

## **Getting healthcare staff more active: The mediating role of self-efficacy**

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## **Abstract**

*Objectives.* Physical activity has been associated with positive health outcomes. The objective of the study was to investigate the relationship between knowledge of physical activity, social support, self-efficacy, perceived barriers to physical activity, and level of physical activity among healthcare employees and students in a National Health Service (NHS) Trust.

*Design.* This study was secondary analysis of questionnaire data on the health and well-being of staff and students within the NHS.

*Method.* A total of 325 student nurses and 1,452 NHS employees completed the questionnaire. The data were analysed using descriptive statistics, zero-order correlations, and structural equation modelling.

*Results.* Self-efficacy fully mediated the relationship between social support, perceived barriers, and level of physical activity in the student sample and partially mediated the relationship between social support, perceived barriers, and level of physical activity in the healthcare staff sample. Knowledge of physical activity had no significant effect on physical activity.

*Conclusion.* Findings suggest that instead of instilling knowledge, interventions to promote physical activity among healthcare staff and students should enhance social support and self-efficacy and also to remove perceived barriers to physical activity.

The National Health Service (NHS) is recognized as one of the best health services in the world and the largest single organization in Europe. Following a rapid increase in preventable health-related problems in the UK population (Department of Health, 2008b; NHS Information Centre, 2009), the NHS is purported as an exemplar for the health of the general public (Department of Health, 2004, 2008a, 2009a, 2009b). NHS staff not only play a major role in promoting healthy behaviours to their patients, but they also play an important role in delivering government health policies (Department of Health, 2009a, 2009b). Moreover, the health of NHS staff is important as it can affect individual health, NHS resources, and quality of patient care (Department of Health, 2009b; Williams, Michie, & Pattani, 1998). Targeting the health of NHS staff (and healthcare students as the next generation of NHS employees) has therefore become a national priority. The link between physical activity and positive physical and psychosocial outcomes is well established (Penedo & Dahn, 2005). Specifically, physical activity is associated with reduced cardiovascular risk (Sallis, Patterson, Buono, & Nader, 1988) and body mass index, improved quality of life (McAuley & Morris, 2007), better mood and functional capacity (Sutherland & Andersen, 2001), reduced clinically defined depression (Lawlor & Hopker, 2001), and lower mortality risk (Martínez-González et al., 2001). Despite the well-known benefits of physical activity and their health-promoting role, healthcare staff often exhibit poor lifestyle behaviours themselves. Research has shown that a large proportion of healthcare staff exercise less than the government recommended level (Department of Health, 2009b; Jinks, Lawson, & Daniels, 2003). Understanding the factors that predict exercise

behaviour in healthcare staff and student nurses will provide important guidelines for the design of health interventions to motivate them to initiate and adhere to regular exercise. This has important public health implications not only for improving the health of those employed within the NHS, but also to increase their motivation to promote exercise to their patients, since it has already been shown that individual behaviours are associated with health-promoting behaviours in healthcare staff (McDowell, McKenna, & Naylor, 1997; Pipe, Sorensen, & Reid, 2009).

### **Factors affecting physical activity**

Given the established link between physical activity and health, the promotion of physical activity has received increasing attention in recent decades. Research in this area has identified various factors associated with physical activity levels. These include social support, self-efficacy (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003), outcome expectancy (Williams, Anderson, & Winett, 2005), and past exercise behaviours (DuCharme & Brawley, 1995). Environmental factors are also reported to be important in shaping physical activity (Troost, Owen, Baulam, Sallis, & Brown, 2002). Despite extensive research exploring the predictors of physical activity in various populations and ages, studies in healthcare staff or a student nurse population have been relatively scarce. One study of 970 female hospital nurses in Thailand indicated that perceived social support, perceived self-efficacy, and barriers to exercise are all significant predictors of exercise participation (Kaewthummanukul, Brown, Weaver, & Thomas, 2006). Utilizing the social cognitive theory (Bandura, 1986), the present study examines the relationship between social support, self-efficacy, barriers to

exercise, and level of physical activity among healthcare staff and student nurses.

The role of physical activity-related knowledge in predicting physical activity levels is also explored.

