Diversity of Bacterial Communities of Fitness Center Surfaces in a U.S. Metropolitan Area

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ABSTRACT

Public fitness centers and exercise facilities have been implicated as possible sources for transmitting community-associated bacterial infections; however, there is a lack of knowledge about the diversity of microbial communities at fitness centers. Microbial load and diversity of the environment are often implicated as a critical indicator of hygiene and cleanliness. Facility cleanliness can be achieved through cleaning and disinfection of environmental surfaces. Accelerated Hydrogen Peroxide® (AHP®) is a proven technology that has demonstrated effectiveness against the commonly found bacteria identified in this study, without compromising user safety.

BAKGROUND

As many aspire to stay fit and healthy, many regularly visit fitness centers or gyms. In fact, data indicates a surge in the number of people visiting fitness centers in the last five years. As fitness centers have been implicated as sources for transmitting bacterial infections, an understanding of overall bacterial population and diversity will shed light on the risk of the pathogen propagation from these facilities. The goal of this study was to assess and comprehensively understand the microbial diversity associated with fitness center surfaces; and to determine if different surfaces of fitness centers serve as potential reservoirs for different bacterial communities.

STUDY

This study investigated the overall bacterial ecology of selected fitness centers in a metropolitan area utilizing environmental surface swabbing. Surface swabs were collected from four fitness centers. Samples were collected from the skin-contact surfaces on exercise equipment, dumbbell, toilet handles, and handrails on stairs of the fitness centers. The samples were obtained from certain places that had not been sanitized before sample collection.

RESULTS

Taxonomical composition revealed that the predominant phyla were *Firmicutes*, *Proteobacteria* and *Actinobacteria*. Within these dominant phyla, the bacterial families with the highest relative abundance across all the samples were *Bacillaceae*, *Staphylococcaceae*, *Enterobacteriaceae*, *Aerococcaceae*, and *Microbacteriaceae*. In the study the presence of several *Staphylococcus spp*. was identified in all surface swab samples and were predominately found in power striders (99.8%), elliptical machines (52.7%), nautilus machines (48%), rails (32.6%), toilet handles (20%), dumb bells (17.7%), treadmills (13.6%), leg presses (6.8%) and stationary bikes (3.7%).

CONCLUSION

This study provides a comprehensive assessment on the diversity in bacterial communities in fitness centers along with the knowledge of the potential presence of pathogen organisms. As many of the identified bacteria can be transferred through contact with environmental surfaces, it is critical to underscore the need of proper hygienic practices in fitness centers and gyms for

minimizing the spread of disease-causing organisms.

REFERENCE

Mukherkee N, Dowd SE, Wise A, Kedia S, Vohra V, Banerjee P. (2014). Diversity of bacterial communities of fitness center surfaces in a U.S. metropolitan area. Int. J. Environ. Res. Public Health. 11(12): 12544-12561.