Why you should read this article:

- To understand the current recommendations regarding the volume of physical activity per week
- To recognise how a nurse's physical activity levels can affect their performance at work and the credibility of advice they provide to patients
- To enhance your knowledge of the psychological benefits of physical activity

Assessing the effect of physical activity and exercise on nurses’ well-being

Frank Owusu-Sekyere

Abstract

It is generally accepted that physical activity has many health benefits, such as improved cardiorespiratory fitness, muscular fitness and bone health. Despite this, inactivity remains a significant health challenge in the UK and globally, contributing to conditions such as coronary heart disease and diabetes mellitus. Nurses have an important health promotion role in recommending the potential benefits of physical activity to the general public. However, research suggests that many nurses may not be undertaking enough physical activity themselves, despite the active nature of the nursing role. This article investigates the evidence that increased physical activity has the potential to improve the well-being of nurses. The article also examines the effect of physical activity on indicators of well-being, including feeling states such as affect, mood and emotion; depression; and sleep.

Author details

Frank Owusu-Sekyere, lecturer in sport and exercise psychology, Kingston University, Kingston upon Thames, Surrey, England

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Physical activity has been defined as any bodily movement produced by skeletal muscles that requires energy expenditure (Biddle et al 2015). Conversely, inactivity involves an absence or lack of movement, while sedentary behaviour involves sitting or lying during waking hours (Biddle et al 2015, World Health Organization (WHO) 2018).

Physical activity includes sub-components such as exercise, which is defined as a more structured and repetitive form of movement with the objective of increasing physical fitness, and sport, which is defined as a governed, structured and competitive form of activity that uses gross motor movement (Biddle et al 2015, WHO 2018). Therefore, physical activity incorporates various types of human activity that involve the individual exceeding their resting metabolic rate.

There is substantial evidence of the multifaceted benefits of physical activity, including its potential to improve health-related factors such as cardiorespiratory fitness, muscular fitness and bone health, while reducing the risk of non-communicable diseases such as coronary heart disease and type 2 diabetes mellitus (Reiner et al 2013, Department of Health and Social Care 2020).

The WHO (2020) states that these benefits can be achieved by meeting prescribed guidelines for the required amount of physical activity. These guidelines recommend that adults aged between 18 years and 64 years should undertake at least 150 minutes of moderate intensity aerobic physical activity throughout any given week; or at least 75 minutes of vigorous intensity aerobic physical activity; or an equivalent combination of moderate and vigorous intensity activity. In addition to this, muscle strengthening exercises should be undertaken on at least two days per week.

Physical inactivity and nurses

Despite clear evidence of the benefits of physical activity, persuading people to partake in exercise remains a significant challenge (Hallal et al 2012, WHO 2020).

In England for example, 34% of men and 42% of women do not meet the aerobic physical
activity guideline of 150 minutes per week (NHS Digital 2016). This contributes to the incidence of non-communicable diseases and costs the NHS around £7.4 billion each year (National Institute for Health and Care Excellence (NICE) 2018). It is therefore understandable that increasing people's physical activity levels has been high on the UK government's agenda for more than a decade (Biddle et al 2017).

The nursing workforce has an important role in promoting physical activity, and individual nurses should be considered as an important agent of change (Blake et al 2017). Nursing involves significant contact with patients, enabling nurses to develop a rapport and offer advice on lifestyle choices, such as inadequate physical activity, that may contribute to suboptimal health (Ross et al 2017). Furthermore, nurses who can develop a rapport and a sense of familiarity with patients increase the likelihood that patients will be receptive to any health promotion advice (Blaber 2013, Blake et al 2017).

Despite, or possibly because of, their role in health promotion, the physical activity levels of nurses themselves are subject to increasing scrutiny (Blake et al 2011, Hawker 2012, Blake and Harrison 2013). Nurses are subject to the same health-related concerns as the general population (Perry et al 2015), which also means that physically inactive nurses can further contribute to the burden on the NHS.

Nurses’ physical activity levels can also affect their performance as professional healthcare providers. Previous research has found that the health of staff such as nurses can have a direct effect on the quality of patient care (Esposito and Fitzpatrick 2011, Healy and McSharry 2011), as well as areas such as health-related productivity (Letvak et al 2013), absenteeism (Blake and Harrison 2013), and the longevity of employment, which in turn affects the amount of experience available to the nursing profession as a whole (Perry et al 2015).