Health education has long been regarded as an important method of encouraging individuals to adopt healthy behaviours. Currently, the majority of education programs focus on dissemination of knowledge, with the view that enhanced knowledge about the benefit of physical activity would increase health behaviour (Suminski & Petosa, 2006; Young, Haskell, Taylor, & Fortmann, 1996). However, it seems that instilling knowledge alone may be insufficient to produce behavioural change (Langlois & Hallam, 2010; N<sup>o</sup>aslund & Fredrikson, 1993). In the context of physical activity, knowledge of physical activity has been associated with physical activity intention or behaviour only in children (Craig, Bauman, Gauvin, Robertson, & Murumets, 2009; DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998) and older adults (Fitzgerald, Singleton, Neale, Prasad, & Hess, 1994). To increase physical activity in adult populations, it may be necessary to target specific social and cognitive variables related to the behaviour.

Grounded in social cognitive theory (Bandura, 1977, 1986), self-efficacy is defined as a personal conviction in one's capabilities to organize and implement courses of actions in order to cope with a prospective situation (Bandura, 1997, 2004). The theory of self-efficacy suggests that the stronger the individual's efficacy expectations, the more likely he/she will initiate, and adhere to the behaviour. Extensive research has demonstrated the positive role of self-efficacy in predicting health behaviour and psychosocial adjustments among diverse populations (Luszczynska, Gutierrez-Dona, & Schwarzer, 2005; Rabinowitz,

Mausbach, Thompson, & Gallagher-Thompson, 2007; Sarkar, Ali, & Whooley, 2007; Schwarzer & Renner, 2000). In addition, considerable evidence has linked self-efficacy with physical activity among individuals of various age ranges and disease conditions (Ferrier, Dunlop, & Blanchard, 2010; Heinrich, Jokura, & Maddock, 2008; Marcus et al., 2008) and most often, self-efficacy is the strongest predictor of physical activity (Reavenall and Blake, 2010). Individuals with higher self-efficacy also perceive less effort being spent during physical activity, show higher level of enjoyment during and after physical activity, and report feeling better after physical activity (McAuley et al., 2007; Treasure & Newbery, 1998). Self-efficacy was therefore hypothesized to be a significant predictor of physical activity in this study.

Perceived social support has also been described as a significant factor associated with physical activity (Kim, McEwen, Kieffer, Herman, & Piette, 2008; Lorentzen, Ommundsen, & Holme, 2007). Social support may have a direct effect on exercise by influencing the individual to 'engage' in physical activity. In the present study, it is proposed that social support may also indirectly influence exercise by strengthening self-efficacy. According to the proactive agentic model (Benight & Bandura, 2004), a supportive individual can be a role model for coping skills, provide incentives for engagement in physical activity, and motivate others by showing that barriers can be overcome. These kinds of social support can enhance self-efficacy which in turn, leads to engagement in physical activity (Peterson et al., 2008), and this has been demonstrated recently in middle-aged and older adults (Ayotte, Margrett, & Hicks-Patrick, 2010). In

addition, the mediational role of self-efficacy can bring out the beneficial effects of social support across diverse populations and cultures (Benight & Harper, 2002; Cheung & Sun, 2000).

It has also been shown that behavioural performance is influenced by the perceptions about the environment, wherein the behaviour will be performed (Bandura, 1986). Therefore, perceived barriers to physical activity may be influential in determining an individual's level of activity. If individuals perceive an environment filled with barriers, they may decide not to initiate or adhere to physical activity. There has been evidence suggesting that perceived barriers to physical activity are important in any age group (Korkiakangas, Alahuhta, & Laitinen, 2009; Moore et al., 2010; Schutzer & Graves, 2004). In addition, it is proposed that perceived barriers to physical activity would lower self-efficacy as such beliefs are not based on actual abilities but on perceptions about one's abilities (Bandura, 1995). For example, in a study of 147 older adults, barriers to physical activity were found to predict physical activity levels indirectly through self-efficacy (Conn, 1998). We propose that practical barriers may affect physical activity intention by lowering an individual's efficacy in initiating physical activity.

### **Aim of the study**

The aim was to explore the effect of knowledge of physical activity, perceived barriers, social support, and self-efficacy on physical activity amongst healthcare staff and nursing students in an NHS Trust. The relationship between physical activity and mood status was also examined. Based on the previous literature, it was hypothesized that self-efficacy would mediate the relationship between social support and practical barriers on physical activity. It was hypothesized

that knowledge would have no effect on self-efficacy and physical activity, and that physical activity would positively predict mood.

