

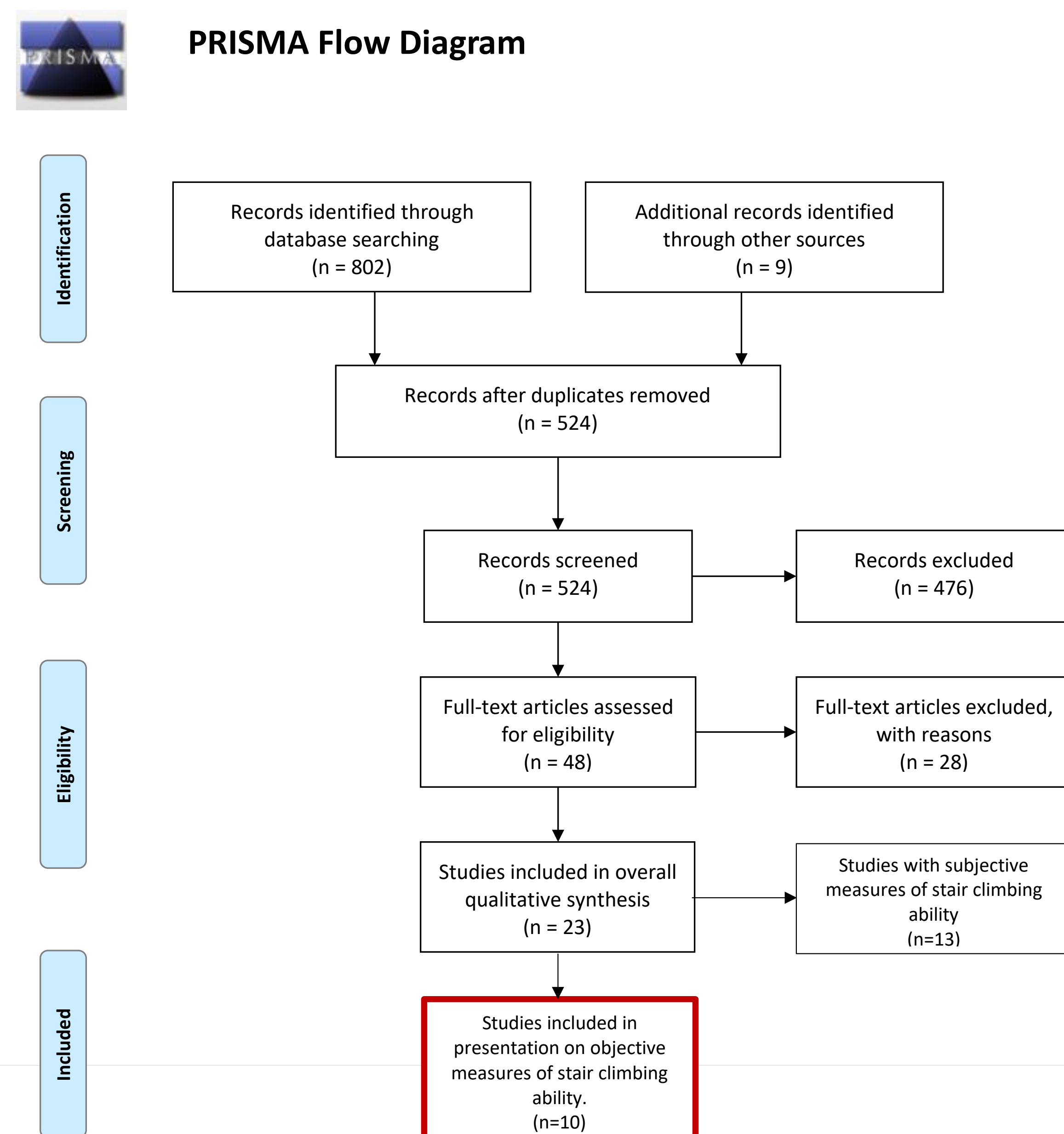


Introduction

Physical activity has been shown to improve numerous physiological factors including blood pressure, cardiorespiratory health, and glucose regulation. Additionally, physical activity has been associated with improved mental health and wellbeing. While guidelines have historically recommended long bouts of moderate to intense exercise, the 2018 National Physical Activity Guidelines suggest that shorter bouts of exercise are likely to provide similar health benefits. With this in mind, it is important to consider how short, lifestyle physical activities effect wellbeing.

