure to tobacco smoke hastens the aging process of the lungs, leading to an untimely decrease in lung function. The aim is to encourage smokers to quit by presenting them with their lung age, which is typically considerably higher than their actual age, thereby promoting better health and alleviating further lung damage.
Limitation:
This short study included a small group of studies and the results might have been more comprehensive if more studies were discussed. The number of smokers participating in most studies was small.
Recommendation:
It is necessary to use the term and principle of lung age and spirometry examination during the stage of advice and encouragement to quit smoking. Conduct objective studies derived from the Iraqi community to know the effect of lung age on local smokers. Study and evaluate the knowledge and awareness of health care providers about the principle of lung age.

5. CONCLUSION

Smoking rates in developing countries continue to increase, as do the economic costs of high smoking rates. It is necessary to use incentives and motivational tools in community organizations and health care providers to encourage smokers to quit smoking. The term lung age is one of the basic concepts that can help and encourage smokers to quit smoking by telling them that their lung age is older than their actual age. The importance of lung age lies in the fact that it shows the age of the lungs by examining lung functions before the appearance of pulmonary symptoms. The use of the term lung age has shown benefit in encouraging people to quit smoking in many continental and international studies, but no study has been conducted to determine the impact of this term on Iraqi society.

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Conflicts of Interest:

The authors declare no conflicts of interest.

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References

[1] M. Abdelaal and G. Mousa, "Long-term effect of telling the lung age on smoking quit rate in undergraduate smokers: a one-year follow-up randomized controlled study," Physiotherapy Quarterly, vol. 30, no. 3, pp. 44–50, 2022.
[2] T. J. Barreiro and I. Perillo, "An approach to interpreting spirometry," American Family Physician, vol. 69, no. 5, pp. 1107–1115, 2004.
[3] T. H. Beaty, H. A. Menkes, B. H. Cohen, and C. A. Newill, "Risk factors associated with longitudinal change in pulmonary function," American Review of Respiratory Disease, vol. 129, no. 5, pp. 660–667, 1984.
[4] J. Belo et al., "Reference values for spirometry in elderly individuals: a cross-sectional study of different reference equations," Multidisciplinary Respiratory Medicine, vol. 13, pp. 1–9, 2018.
[5] M. Ben Fredj et al., "Spirometry as a motivator for smoking cessation among patients attending the smoking cessation clinic of Monastir," BMC Public Health, vol. 22, no. 1, p. 1164, 2022.
[6] M. R. Bye, D. Kerstein, and E. Barsh, "The importance of spirometry in the assessment of childhood asthma," American Journal of Diseases of Children, vol. 146, no. 8, pp. 977–978, 1992.
[7] J. H. Comroe, "The lung," Scientific American, vol. 214, no. 2, pp. 56–71, 1966.
[8] T. Eaton, S. Withy, J. E. Garrett, R. M. L. Whitlock, H. H. Rea, and J. Mercer, "Spirometry in primary care practice: the importance of quality assurance and the impact of spirometry workshops," Chest, vol. 116, no. 2, pp. 416–423, 1999.
[9] M. E. Hanley, T. E. King Jr., M. I. Schwarz, L. C. Watters, A. S. Shen, and R. M. Cherniack, "The impact of smoking on mechanical properties of the lungs in idiopathic pulmonary fibrosis and sarcoidosis," American Journal of Respiratory and Critical Care Medicine, vol. 144, no. 5, pp. 1102–1106, 1991.
[10] J. C. Hogg et al., "Lung structure and function in cigarette smokers," Thorax, vol. 49, no. 5, pp. 473–478, 1994.
[11] M. Ben Khelifa, H. Ben Salem, R. Sfaxi, S. Chatti, S. Rouatbi, and H. Ben Saad, "'Spirometric' lung age reference equations: a narrative review," Respiratory Physiology & Neurobiology, vol. 247, pp. 31–42, 2018.
[12] B. Knox-Brown, O. Mulhern, J. Feary, and A. F. S. Amaral, "Spirometry parameters used to define small airways obstruction in population-based studies: systematic review," Respiratory Research, vol. 23, no. 1, p. 67, 2022.
[13] S. J. Lai-Fook and R. E. Hyatt, "Effects of age on elastic moduli of human lungs," Journal of Applied Physiology, vol. 89, no. 1, pp. 163–168, 2000.
[14] M.-R. Lee et al., "Factors associated with lung function decline in patients with non-tuberculous mycobacterial pulmonary disease," PLoS One, vol. 8, no. 3, p. e58214, 2013.
[15] T. G. Liou and R. E. Kanner, "Spirometry," Clinical Reviews in Allergy & Immunology, vol. 37, pp. 137–152, 2009.
[16] A. Mishra, G. Mohammad, T. Norboo, J. H. Newman, and M. A. Q. Pasha, "Lungs at high-altitude: genomic insights into hypoxic responses," Journal of Applied Physiology, vol. 119, no. 1, pp. 1–15, 2015.
[17] J. F. Morris and W. Temple, "Spirometric 'lung age' estimation for motivating smoking cessation," Preventive Medicine, vol. 14, no. 5, pp. 655–662, 1985.
[18] W. Newbury, J. Newbury, N. Briggs, and A. Crockett, "Exploring the need to update lung age equations," Primary Care Respiratory Journal, vol. 19, no. 3, pp. 242–247, 2010.
[19] S. Ostrowski and W. Barud, "Factors influencing lung function: are the predicted values for spirometry reliable enough?," Journal of Physiology and Pharmacology, vol. 57, pp. 263–269, 2006.
[20] K. Parameswaran, D. C. Todd, and M. Soth, "Altered respiratory physiology in obesity," Canadian Respiratory Journal, vol. 13, pp. 203–210, 2006.
[21] G. Parkes, T. Greenhalgh, M. Griffin, and R. Dent, "Effect on smoking quit rate of telling patients their lung age: the Step2quit randomised controlled trial," BMJ, vol. 336, no. 7644, pp. 598–600, 2008.
[22] I. Romieu, "Nutrition and lung health [State of the Art]," The International Journal of Tuberculosis and Lung Disease, vol. 9, no. 4, pp. 362–374, 2005.
[23] M. A. Spruit, F. Pitta, E. McAuley, R. L. ZuWallack, and L. Nici, "Pulmonary rehabilitation and physical activity in patients with chronic obstructive pulmonary disease," American Journal of Respiratory and Critical Care Medicine, vol. 192, no. 8, pp. 924–933, 2015.

[24] H. Takagi et al., "Effect of telling patients their ‘spirometric-lung-age’ on smoking cessation in Japanese smokers," Journal of Thoracic Disease, vol. 9, no. 12, pp. 5052–5058, 2017.
[25] J. M. Turner, J. Mead, and M. E. Wohl, "Elasticity of human lungs in relation to age," Journal of Applied Physiology, vol. 25, no. 6, pp. 664–671, 1968.
[26] WHO, "Smoking in Iraq," 2020.
[27] K. Yamaguchi, S. Onizawa, T. Tsuji, K. Aoshiba, and A. Nagai, "How to evaluate ‘Spirometric’ lung age–What method is approvable?," Respiratory Physiology & Neurobiology, vol. 178, no. 2, pp. 349–351, 2011.