

LETTER TO THE EDITOR

Methodological problems in the article comparing lung function profiles and aerobic capacity of adult cigarette and hookah smokers after 12 weeks intermittent training

Responsible Editor: Amin Bredan, VIB Inflammation Research Center & Ghent University, Ghent, Belgium.

I read with great interest the paper by Koubaa et al. 'Lung function profiles and aerobic capacity of adult cigarette and hookah smokers after 12 weeks intermittent training' (1). Some methodological problems were noted and should be highlighted.

The first methodological problem (and may be the more important) in the article by Koubaa and colleagues (1) concerns the pulmonary function assessment section. Older standards, described by the American Thoracic Society (ATS) in 1995 (reference number 38 in their paper), were applied. This is a serious methodological limitation, since recommendations have been largely changed in 2005. Actually, it is recommended that the latest European Respiratory Society (ERS)/ATS recommendations be applied concerning spirometry (2, 3). In their paper, no information was given about spirometric data repeatability and only the vague sentence 'three correct maneuvers' was cited. In addition, authors stated 'results were expressed as percentages of the predicted value' without any precision about which spirometric norms were applied. It is important to note that Tunisian pulmonary functional laboratories accept the default settings for reference equations [ERS/European Community for Steel and Coal (ERS/CECA-1983) (4)] offered by the manufacturer even though adult Tunisian reference equations are available (5). A recent paper (6) clearly demonstrated that the use of the ERS/CECA-1983 norms resulted in misinterpretation of spirometry data in a significant proportion of subjects and that this could result in inappropriate diagnosis and/or management. Moreover, a local study does not recommend the use of the recent multiethnic norms derived by the ERS global lung initiative to interpret spirometry in the local adult population. In addition, another crucial point was the use of inappropriate definition for obstructive ventilatory defect (first, second forced expiratory volume/forced vital capacity ratio < 70%). The use of a fixed threshold as the lower limit of normal has been widely criticized, and more importantly, clinicians may have to review and revise previous diagnoses (7). Moreover, only expiratory flows, and not lung volumes, were measured/calculated and included in the lung function profile evaluation (1).

However, in a previous local study, named 'spirometric profile of narghile smokers', published twice in French and English languages (8, 9), it was clearly shown that 36% and 14% of exclusive shisha smokers (ESS) have, respectively, restrictive ventilatory defect and lung hyperinflation. These findings were recently confirmed in a case-control study published in the *Libyan Journal of Medicine* (10), where it was shown that exclusive cigarettes smokers (ECS) had a significantly higher percentage of lung hyperinflation when compared to ESS. It was better to discuss this point as a methodological limitation since lung hyperinflation can be significantly reduced by pulmonary rehabilitation program (11). Another confounding parameter was the lack of information about the last shisha session before testing (8) [e.g. 1 day (12) or 1 h before testing, as stated by the same team in a previous paper (13)]. This information is capital to avoid confusion between the chronic and acute effects of shisha use on lung function and/or exercise (12, 14).

The second methodological problem in the article by Koubaa and colleagues (1) was about the use of the term 'hookah' to describe the method of tobacco use featuring the passage of smoke through water before being inhaled. In the literature, the name of this mode of smoking depends on the country of origin and includes the following terms: arghil, arghila, arghileh, argil, argileh, chicha, chilam, ghelyan, goza, gozha, guza, hooka, hookah, hubbl bubbl, hubble bubble, hubble-bubble, hukka, huqqa, narghil, narghile, nargil, narguile, narguileh, narguilhé, sheesha, shisha, water pipe, and water-pipe (14, 15). In Tunisia, the term shisha (spelled 'chicha' in French) is the most popular and the terms 'hookah' (1) or waterpipe (13) preferred by Koubaa et al. are rarely used.

The third methodological problem was the lack of information about the different types of shisha tobacco used. In fact, there are three distinct forms of shisha tobacco (15, 16): Tombak, Jurak, and Tabamel. This makes comparison with future studies difficult, because in the case of Tombak or Jurak, in comparison to Tabamel, the respiratory patterns are different (15, 17). The fourth problem was the unknown profile of participants in the

experiment (often ex-cigarette smokers who start shisha), which could be a methodological error (16). The body keeps a memory of physiological and behavioral practices of the smokers (17). As done by other authors (10, 12), the term ‘exclusive’ should be used to clearly avoid such misclassification.

