Search

Maximising mobility in the older people when isolated with COVID-19

[https://www.cebm.net/wp-content/uploads/2020/03/COVID-Banner.png]

JAMIE HARTMANN-BOYCE, NATHAN DAVIES, RACHAEL FROST, JON BUSSEY, SOPHIE PARK

20/03/2020

On behalf of the Oxford COVID-19 Evidence Service Team
Centre for Evidence-Based Medicine, Nuffield Department of Primary Care Health Sciences,
University of Oxford
Correspondence to **jamie.hartmann-boyce@phc.ox.ac.uk**

VERDICT

This rapid review focuses on how to minimise development of frailty in people who were previously mobile but are now house-bound due to Covid-19 isolation. There is a paucity of evidence on how to maximise mobility in older people who are isolated at home.

This rapid review has four key messages:

1) There is some evidence that doing movement and exercise can reduce elements of frailty.
2) A mixture of resistance, strength and balancing exercises appear most effective in this population.
3) Adding a social element to exercise may improve adherence and motivation for exercise. This may also minimise risk of depression and anxiety which can worsen frailty.
4) There may be a role for technology to support exercise programs via e.g. internet, media broadcasts, or video games.

BACKGROUND

Covid-19 UK social isolation policies currently recommend that older people (>70 years old) stay at home for the next 3-4 months. Some older people may already be

housebound and/or frail. However, many older people over 70 years would usually maintain a range of regular activities outside the home. Social isolation strategies will likely reduce patients' walking and physical activity, and lead to an increase in sedentary behaviour. Impaired mobility in older adults has a negative impact [http://www.periodicos.ufc.br/index.php/rene/article/view/3749] on quality of life and a range of health and well-being outcomes. Increasing sedentariness risks impairing mobility [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3567319/] .

AIM

This rapid review aimed to evaluate the evidence for interventions to maximise mobility in older people, and minimise deterioration in activity and frailty levels.

CURRENT EVIDENCE

Does exercise reduce elements of Frailty?

There is clear evidence from systematic reviews that exercise can improve mobility, prevent frailty, prevent falls and improve or maintain functional ability. Exercise programmes are recommended by the International Conference of Frailty and Sarcopenia Research taskforce [https://link.springer.com/article/10.1007/s12603-019-1273-z] to treat and manage frailty.

A 2015 review [https://www.ncbi.nlm.nih.gov/pubmed/25989701] of individualised home-based exercise programmes found significant improvements in physical activity, balance, mobility and muscle strength, but all interventions included in-person home visits. A 2015 meta-analysis [https://www.ncbi.nlm.nih.gov/pubmed/22972103] of six trials found that home-based exercises led to a 22% reduction in falls, but again most included elements of in-person contact.

Exercise should be recommended to all older people who are self-isolating, but those that are are fitter are likely to benefit more. One systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5771690/pdf/jbisris-16-140.pdf] of 21 (mostly small) studies found that group exercise or group + home-based exercise was effective at preventing frailty across all ages. However, another systematic review [https://www.tandfonline.com/doi/abs/10.1080/21679169.2019.1645882?journalCode=iejp20] of seven RCTs suggests that people who are 'pre-frail' at the start of an exercise programme are more likely to experience gains in mobility and functioning.

One qualitative study [https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12526] found that exercises to maintain mobility are highly acceptable to pre-frail older people.

What type of exercise helps?

Most existing evidence lacks definitive conclusions about which exercises should be included in programmes for older people. Systematic reviews of group exercise suggest multi-component exercise programmes are effective and acceptable at improving physical functioning, balance and muscle strength in pre-frail older people [https://link.springer.com/article/10.1186/s12877-017-0547-8] and frail older people [https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-015-0155-4] and at reducing frailty in community-dwelling older people [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7006935/] . A recent

systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3634155/] recommends a low intensity combination of:

- resistance exercises to build strength in both the arms and legs
- functional exercises (such as sit-to-stand, stepping over obstacles, stair climbing)
- balance exercises (e.g. tandem foot standing, multi-directional weight lifts, heel–toe walking, line walking, stepping practice, standing on one leg, weight transfers (from one leg to the other))
- Endurance exercise such as walking or stair climbing

Resistance bands may be helpful. One RCT [https://www.tandfonline.com/doi/full/10.1080/09593985.2018.1548673] evaluating group resistance band exercises for upper and lower body strength (45-60min including warm up and cool down, 3 days/week for 8 weeks) found reduced frailty, improved grip strength, gait speed and physical activity compared to control in 70 pre-frail older people.