Furthermore, patients are increasingly likely to regard healthcare staff as credible if those staff are perceived to be following their own health promotion advice, for example remaining active and exercising regularly (Fie et al 2013, Blake et al 2017). Being physically inactive can affect a nurse’s credibility with patients and thereby their ability to deliver effective and high-quality care (Perry et al 2015).

Nurses have various advantages that should encourage their participation in physical activity. For example, nurses are well educated, particularly in health and well-being, and benefit from the socioeconomic advantage of employment, which enhances the availability, choice and practicality of exercise (Perry et al 2015). However, such benefits do not always appear to translate into positive lifestyle choices for nurses (Bakhshi et al 2015, Blake et al 2017). A significant proportion of nurses do not undertake sufficient physical activity (Kumbrija et al 2007), with some studies identifying that as many as 50-70% of nurses were not sufficiently active ( Nahm et al 2012, Blake and Harrison 2013).

This article provides an evidence-based overview of how physical activity can contribute to the well-being of nurses, focusing less on the commonly discussed physiological benefits, and more on the psychological benefits of physical activity.

Psychological benefits of physical activity

When considered purely in relation to the prevention of disease, physical activity could be viewed as little more than a method for extending life expectancy ( Biddle et al 2013). However, outside of a narrow focus on disease prevention, research consistently details the role of physical activity in yielding ‘statistically significant, clinically meaningful improvements in well-being and quality of life outcomes’ ( Focht 2012).

These improvements include enhanced subjective well-being, increased life satisfaction, and reductions in the symptoms of anxiety and depression ( Elavsky et al 2005, Ekekakis 2013). These improvements are often discussed in relation to psychological concepts such as psychological well-being, global well-being, life satisfaction, quality of life and health-related quality of life; however, these terms are inconsistently defined and the subject of much debate ( Karimi and Brazier 2016).

Therefore, when considering the benefits of physical activity, this article will use the universally recognised term ‘well-being’ to encompass elements such as self-acceptance, positive relationships, autonomy, environmental mastery, personal growth and sense of purpose ( Hawker 2012, Karimi and Brazier 2016).

Physical activity has several psychological benefits, which may directly or indirectly improve well-being. For example, regular strength and aerobic exercise can lead to significant improvements in cognitive functioning and a slowing of cognitive decline in older adults ( Dishman et al 2012). Similarly, there is a small but significant relationship between physical activity and self-esteem, where well-being is enhanced by physical self-worth ( Elavsky 2010, Biddle et al 2015).

This article will focus on evidence of the role of physical activity in three of the most significant influencers of well-being – the ‘feeling states’ (affect, mood and emotion), depression and sleep.

Affect, mood and emotion

Affect is defined as the most generic, consciously accessible feeling state that an individual can experience ( Lochner 2016). ‘Affective states’ is commonly used as an umbrella term encompassing mood and emotion ( Lochner 2016). Within this, mood is considered an affective state that may or may not have originated from a clearly identifiable stimulus; while emotion is a specific feeling state following a reaction to, or cognitive appraisal of, an eliciting event that is comparatively intense, shorter in duration and has behavioural implications ( Biddle et al 2015, Lochner 2016).
The notion that physical activity ‘makes us feel good’ is common and relatively uncontroversial (Emerson and Williams 2015). The release of neurotransmitters such as endorphins and serotonin is often cited as the reason why physical activity is positively associated with feelings of happiness and subjective well-being (Pucci et al 2012).

Research generally supports the theory that exercise enhances positive affective states (Helfer et al 2015). However, the relationship between exercise and positive affect is not as straightforward as is often portrayed (Emerson and Williams 2015), and not all physical activity elicits a positive response. As such, research in this area has focused on understanding the exact circumstances that elicit a significant positive response.

Comparisons have been made between the benefits of types of exercise, for example aerobic versus resistance; exercise intensity, for example high versus low; and exercise longevity, for example single sessions (acute) versus sustained periods of activity (chronic). McDonald and Hodgdon’s (1991) meta-analysis on exercise and mood concluded that aerobic fitness training reduced feelings of tension, anger, depression, fatigue and confusion, while increasing vigour.

Similarly, Arent et al’s (2000) meta-analysis of 32 studies found that the mood of older adults could be improved by low intensity exercise, as well as by a mix of elements of cardiovascular and resistance training.

