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Exercise versus no exercise for the occurrence, severity and duration of acute respiratory infections

Lina Fierens, MSc, RN¹, Eva Goossens PhD, MSc, RN^{1,2,3,4}

¹ Antwerp University Hospital, Antwerp, Belgium

² Department of Public Health and Primary Care, KU Leuven, Leuven, Belgium

³ Research Foundation Flanders (FWO), Brussels, Belgium

⁴ Division of Nursing and Midwifery, Faculty of Medicine and Health Sciences, Center for Research and Innovation in Care, University of Antwerp, Antwerp, Belgium

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***Address for correspondence:**

Fierens Lina, Antwerp University Hospital (UZA), Antwerp, Belgium; E-mail:
lina.fierens@uza.be

1 Background

Acute respiratory tract infections (ARTIs), characterized by a duration of less than 30 days, are considered the most common acute conditions affecting the general population. These ARTIs occur due to invading microorganisms (i.e., virus, bacteria and fungi) and can manifest at any part of the respiratory tract. The classification of ARTIs is defined by the infected anatomical area as either 'upper' (i.e., the common cold and sinusitis) or 'lower' respiratory tract infections such as pneumonia and bronchiolitis, which are often more severe (Grande, Keogh, Silva, & Scott, 2020). These acute conditions are responsible for 10% of ambulatory and emergency department visits in the USA and an estimated 2.65 million deaths worldwide in 2013 (Martineau et al., 2016).

Preventive strategies for ARTIs in the community include smoking cessation, handwashing, avoiding contact with infected people, good nutrition and vaccination schemes (Cohen, Tyrrell, Russell, Jarvis, & Smith, 1993; Jefferson et al., 2011; Roth, Caulfield, Ezzati, & Black, 2008). Furthermore, observational studies have shown an association between exercise and decreased rates of ARTIs.

Exercise can be defined as "a planned and structured program of motor actions to improve or maintain components of physical fitness" (Carpersen, Powel, & Christenson, 1985). People who regularly exercise have been found to experience improved general health, better maximal oxygen uptake, increased muscular strength, improved flexibility and better body composition. Physical exercise can theoretically improve the natural immune function and stress resistance and is a low-cost and readily available intervention that most people could implement. Performing physical exercise on a regular basis might be effective in reducing the occurrence, severity and durations of ARTIs.

2 Objectives

A 2020 update of a Cochrane review of 2015 evaluated the effect of exercise on susceptibility to ARTIs. (Grande et al., 2020) The effect of exercise on the number of ARTI episodes per person per year, symptom severity, the number of symptom days and illness duration was investigated.

3 Intervention/Methods

The review update was based on a systematic search for studies up to March 2020 in electronic databases and two trial registries. All (quasi) randomized controlled trials with participants of all ages, including those with chronic respiratory conditions, were eligible.

Two reviewers independently identified studies for inclusion, recorded reasons for exclusion, extracted data and assessed the risk of bias. Exercise variables were the type of exercise (i.e., resistance, endurance or stretching), frequency of exercise (i.e., number of sessions per week) and exercise intensity.

Selected trials used exercise in at least one group as compared to no exercise or no intervention (i.e., usual care). Outcome measures were defined by the (i) number of ARTI episodes per person per year, (ii) proportion of participants who experienced at least one ARTI over the study period, (iii) severity of ARTI symptoms, (iv) number of symptom days in the follow-up period and (v) number of symptom days per episode of illness.

4 Results

The authors found three further studies that were eligible for inclusion, resulting in a total of 14 randomized controlled trials involving 1,377 participants aged 18 to 85 years. The most common intervention entailed performing aerobic exercise such as walking, bicycling, treadmill or a combination, at least three times a week. Exercise duration was 30 to 40 min and was performed mostly under supervision.

Analysis showed no significant differences in number of ARTI episodes per person per year and number of symptom days per episode between the exercise group and non-exercise group. Severity of ARTI symptoms (95% CI [-198.28 to -8.87]) and number of symptom days (95% CI [-3.50 to -0.98]) were significantly lower among people who exercised.

5 Conclusions

This updated meta-analysis suggested that the number of symptom days in the follow-up and severity of ARTIs symptoms can be reduced by performing consistent physical exercise. However, to date, it remains unclear whether performing regular exercise has an impact on the occurrence, severity or duration of ARTIs. The level of identified evidence was low due to a considerable risk of bias and limitations in study design, implementation, imprecision and inconsistency. Better-designed research is mandatory to understand whether exercise reduces the occurrence, severity or duration of ARTIs.

Based on the current evidence, performing physical activities on a regular basis can result in reduced symptom severity and number of days patients suffer from ARTIs. However, the effect of physical exercise on the occurrence, severity and duration of ARTIs is not yet determined. Despite the low quality of the current evidence base, it is possible that future research will alter this conclusion. There is a need for studies with a more robust study methodology to investigate if an increase of physical activity has a positive effect on the susceptibility to ARTIs.

References

- Carpersen, J. C., Powel, K. E., & Christenson, G. M. (1985). Physical activity, exercises, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, **100**(2), 126– 131.
- Cohen, S., Tyrrell, D. A., Russell, M. A. H., Jarvis, M. J., & Smith, A. P. (1993). Smoking alcohol consumption, and susceptibility to the common cold. *American Journal of Public Health*, **83**(9), 1277– 1283.
- Grande, A. J., Keogh, J., Silva, V., & Scott, A. M. (2020). Exercise versus no exercise for the occurrence, severity, and duration of acute respiratory infections (review). *Cochrane Database of Systematic Reviews*, (4), CD010596.
- Jefferson, T., Del Mar, D. B., Dooley, L., Ferroni, E., Al-Ansary, L. A., Bawazeer, G. A., ... Conly, J. M. (2011). Physical interventions to interrupt or reduce the spread of respiratory viruses. *Cochrane Database of Systematic Reviews*, (7), CD006207.
- Martineau, A. R., Jolliffe, D. A., Hooper, R. L., Greenberg, L., Aloia, J. F., Bergman, P., ... Goodall, E. C. (2016). Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *British Medical Journal*, **356**, i6583.
- Roth, D. E., Caulfield, L. E., Ezzati, M., & Black, R. E. (2008). Acute lower respiratory infections in childhood: Opportunities for reducing the global burden through nutritional interventions. *Bulletin of the World Health Organization*, **86**, 356– 364.