The last methodological problem in the study by Koubaa et al. (1) was that the great majority of the bibliographical references are from the United States, as if local researchers (from Maalej to Hsairi and from Ourari to Chaouachi) had not produced any relevant literature on this issue. This is a striking form of publication (bibliographical) bias (8–10, 12, 15, 18–20). In addition, the only paper (12) that has investigated the ESS deficiency and incapacity measured by spirometry and 6-min walk test was omitted. This paper concluded that ESS use may cause an alteration in submaximal aerobic capacity and suggested that a pulmonary rehabilitation program is an excellent axis to follow (12).

The authors are therefore invited to amend their questionnaire and add items describing the type of the tobacco used, the exact profile of participants, and the date of the last session before performing tests.

We are sure that research on shisha smoking would benefit from more solid methodological rigor (21).

Conflict of interest and funding

I have no competing interests. I have never received direct or indirect funding from pharmaceutical companies or from the tobacco industry

Helmi Ben Saad

Laboratory of Physiology
Faculty of Medicine of Sousse
University of Sousse
Sousse, Tunisia

Department of Physiology and Functional Exploration
Farhat HACHED University Hospital of Sousse
Sousse, Tunisia

Research Laboratory N° LR14ES05: Interactions of
the Cardiopulmonary System
Faculty of Medicine of Sousse
University of Sousse
Sousse, Tunisia
Email: helmi.bensaad@rns.tn

References

- Koubaa A, Triki M, Trabelsi H, Masmoudi L, Zeghal KN, Sahnoun Z, et al. Lung function profiles and aerobic capacity of adult cigarette and hookah smokers after 12 weeks intermittent training. *Libyan J Med*. 2015; 10: 26680.
- Miller MR, Hankinson J, Brusasco V, Burgos F, Casaburi R, Coates A, et al. Standardisation of spirometry. *Eur Respir J*. 2005; 26: 319–38.
- Pellegrino R, Viegi G, Brusasco V, Crapo RO, Burgos F, Casaburi R, et al. Interpretative strategies for lung function tests. *Eur Respir J*. 2005; 26: 948–68.
- No authors listed. Standardized lung function testing. Report working party. *Bull Eur Physiopathol Respir*. 1983; 19(Suppl 5): 1–95.
- Tabka Z, Hassayoune H, Guenard H, Zebidi A, Commenges D, Essabah H, et al. Spirometric reference values in a Tunisian population. *Tunis Med*. 1995; 73: 125–31.
- El Attar M, Hadj Mabrouk K, Ben Abdelaziz A, Abdelghani A, Bousarssar M, Limam K, et al. Applicability of the old European respiratory society/European community for steel and coal reference equations for spirometry interpretation in tunisian adult population. *Tunis Med*. 2014; 92: 574–80.
- Le groupe Pulmonaria, Quanjer PH, Enright PL, Stocks J, Ruppel G, Swanney MP, et al. Open letter to the members of the GOLD committee. *Rev Mal Respir*. 2010; 27: 1003–7.
- Ben Saad H, Khemis M, Bougmiza I, Prefaut C, Aouina H, Mrizek N, et al. Spirometric profile of narghile smokers. *Rev Mal Respir*. 2011; 28: 39–e51.
- Ben Saad H, Khemiss M, Bougmiza I, Prefaut C, Aouina H, Mrizek N, et al. Spirometric profile of narghile smokers. *Rev Mal Respir*. 2009; 26: 299–314.
- Ben Saad H, Khemiss M, Nhari S, Ben Essghaier M, Rouatbi S. Pulmonary functions of narghile smokers compared to cigarette smokers: a case-control study. *Libyan J Med*. 2013; 8: 22650.
- Perez Bogerd S, Selleron B, Hotton R, Ferrali O, Sergysels R. Chest physiotherapy techniques – can they reduce hyperinflation. *Rev Mal Respir*. 2009; 26: 1107–17.
- Ben Saad H, Babba M, Boukamcha R, Ghannouchi I, Latiri I, Mezghenni S, et al. Investigation of exclusive narghile smokers: deficiency and incapacity measured by spirometry and 6-minute walk test. *Respir Care*. 2014; 59: 1696–709.
- Koubaa A, Trabelsi H, Masmoudi L, Triki M, Sahnoun Z, Zeghal K, et al. Water pipe tobacco smoking and cigarette smoking: comparative analysis of the smoking effects on antioxidant status, lipid profile and cardiopulmonary quality in sedentary smokers Tunisian. *IJIPS*. 2013; 2: 51–7.
- El-Zaatari ZM, Chami HA, Zaatari GS. Health effects associated with waterpipe smoking. *Tob Control*. 2015; 24(Suppl 1): i31–43.
- Ben Saad H. The narghile and its effects on health. Part I: the narghile, general description and properties. *Rev Pneumol Clin*. 2009; 65: 369–75.
- Chaouachi K. A critique of the WHO TobReg’s “Advisory Note” report entitled: “waterpipe tobacco smoking: health effects, research needs and recommended actions by regulators”. *J Negat Results Biomed*. 2006; 5: 17.
- Chaouachi K. Hookah (Shisha, Narghile) Smoking and Environmental Tobacco Smoke (ETS). A critical review of the relevant literature and the public health consequences. *Int J Environ Res Public Health*. 2009; 6: 798–843.
- Ben Saad H. The narghile and its effects on health. Part II: the effects of the narghile on health. *Rev Pneumol Clin*. 2010; 66: 132–44.
- Ben Saad H, Chaouachi K. Comparison of cigarette and waterpipe smoking among pupils in the urban area of Sousse, Tunisia. *Tunis Med*. 2010; 88: 470–3. (Letter to editor).
- Chaouachi K. Assessment of narghile (shisha, hookah) smokers’ actual exposure to toxic chemicals requires further sound studies. *Libyan J Med*. 2011; 6: 5934, doi: <http://dx.doi.org/10.3402/ljm.v6i0.5934>