Research has not dismissed the potential of higher intensity exercise to improve mood, but concludes that as the intensity of exercise increases, so too does the risk that the individual’s affective response will cease to be positive and that the exercise may become onerous (Ekkekakis et al 2005, 2011). Therefore, although high intensity exercises such as interval training have grown in popularity, their demanding nature means that they may elicit negative feeling states during and following participation (Ekkekakis et al 2005). This is particularly evident when the exercise intensity is imposed, rather than self-selected (Ekkekakis et al 2011).

In terms of exercise longevity, research suggests that positive affective states occur following both a single session and sustained periods of physical activity.

A meta-analysis by Reed and Ones (2006) analysed 158 studies on the acute effects of aerobic exercise and found a moderate but meaningful improvement in positive affect immediately following up to 35 minutes of low intensity activity. This finding was supported by other studies such as Reed and Buck (2009). However, the positive effect was even stronger over a sustained period of time; for example, 30-35 minutes of low intensity activity completed for 3-5 days per week for 10-12 weeks (Reed and Buck 2009).

These findings demonstrate that the relationship between physical activity and feeling states is mediated by various exercise factors such as intensity, type of activity and length of participation. Nonetheless, there is significant evidence that targeted bouts of exercise can improve an individual’s affective state, and that this effect is increasingly significant when pre-activity affective states are low (Reed and Ones 2006, Biddle et al 2015).

Depression

Around one in four people in England experience a mental health issue such as depression and anxiety each year, and it is predicted that by 2030 depression will be the leading risk factor for life expectancy (NHS Digital 2009, Biddle et al 2015). Mental health is particularly relevant for nurses, with research demonstrating that healthcare professionals often experience working environments that can have a detrimental effect on their mental health, involving long working hours and shift patterns that can interfere with sleep (Kalmbach et al 2018).

While there are various established forms of treatment for mental health issues, including medicines such as antidepressants and cognitive behavioural therapy (CBT), physical activity has also been considered as a treatment modality because of its potential to promote positive affective states, improve social interaction and relieve stress (Hamer et al 2006, Ekkekakis 2013).

Evidence of a bi-directional relationship between physical activity and depression was identified by Azvedo da Silva et al (2012). Their longitudinal study of civil servants aged 35-55 years concluded that those who were not depressed but remained regularly active were less likely to be depressed after an eight-year follow-up than those who were not regularly active. Inversely, those who were depressed at baseline were less likely to be regularly active at the eight-year follow-up than those who were not depressed at baseline.

Similarly, Mammen and Faulker’s (2013) seminal systematic review of 30 longitudinal studies found a significant inverse relationship between physical activity and depression at follow-up, concluding that even low levels of physical activity, for example walking for fewer than 150 minutes per week, have an important role in the promotion of physical activity to their patients).

Nurses’ own physical activity levels can affect their performance at work and the quality of care they provide.

Undertaking physical activity can provide nurses with several psychological benefits, such as improved mood and sleep quality.

Key points

- In England, 34% of men and 42% of women do not undertake the recommended 150 minutes of moderate intensity physical activity per week.
- Nurses have an important role in the promotion of physical activity to their patients.
- The physical activity levels of nurses themselves are subject to scrutiny, and patients are increasingly likely to regard health promotion advice from a healthcare professional as credible if they perceive that the healthcare professional is following their own advice.
- Nurses’ own physical activity levels can affect their performance at work and the quality of care they provide.
- Undertaking physical activity can provide nurses with several psychological benefits, such as improved mood and sleep quality.
per week, could prevent future depression. 

Such findings support the theory that physical activity may reduce the likelihood of people developing depression. However, the complex nature of mental health issues, and the potential for the role of physical activity to be influenced by a multitude of factors, have meant that the positive effects of physical activity on depression remain disputed.

This is compounded by research in this area being affected by inconsistencies in methodological rigour, various approaches to defining mental health issues, and confounding variables such as age, genetics, socioeconomic status, the presence of other physical health issues and the use of medicines such as antidepressants (Biddle et al 2015). For example, while previous studies have found that aerobic exercise can reduce symptoms of depression (Dunn et al 2005), and yield outcomes comparable to antidepressant medicines (Babiyak et al 2000), more recent research has not consistently supported these claims.

Cooney et al (2013) reviewed 39 randomised controlled trials comparing exercise with a range of treatments including placebo, medicines and psychological therapies such as CBT in adults with depression. While the researchers found that exercise was moderately more effective in reducing symptoms of depression than no intervention or placebo, exercise was no more effective than psychological or pharmacological therapies.

