



Letter to the Editor

Re: Microbiological colonization of healthcare workers' mobile phones in a tertiary-level Italian intensive care unit


Dear Editor,

I read with interest the recently published paper by Galazzi et al. entitled "Microbiological colonization of healthcare workers' mobile phones in a tertiary-level Italian intensive care unit" (Galazzi et al., 2019). This paper addresses the microbiological colonization of intensive care unit (ICU) healthcare workers' mobile phones. Galazzi et al. state that the mobile phones of ICU healthcare workers are colonized by microorganisms (including pathogenic microorganisms). They also indicated that the mobile phone colonization did not significantly change during the work shift (a similar pattern from the beginning to the end of the work shift). Moreover, they reported that the microbiological colonization of mobile phones was irrespective of the microbiological patients' flora.

The paper authored by Galazzi et al. addresses a very challenging issue which significantly affects the health of ICU patients. Given this consideration, this paper increases our knowledge about potential sources of nosocomial infection. However, this paper has at least one shortcoming. This shortcoming comes from not considering the key role of exposure to radiofrequency (RF) radiation in acquired antibiotic resistance. Our studies show that exposure to both ionizing (Mortazavi et al., 2017) and non-ionizing (Taheiri et al., 2017) electromagnetic radiation can make microorganisms more resistant to antibiotics. Our findings are generally in line with other studies that confirm the RF-induced resistance in microorganisms "This study throws light in to resistance developed by microorganisms to normally used antibiotics. This research indicates that, the organisms achieve resistance not only due to the numerous commonly known reasons like patients' non compliance, etc but also due to in vitro exposure of RF waves" (Arunkumar, 2016).

This phenomenon is a kind of "bacterial adaptive response". Adaptive response can be defined as increased resistance in living organisms pre-exposed to a low level stressor (e.g., low doses of ionizing radiation) before exposure to a high challenging stressor (Lee et al., 2002). Radiofrequency electromagnetic fields (RF-EMF) emitted by mobile phones are absorbed in the microorganisms present on mobile phones of healthcare workers and leads to radioadaptation. Radioadaptation of microorganisms not only makes them more resistant to higher doses of radiation but makes them resistant to any factor that can be life threatening for bacteria (e.g. antibiotics).

Therefore, radioadaptation of bacteria observed as extreme resistant to antibiotics can be life threatening for humans. Considering the concerns expressed in this letter, Galazzi et al. should have also assessed the pattern of exposure of microorganisms to RF-EMF through evaluation of mobile phone use (calling, texting, surfing the Internet, watching online videos, etc.) of the doctors, nurses and healthcare assistants participated in their study. In summary, although the paper by Galazzi et al. addresses an important topic, assessing the pattern of mobile phone use of the participants could make this study more valid.

Conflict of interest

Author declares no conflict of interest.

References

- Arunkumar, G., 2016. Study of the effect of mobile phone radiation on antibiotic sensitivity in micro organisms. *J. Med. Microb. Diagn.*, 5
- Galazzi, A., Panigada, M., Broggi, E., Grancini, A., Adamini, I., Binda, F., et al. 2019. Microbiological colonization of healthcare workers' mobile phones in a tertiary-level Italian intensive care unit. *Intensive Crit. Care Nurs.* 5, 30322–30327.
- Lee, Y.J., Park, G.H., Cho, H.N., Cho, C.K., Park, Y.M., Lee, S.J., et al. 2002. Induction of adaptive response by low-dose radiation in RIF cells transfected with Hspb1 (Hsp25) or inducible Hspa (Hsp70). *Radiat. Res.* 157, 371–377.
- Mortazavi, S.M.J., Zarei, S., Taheiri, M., Tajbakhsh, S., Mortazavi, S.A., Ranjbar, S., et al. 2017. Sensitivity to antibiotics of bacteria exposed to gamma radiation emitted from hot soils of the high background radiation areas of Ramsar, Northern Iran. *Int. J. Occup. Environ. Med.* 8, 80–84.
- Taheiri, M., Mortazavi, S.M.J., Moradi, M., Mansouri, S., Hatam, G.R., Nouri, F., 2017. Evaluation of the effect of radiofrequency radiation emitted from Wi-Fi router and mobile phone simulator on the antibacterial susceptibility of pathogenic bacteria *listeria monocytogenes* and *Escherichia coli*. *Dose Response* 15. 1559325816688527.

S.M.J. Mortazavi*

Medical Physics Department, Shiraz University of Medical Sciences,
Shiraz, Iran
Diagnostic Imaging Department, Fox Chase Cancer Center, Philadelphia,
PA 19111, USA

* Address: Fox Chase Cancer Center, Philadelphia, PA 19111, USA.

E-mail address: S.M.Javad.Mortazavi@fccc.edu
URLs: <https://www.foxchase.org/sm-mortazavi>
<https://orcid.org/0000-0003-0139-2774>