Feasibility of physiological testing (Oxygen Consumption (VO_2), Heart Rate, Blood Pressure, Lactic acid and activity levels) in people with Myalgic Encephalomyelitis during normal daily activities.

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Background and objectives

People with Myalgic Encephalomyelitis (PwME) have abnormally low maximum oxygen consumption (VO2)[(1–8)] and reach their anaerobic thresholds (AT) quicker than healthy controls[(3,9)]. Some also produce greater levels of lactic acid when exercising[(3,10,11)]. It is unclear if this also happens during everyday activities.

The aim of this study was to investigate the feasibility of physiological measurements of PwME in their own homes during everyday activities.

Methods

Adults with ME who met the ICC[12] criteria wore a portable metabolic assessment system (PMS), heart rate variability (HRV) monitor, and their blood pressure (BP), heart rate (HR), oxygen saturation (O_2 sat) and lactic acid (LA) were taken during lying, sitting, standing, bathroom, kitchen, stairs and cognitive activities (according to their abilities). To assess longer-term responses, they continued to wear the HRV monitor for up to six additional days and also recorded their BP, HR, O_2 saturation and LA.

Figure 1. Pulse oximeter

Figure 2 lactic acid monitor

Figure 3 HRV monitor

Figure 4 Portable metabolic system

Figure 5 BP monitor

Results

17 participants were recruited, 71% female, mean age 45 years (see figure 6). Mean duration of ME, 15.3 years (see figure 7). Two had mild, 10 moderate and five had severe ME (see figure 8).

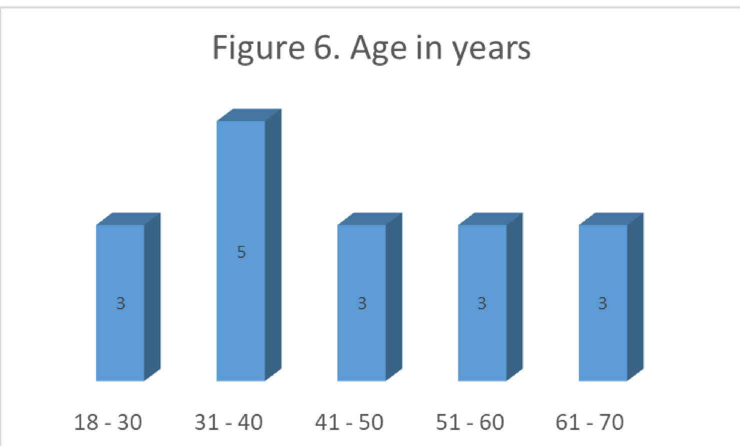

Figure 6. Age in years

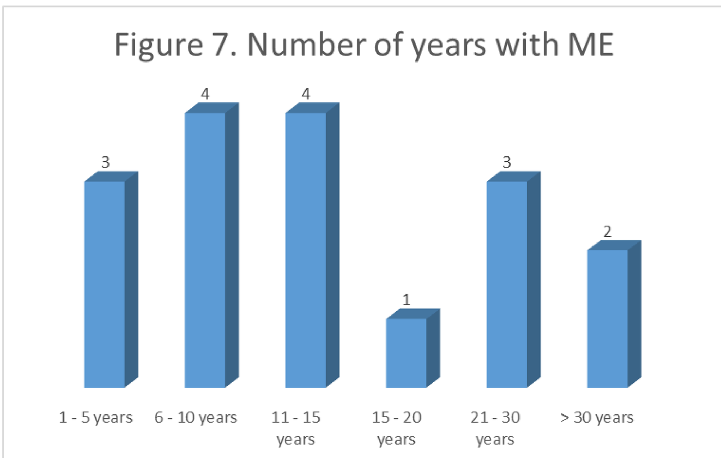

Figure 7. Number of years with ME

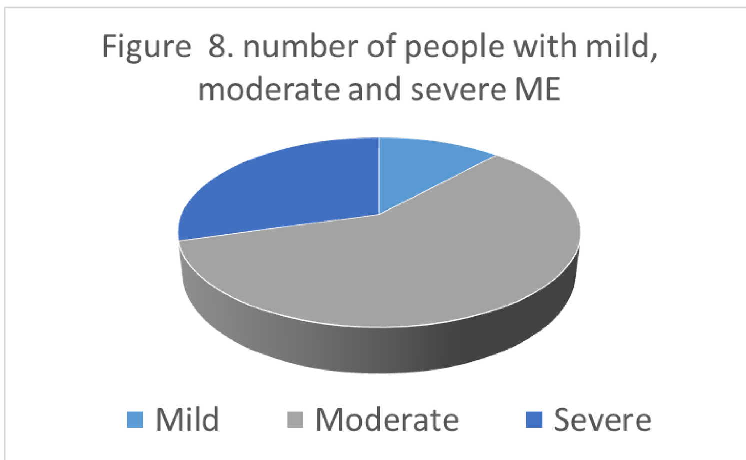

Figure 8. number of people with mild, moderate and severe ME

Feasibility of the study:

1. Recruitment was successful – 20 people were recruited online in four hours.
2. Procedure - all participants found the procedure acceptable and were able to complete some of the activities. However only 13 managed to stand still for 5 minutes and only 14 managed all the activities.
3. Outcome measures – measures were acceptable to all and identified changes in PwME. However, one person with severe ME struggled to take ongoing measurements due to cognitive difficulties and everyone struggled to take measurements when in PEM.

Some comments from participants:

It's been a real privilege to be part of the study… thank you for allowing me to participate (especially at severe)

I had a couple of issues with the heart rate monitor - the stickers don't seem to be that sticky and fell off a couple of times. Another time the bottom clip came off. Otherwise everything else has been great.

I'm so excited about this evidence. I know I'll send it to many people, starting with my Cardiologist! Thank you again. I feel extremely fortunate to have been involved in your study.

Discussion and Conclusion

Physiological measurement during everyday activity is feasible for PwME with mild to severe disability. Activities need to be adapted for different severities of ME to identify abnormalities and prevent harm. The outcome measures identified abnormal physiological changes in all PwME. Further research is needed to develop diagnostic and possible treatment protocols.

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