It is important that the potential for exercise to treat depression is not overstated or promoted in place of other treatments such as antidepressant medicines and CBT without an evidence-based rationale. However, this does not mean that physical activity has no place in treating depression. Instead, physical activity can be used to supplement existing forms of treatment. Biddle et al (2015) stated that, ‘the potential benefit of advocating the use of exercise as part of the treatment for depression far outweighs the potential risk that no effect will occur’.

There has been a lack of research into the benefits of exercise as a treatment for anxiety, while the evidence that does exist may be negatively affected by research issues such as use of participants with clinical and non-clinically diagnosed anxiety (Biddle et al 2015). Consequently, it is challenging to form significant conclusions about the role of physical activity in reducing anxiety.

It is important to note that most of the studies detailed in this section focus on depression and anxiety within the general population rather than in nurses specifically. Nonetheless, general findings on the effects of physical activity on the symptoms of mental health issues are particularly relevant to nurses, whose role often involves extrinsic effort, for example physical demands under time pressure and with associated responsibility, and over-commitment, which are associated with elevated risk of anxiety and depression (Mark and Smith 2012).

**Sleep**

Optimal sleep quality improves daytime functioning, life satisfaction and mental health in general, while impaired sleep length and quality are associated with suboptimal quality of life, decreased productivity and an increased risk of morbidity (Kripke et al 2002, Kredlow et al 2015).

Considering the research that has shown nurses are susceptible to mental health issues because of the demanding nature of the role (Kalmbach et al 2018), improvements in sleep quality may be another benefit of nurses engaging in physical activity.

Physical activity has often been used as a self-help intervention for managing sleep issues (Kredlow et al 2015), which is based primarily on the ‘common-sense’ anecdotal theory that physical activity will exhaust the individual and improve the quality of their sleep (Biddle et al 2015).

There are also several theories about the mechanisms through which physical activity may exert an influence on sleep. These mechanisms include increased energy consumption and metabolic rate (Morselli et al 2012), improved mood and reduced anxiety symptoms (Uchida et al 2012), reduced heart rate and heart rate variability (Sandecock et al 2005), and reduced body mass index (Kredlow et al 2015).

Although there is a lack of agreement on the exact mechanisms by which physical activity may improve sleep, the general theory is supported by research. For example, meta-analyses in this area have found that both single sessions and more regular exercise increases the proportion of deep sleep and total sleep time, while also reducing the amount of time taken to fall asleep (Yang et al 2012).

Kredlow et al (2015) conducted a meta-analysis on the effects of acute and chronic physical activity on sleep using 66 studies that incorporated 2,863 participants. The researchers found significant evidence that acute exercise reduces sleep disturbance and had a small but significant beneficial effect on total sleep time, sleep efficiency and sleep quality.

Regarding regular exercise, Kredlow et al (2015) found that it had a small but significant beneficial effect on total sleep time and sleep efficiency, and a moderate beneficial effect on sleep quality. The research found no significant difference between aerobic versus anaerobic exercise. Overall, research suggests that nurses may experience sleep benefits through various types of physical activity.

When considering the effects of exercise on sleep quality, another important consideration is the timing of the physical activity. Some studies have stated that exercising within a few hours of bedtime may be detrimental to sleep (Stepanski and Wyatt 2003). However, Kredlow et al (2015) stated that such findings were inconsistent and there was no clear guidance on optimal exercise time. For example, exercising less than three hours before bedtime was significantly associated with less disturbed sleep (defined as lower wake time after sleep onset), whereas exercising 3-8 hours before bedtime resulted in a decrease in rapid eye movement sleep (Kredlow et al 2015). More recent evidence has found that
evening exercise assisted sleep, although this was only the case when the exercise was moderate and not vigorous, was not conducted less than one hour before bedtime, such as cycling (Stutz et al 2019, Miller et al 2020).

Conclusion

There is a dearth of research evidence on the potential benefits of physical activity that can be applied to the nursing workforce. However, research does suggest that physical activity can enhance affective states, serve as a preventive mechanism against depression, contribute towards the treatment of depression, and improve the length and quality of sleep.

There are several factors that can affect how nurses experience these benefits, for example the time, type and regularity of physical activity. Nonetheless, the evidence suggests that nurses can experience the well-being-related benefits of physical activity by following the WHO (2020) prescribed guidelines for the required amount of physical activity in adults.

References