21. Chaouachi K. More rigor needed in systematic reviews on “waterpipe” (hookah, narghile, shisha) smoking. *Chest*. 2011; 139: 1250–1.

REPLY

Dear Editor,

We read with interest the comments on our paper ‘Lung function profiles and aerobic capacity of adult cigarette and hookah smokers after 12 weeks intermittent training’ (1).

We agree that the new standards would have been more appropriate. As for collection of the spirometric data, we first showed the subjects a demonstration of the tests before recording the pulmonary function tests. Next, a minimum of three readings were recorded for each test for every subject, and the best of the three was selected to have reproducibility and validity of the recorded test. The time of the last shisha before testing was at least 1 h.

Concerning the use of the default setting of references offered by the manufacturer although Tunisian references are available, we wish to clarify that these Tunisian references are still not included in those machines and so we did not have other adequate solutions. The use of a threshold limit <70% for Tunisian normal people could be criticized, but there was no other confirmed limit value for use.

We agree that the term shisha is the most popular in Tunisia, but we preferred the term hookah because it was the most widely used term in the general literature globally. As for the different types of shisha tobacco and the unknown profile of the participants, we do not consider these criteria as very important. Our most important criterion was that the participant must have been a regular and exclusive smoker of shisha or cigarettes for many years, leaving the kind of tobacco for future research.

Sincerely,

Abdessalem Koubaa

Clinical Laboratory of Physiology
Physiology and Functional
Testing Department, 98/UR08-67
Medical School of Sousse, University of Sousse
Sousse, Tunisia

Moez Triki

Clinical Laboratory of Physiology
Physiology and Functional
Testing Department, 98/UR08-67
Medical School of Sousse, University of Sousse
Sousse, Tunisia
Email: trikimoez27@yahoo.fr

Hajer Trabelsi

Clinical Laboratory of Physiology
Physiology and Functional
Testing Department, 98/UR08-67
Medical School of Sousse, University of Sousse
Sousse, Tunisia

Ahmad Hakim

Clinical Laboratory of Physiology
Physiology and Functional
Testing Department, 98/UR08-67
Medical School of Sousse
University of Sousse
Sousse, Tunisia