## **Method**

### **Design**

This study was a secondary analysis of data from a large-scale survey on the health and well-being of NHS staff collected from December 2005 to January 2006 and of nursing students collected in October to November 2006. Only the data on self-reported physical activity and general health from the larger surveys were used for this study.

### **Sample**

The original studies were conducted at a single site of an acute NHS teaching hospital. All 7,087 NHS employees and 1,265 undergraduate nursing students based on the site were invited to take part in the study. A power analysis for the secondary analysis indicated that a structural equation modelling (SEM) analysis with five independent variables, a medium effect size ( $f^2 = .25$ ), a .05 statistical significance level, and a power of .80 required 206 participants (Cohen, 1988). Thus, the obtained sample of 1,452 healthcare staff and 325 nursing students was adequate for the planned statistical analysis.

### **Questionnaire measures**

The questionnaire tool used in both the original studies was adapted from a measure used in a national evaluation of workplace wellness programmes across the United Kingdom (Bull, Adams, Hooper, & Jones, 2008) and also in an



evaluation of an NHS workplace wellness scheme (Lee, Batt, Mortimer, Blake, & Booth, 2008).

### **Physical activity level and barriers to physical activity**

Level of physical activity was measured by a single item 'Think about all the physical activity you do in a typical week. Do you take part in physical activity or exercise on most days of the week for 30 minutes or more each time?'. Response was rated on a 6-point Likert Scale, from 0 = 'No and do not intend to do so' to 5 = 'Yes and have been doing for more than 6 months'. Participants were also presented with a list of 20 common barriers that may prevent people from engaging in physical activity and were asked to select the item(s) that applied to them (McCormack, Milligan, Giles-Corti, & Clarkson, 2003).

### **Self-efficacy for physical activity**

Self-efficacy for physical activity was measured using a 5-item scale (McCormack et al., 2003). Items were rated on a 3-point Likert Scale, from 0 = 'Not at all confident' to 2 = 'Very confident', with higher score indicating higher level of self-efficacy. The reliability of the scale was satisfactory in both samples (Cronbach's  $\alpha = .82$  in the student sample and  $.85$  in the staff sample).

### **Knowledge of physical activity**

Knowledge of physical activity was measured on a 5-item scale (Australian Institute of Health and Welfare, 2003). Participants were given five statements about physical activity and health and were asked to rate them on a 5-point Likert Scale, from 0 = 'strongly disagree' to 4 = 'strongly agree', with higher score

indicating better knowledge of physical activity. The reliability of the scale was satisfactory in both samples (Cronbach's  $\alpha = .84$  in the student sample and  $.87$  in the staff sample).

### **Social support for physical activity**

Social support for physical activity was measured by a 4-item scale, adapted from the RESIDE Project (Giles-Corti et al., 2007). Participants rated how often their family, partner, friends, and colleagues gave them encouragement to be physically active in the past month on a 5-point Likert Scale, from 0 = 'Rarely' to 4 = 'Very often', with higher score indicating higher level of social support. The reliability of the scale was satisfactory in both samples (Cronbach's  $\alpha = .88$  in the student sample and  $.92$  in the staff sample).

### **Mood**

Perception of mood status was measured using the 12-item General Health Questionnaire- 12 (GHQ) (Goldberg & Williams, 1998). Participants were asked to rate how their general health had been over the past few weeks on a 4-point Likert Scale, from 0 = 'more than usual' to 3 = 'much less than usual'. Likert scoring was used (0011) and the sum of the item scores was calculated (Goldberg et al., 1997). Higher scores indicated lower mood. The reliability of the scale was satisfactory in both samples (Cronbach's  $\alpha = .85$  in the student sample and  $.84$  in the staff sample).