What is the evidence for exercise *in the home?*

Home exercise regimes focused purely on flexibility were often used as control groups.

One recent trial of home-based exercises supports the above multi-component approach. This randomised controlled trial [https://academic.oup.com/ageing/article/46/3/401/2863847] evaluated a nutritional intervention plus outdoor walking and a set of 15 mixed exercises (3 arm strengtheners, 7 leg strengtheners and 5 balance and coordination) carried out at least 4 times/week. The exercise component was unsupervised home-based exercises after an initial primary care training session. In 133 pre-frail older people analysed, the risk of frailty was reduced by five times one year later compared to control.

A further large systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6936986/] found evidence that Tai Chi programmes can reduce falls.

Reducing the amount of time spent sedentary by focussing on activities of daily living is likely to maintain mobility. One systematic review [https://www.tandfonline.com/doi/full/10.1080/17461391.2017.1327983?needAccess=true&instName=UCL+%28University+College+London%29] suggests that more sedentary behaviour is associated with reduced ability to carry out everyday tasks.

How often and for how long should older adults aim to exercise?

For effects on muscle strength, balance and frailty, reviews suggest exercising for 20-45 minutes, at least 3-4 times a week.

One systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3634155/] of 20 RCTs focussing on group training for frail older people recommended that resistance programmes be performed 2-3 times a week, with sets of 8-12 repetitions and include exercises focussing on activities of daily living (e.g. sit-to-stand exercises). They recommended endurance training (walking, stair climbing, steps, stationary cycling) of 5-10min, progressing in duration. Balance training was only effective when

combined with other types of exercise.

Another systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3092602/pdf/JAR2011-569194.pdf] found that programs of 30-45 minutes carried out at least 3 times per week had the most beneficial effects.

Older people should exercise for the entire duration of self-isolation. One large systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6936986/] of falls prevention exercises emphasised the importance of maintaining exercise over time – benefits from Tai Chi were found after 20 weeks and from resistance and balance exercises after 25 weeks.

What is the role of motivation and social elements to exercise?
Qualitative studies have demonstrated that older people are highly motivated to undertake exercise as a clear pathway to maintaining mobility and independence (Frost 2018 [https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12526] , Avgerinou et al., 2019 [https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12781]). However, many reviews document issues with adherence to home exercises and this may be heightened while socially isolated. Properly targeting needs and tailoring to individuals may encourage engagement (Gwyther 2018 [https://www.ncbi.nlm.nih.gov/pubmed/29916302]). Potential ways to encourage older people to continue exercising include:

- Choose activities they enjoy – evidence suggests that people prefer exercises that are relevant to their everyday activities and are fun, and these are associated with more successful programmes (Gwyther et al., 2018 [https://www.ncbi.nlm.nih.gov/pubmed/29916302])
- Setting goals about when and where to do the exercises (Avgerinou et al., 2019 [https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12781])
- Self-monitoring through diaries or phone apps or others' monitoring of exercises (e.g friends, relatives, carers taking on a 'coach' role) (Avgerinou et al., 2019 [https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12781])

All interventions evaluated involve an element of face-to-face contact. Interaction with family and friends has been shown to correlate with the prevention of frailty in housebound older people (Katsura et al., 2018 [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6288724/pdf/jrm-13-141.pdf]). The opportunity for social interaction whilst socially isolating during the COVID-19 pandemic will be limited, therefore there may be an opportunity for the use of digital technologies.

What is the role of technology?
Technology may be used to deliver interventions in the home and increase social interaction. A qualitative study demonstrated older adults felt the internet was a good resource to enhance social interaction when they felt isolated (Davies et al., 2019 [https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.12701]).

A 2017 systematic review [https://www.jmir.org/2018/4/e152/] and meta-analysis of electronic health supported home-based exercise programmes for patients with osteoarthritis found high quality evidence for beneficial effects on physical function (SMD 0.41, 95% CI 0.17-0.64) and quality of life (SMD=0.27, 95% CI 0.06-0.47). To

what extent this is generalizable to older people is unclear, as the mean age in studies ranged from 56 to 63. Three of the seven interventions tested were delivered only via remote means. Two of these (Bennell 2017 [https://pubmed.ncbi.nlm.nih.gov/28241215/?dopt=Abstract] and Bossen 2013 [https://www.jmir.org/2013/11/e257/]) used internet-based interventions. Pooling these interventions showed statistically significant improvements in physical function and quality of life at 1 to 6 months. At 9 to 12 months physical function was also statistically significantly improved. The one study [https://www.hindawi.com/journals/ijta/2014/903816/] of telemedicine without in-person contact (n = 50) did not report physical function outcomes.

