

How can medical students suffering from hearing loss auscultate their patients?

Introduction

Auscultation is a fundamental part of medical examination. It is generally performed using a stethoscope which allows listening to body sounds, in particular of the heart and lungs, the function of which can be initially explored using this instrument. According to Rabinowitz *et al.*, despite improvements in diagnostic technology, “the ability to auscultate a patient’s heart and lungs using a stethoscope remains the basic occupational skill for physicians” (3). Older physicians are more likely to have hearing difficulties in their practice, mainly due to age-related hearing loss (*presbycusis*), but even younger colleagues, particularly residents and students, might suffer from hearing impairment because of congenital or acquired disorders. Therefore, even if physical examinations for medical school and residency training do not routinely include audiometric testing (3), hearing disorders should be accurately investigated by occupational physicians in universities during fit to work assessment of students. In particular, family history of hearing loss and other congenital disorders should be evaluated during medical examinations of future physicians. Medical students with impaired hearing, as well as those with other disabilities, should not be discriminated and excluded from training in hospital (4), but instead they should possibly be supported in their internship and provided with tools and equipment that could help them to achieve the necessary learning outcomes.

Case report

In September 2010, a 22-year-old male medical student, suffering from congenital hearing loss, reported to the Occupational Health Unit of the University of Milano Bicocca (1) for fitness to work assessment before his first internship in a hospital.

In particular, he suffered from a bilateral high-frequency sensorineural deafness (hearing threshold of 40 dB or higher at all frequencies, from 250 to 8000 Hz), so he normally wore hearing aids. During the examination, the student complained about his difficulty in using a conventional acoustic stethoscope, since he had to remove and continuously replace his hearing aids as he was also not able to correctly listen to heart and breathing sounds or to measure blood pressure without them. Since an electronic

stethoscope amplifies body sounds, it appeared to be an easy solution, but the student still had to remove the aids, feeling ashamed to be seen by patients, supervisors and other students. Therefore, a digital stethoscope connected by a mini-jack cable to headphones (*i-Scope 200, Dong-Jin Medical*) was proposed to the student. Standard in-ear headphones were replaced with circumaural headphones that completely encompassed and surrounded the ears, enabling him to keep wearing his own hearing aids. The digital stethoscope could be set in three different modes: “diaphragm mode” (100-1500 Hz) for respiratory system evaluation, “bell mode” (20-500 Hz) for circulatory system examination and blood pressure measurement, and “wide mode” (20-1500 Hz) for the gastrointestinal system.

The student was able to use the digital stethoscope, purchased with university funds for students with disabilities, during the first and subsequent internship periods under the control of a supervisor. After a brief period to get accustomed to the new tool (especially in blood pressure measurement), he was able to achieve all the learning outcomes and skills. In particular, no significant differences in measured blood pressure values were observed in comparison with other medical students. In the following year his auscultation skills were tested on patients and he passed this test with the highest marks, using the digital stethoscope. Furthermore, the student successfully used this tool during a clinical exchange experience abroad.

Discussion

Hearing is an important sense for physicians, since it allows them to diagnose some widespread diseases (e.g. hypertension, cardiac arrhythmias, lung diseases, and bowel obstruction) and to communicate effectively with patients, staff, and colleagues, even in situations of background noise (e.g. emergency room) or by telephone (3). It is therefore worth paying attention to the problem of disabled medical students and residents with congenital or acquired hearing impairment. Fit to work assessment may be an opportunity to help students with disability to perform their internship in the best possible way, by providing useful tools and equipment. This case report shows how a correct assessment of the problems related to a sensory deficit may positively impact on achievement of learning outcomes and

professional skills by a disabled medical student during his training. Furthermore, this approach also allowed the student to overcome the shame of his disability towards his colleagues and patients. Thanks to an adequately modified digital stethoscope, he was also able to attend a clinical exchange experience abroad, successfully and without any discrimination. In the international scientific literature no differences were found comparing acoustic and electronic stethoscopes during clinical auscultation training, since the latter is an excellent tool for cardiac and respiratory auscultation (2).

Lastly, it is interesting to note that in the following months two other cases of healthcare students, suffering from congenital hearing loss and wearing hearing aids, reported to our Occupational Health Unit before their internship period: a 21-year-old male medical student and a 20-year-old female nursing student. In particular the nursing student complained about a problem in blood pressure measurement. The digital stethoscope with circumaural headphones was successfully suggested to both of them, showing that this case report may be an example that can be followed in assessing similar cases, also in other universities, since generally the costs of these tools is not high.

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