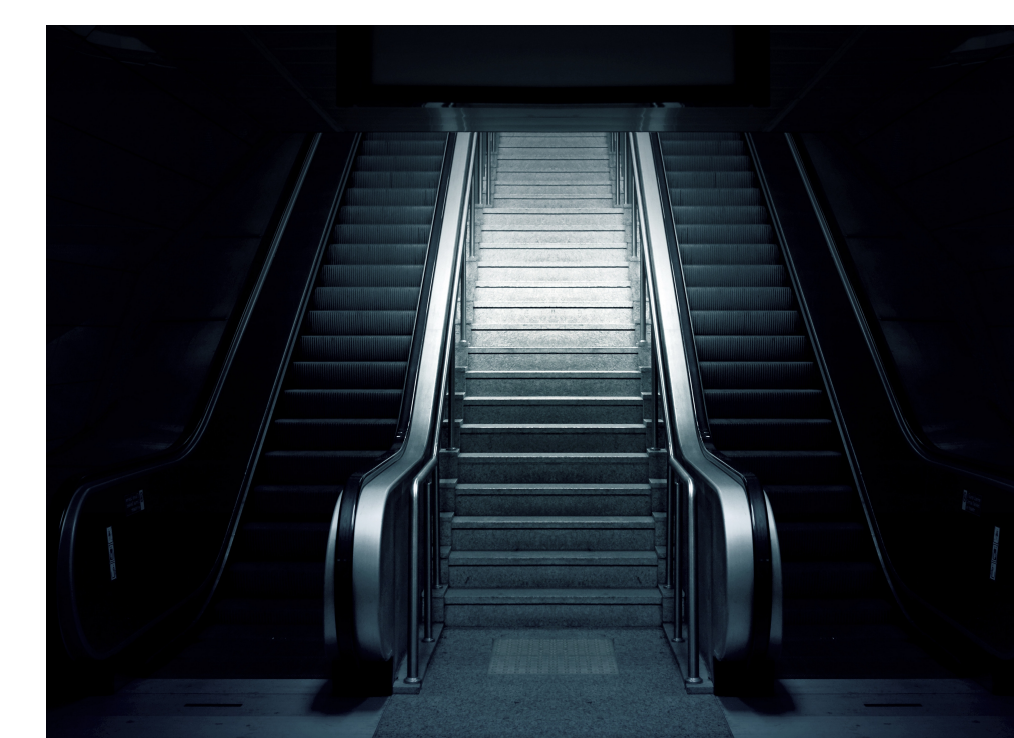
Stair climbing is a common lifestyle physical activity that can be classified as moderate to intense. Major muscle groups of the leg are activated when a person ascends a staircase and heart rate often rises. The prevalence of stairs within homes and public buildings have made them a popular tool for studying physiological factors. The information on mental wellbeing and stair climbing, however, is less well known. This presentation is focused on exploring the current literature regarding stair climbing and mental health outcomes. Specifically, this will focus on studies in which stair climbing ability was objectively measured. The expectation upon beginning this study was that stair use and the ability to climb stairs would be associated with improved mental health.

Figure 1. PRISMA Flow Diagram. This diagram displays the methods by which records were screened and sorted.



Methods

A systematic review was conducted using the standardized guidelines put in place by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A search on PubMed, PsychInfo, and Web of Science was done using keywords pertaining to this topic such as "stair-climbing", "mental health", "anxiety", and "quality of life". 802 studies were initially found during this search. Further sources were found using the citations of these papers. These articles were then sorted and included or excluded based on standardized criteria. These criteria included duplication and the mention of mental health outcomes. A total of 23 sources were found to include in the literature review. The studies were further organized based on whether measurements were objective or subjective. There were found to be 13 sources regarding subjective measures of stair climbing abilities, and 10 studies related to those objectively measured. This presentation is concerned with the body work work concerning objective measures of stair climbing. These objective measures include stair climbing time, stair height, and number of stairs traversed.



Results

Ten studies were found through this literature review that used objective measures to judge stair climbing capabilities. Of these studies, objective measures included stair climbing time, manipulation of stair height, and number of stairs traversed. Mental health outcomes included quality of life, fatigue, and more commonly symptoms of anxiety or depression.

Stair Climbing Time: There were seven studies that used stair climbing time as a method of measuring stair climbing aptitude. These studies were both cross-sectional and longitudinal. All of the studies found were done with patient populations or populations experiencing some sort of ailment. Aside from one study that was specifically concerning women, each study measured effects of both genders. Within the studies using time as a measure of stair climbing ability, five showed a statistically significant and positive relationship between time to traverse stairs and poor mental health outcomes.

Manipulation of Stair Height: There were two studies that measured step height. Both studies were on done on large, senior populations of Nordic residency. One study did not procure statistically significant results. The other showed that stair climbing capability, as measured by step height, was associated with symptoms of vitality ($r=0.31$) and mental health ($r=0.24$).

Number of stairs traversed: There was one study that used the number of stairs climbed in a given time to measure stair climbing ability. This study was concerned with feelings of fatigue, and it found that stair climbing is associated with a burst of energy that outlasts that of a 50mg dose of caffeine. This study was done specifically with college-aged women.

Table 1. Classification of studies and their results. All based on whether or not the association between mental health and objective measures was statistically significant.

Measure	Number of Articles	Number of articles indicating positive relationship with mental health outcomes	Number of Articles indicating no relationship between mental health outcomes
Total Objectively Measured Studies	10	7	3
Measured Stair Climbing Time	7	5	2
Manipulation of Stair Height	2	1	1
Measured Number of Stairs Traversed	1	1	0

Discussion

Based on information obtained through this systematic review, there is evidence that slow stair navigation is related to elevated symptoms of depression and anxiety. Because most of the studies done were cross-sectional, the causation of this relationship can not be established. In studies measuring the height of stairs traversed or number of stairs climbed, the relationship between stair climbing ability and mental health outcomes is unclear. More studies would need to be done in order to make sure statements with these measures.

Because most of these studies were done on clinical populations it is difficult to generalize these results to the overall public. More studies need to be done to determine if these findings can be extended to healthy populations. Additionally, all but one of these studies were done on middle age or senior adults. More studies need to be done on the effects that stair climbing has on younger populations.

Conclusions

This systematic review was done to better understand the current literature on stair climbing and it's psychological outcomes. This presentation specifically focuses on studies that utilize objective measures of stair climbing capability. From this review, it was found that there is a small body of work on this subject that mostly consists of clinical and senior populations. The diversity of approaches to this issue made it difficult to extrapolate any generalizations to the public.

Of the studies found, there was a trend indicating that stair climbing ability does have a relationship with mental health outcomes. The weight of the evidence supports that elevated symptoms of anxiety and depression are usually associated with worse performance on stair tasks. Given the importance of stair climbing as a lifestyle physical activity, it is important that more research be conducted to better understand it's relationship with the psychological factors.