There is evidence from a meta-analysis [https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0208192] that video games involving physical activity (“exergames”) have beneficial physical health effects in older people, particularly for those who are older, who have depression or who have reduced mobility. Some effects on social health were also found, and offer a way to socialise, including with younger generations such as grandchildren. One small (n = 32) randomized controlled trial [https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0057734] of a video game (open source game Stepmania [https://www.stepmania.com/]) found a significant improvement in the intervention group compared to the control group for Physiological Profile Assessment (PPA) composite scores at 8 weeks (F31,1=12.706, p=0.001). Another study found group tai chi training by teleconference was as effective as community-based training, and slightly better than a home DVD (Wu et al., 2010 [https://www.sciencedirect.com/science/article/pii/S0003999310001243?via%3Dihub]).

LIMITATIONS

While some patients will have specific conditions which limit engagement with exercise, this review focuses on supporting patients who were previously mobile, but are now house-bound due to Covid-19 social isolation.

One systematic review [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3092602/pdf/JAR2011-569194.pdf] found little increase in adverse events attributable to exercise in frail older people, apart from a small increased risk of musculoskeletal injuries in some studies. For those who are frail and struggling with mobility, chair-based exercises appear to be safe and effective in one systematic review [https://www.hindawi.com/journals/bmri/2013/309506/] . However, most of the studies evaluated in the reviews covered here include some degree of in-person contact, training, or supervision, and therefore their extension to entirely remote programmes is not clear.

Many of the included studies test programmes which may not be widely available. However, there are online resources available designed specifically for older people, for example the Later Life Training and YouTube videos including the Later Life Training YouTube channel [https://www.youtube.com/channel/UCqen30veJkDw_izbDFMyb6w] .

CONCLUSION

Older people aged 70+ are being advised to socially isolate to minimise risk of contracting Covid-19. Pre-frail patients and those on the cusp of deterioration are particularly vulnerable. Social isolation may reduce mobility and tip patients

towards functional loss. Anxiety and depression can also worsen frailty. Exercise and social elements of programmes are, therefore, important to consider. Though the existing evidence-base is limited, there is some evidence to suggest that home-based and technology-assisted programmes may help.

Disclaimer: the article has not been peer-reviewed; it should not replace individual clinical judgement and the sources cited should be checked. The views expressed in this commentary represent the views of the authors and not necessarily those of the host institution, the NHS, the NIHR, or the Department of Health and Social Care. The views are not a substitute for professional medical advice.

AUTHORS

[https://www.cebm.net/wp-content/uploads/2020/03/2c9a1a3e74c4c4c66f8f90327ec08080.jpg] Jamie Hartmann-Boyce is a departmental lecturer and deputy-director of the Evidence-Based Health Care DPhil programme within the Centre for Evidence-Based Medicine in the Nuffield Department of Primary Care Health Sciences, University of Oxford.

[https://www.cebm.net/wp-content/uploads/2020/03/Nathan-Davies.jpg]

Nathan Davies is Senior Research Fellow within the Centre for Ageing Population Studies in the Research Department of Primary Care and Population Health, University College London.

[https://www.cebm.net/wp-content/uploads/2020/03/Rachel-Frost.png] Rachael Frost is a Research Fellow with interests in frailty research, within the Centre for Ageing Population Studies in the Research Department of Primary Care and Population Health, University College London.

[https://www.cebm.net/wp-content/uploads/2020/03/Rachel-Frost.png]

[https://www.cebm.net/wp-content/uploads/2020/03/Sophie-Park.jpg] Sophie Park is a GP, Director of Medical Education (Primary Care and Community) at UCL Medical School and UCL Lead for the School of Primary Care Research (SPCR) Evidence Synthesis Working Group (ESWG).

[https://www.cebm.net/wp-content/uploads/2020/03/Sophie-Park.jpg]

SEARCH TERMS

PubMed was searched on 19 March 2020 for terms relating to “mobility”, “elderly”, and “systematic review” combined with “home” or “isolation”. Reference lists from included reviews and relevant trials were screened, with supplementary searches carried out to identify studies regarding the role of technology.

REFERENCES

All sources of evidence used in this review are available via the hyperlinks above.

All Rights Reserved. (c) 2017 Centre for Evidence-Based Medicine - cebm.net