### **Study procedure**

Ethical approval was gained for the original studies from the University Medical

School Research Ethics Committee (for the student sample) and also from the COREC (Central Office for Research Ethics Committees) and local NHS Research and Development (for the staff sample). For the student sample, questionnaires were distributed to all pre-registration nursing students who were provided with a verbal and written explanation of the study by the same researcher. Those students who chose to participate were asked to return the form anonymously within 4 weeks to a response-box located in a central area. For the healthcare staff sample, questionnaires were distributed to all employees in the following occupational groups: Admin and Clerical/Senior Managers (n = 1,214), Allied Health Professionals (n = 387), Ancillary (n = 507), Dental (n = 3), Maintenance (n = 88), Medical (n = 988), Nursing and Midwifery (n = 2966), Scientific and Professional (n = 90), Technicians (n = 844) via departmental managers, and through e-mail. Completion was voluntary and anonymous. Employees were asked to return their questionnaires via the internal mail system within 4 weeks.

### **Data analysis**

First, descriptive statistics and zero-order correlations among all variables were examined. Second, a two-stage modelling procedure recommended by Anderson and Gerbing (1988) was used to evaluate the goodness of fit of the hypothesized model. Confirmatory factor analysis (CFA) was conducted to examine the adequacy of the measurement for each of the constructs under investigation, in which latent factors were allowed to inter-correlate freely (Byrne, 2001). Followed by the evaluation of the measurement model, SEM analysis was performed to test the fit of hypothesized structural model. For both CFA and

SEM, parcels were created as indicators for each construct. Finally, to examine the meditational effect of self-efficacy on the relationship between knowledge, social support to physical activity, and barriers to physical activity on levels of activity, bootstrap procedure was used to test the indirect effect. Following the recommendations of Shrout and Bolger (2002), bias-corrected confidence intervals (CIs), based on 1,000 resamples, were used in the bootstrap analysis. To determine the suitability of the models, several fit indices were used: chi-square of the estimated model ( $\chi^2$ ), non-normed fit index (NFI), incremental fit index (IFI), and root mean square error of approximation (RMSEA) (Bentler, 1990). NFI and IFI range between 0 and 1, with values greater than .90 are indicative of a good fit, whereas RMSEA values between .03 and .08 are interpreted as reasonable fit (Browne & Cudeck, 1993; Hoyle & Panter, 1995; Hu & Bentler, 1999). Analyses were performed using AMOS 16.0 (SPSS Inc.) with the maximum likelihood method of estimation.

## **Results**

### **Sample characteristics**

Of the 1,452 staff in the original survey, 79.5% were female and mean age was 41 years (SD =11.24, range 17–72). On average, staff had worked for the Trust for 8.7 years (SD = 8.22, range <1–40). The sample was relatively representative of Trust employees overall. Most of the staff were from nursing (38.2%) and administrative or clerical categories (25.5%) that represented the largest occupational groups within the Trust. Of the 325 student nurses in the original study, 96% were female and the mean age was 24.78 years (SD = 6.88, range 19–53 years), which was representative of the nursing student population.

## **Descriptive statistics**

Almost half of the healthcare staff (45.2%) and more than half of the student nurses (54%) did not meet the government guidelines for physical activity (i.e., 30 min of moderate activity on most days of the week) (Department of Health, 2004). The most common reported barriers to engaging in physical activity for both samples were not having time to be physically active (62.6% for healthcare staff; 70.6% for the student nurses), feeling tired (34.1% for healthcare staff; 48.5% for the student nurses), and lack of motivation (23.7% for healthcare staff; 36.4% for student nurses). The mean score for self-efficacy for physical activity was relatively low in both samples ( $M = .99$ ,  $SD = .54$  for healthcare staff;  $M = .79$ ,  $SD = .45$  for student nurses). Knowledge about physical activity was generally high as might be expected in those educated in, and promoting healthcare behaviours ( $M = 2.60$ ,  $SD = .55$  for healthcare staff,  $M = 2.62$ ,  $SD = .49$  for student nurses). The mean score of social support for physical activity was quite low ( $M = 1.40$ ,  $SD = 1.03$  for healthcare staff;  $M = 1.51$ ,  $SD = .96$  for student nurses). Table 1 shows the descriptive statistics for the variables in the study.

[insert Table 1 here]

## **Correlation between variables**

Results from correlation analyses showed that self-efficacy ( $r = .40$ ,  $p < .001$  for healthcare staff;  $r = .41$ ,  $p < .001$  for student nurses) and social support ( $r = .22$ ,  $p < .001$  for healthcare staff;  $r = .24$ ,  $p < .001$  for student nurses) were positively

correlated with level of physical activity in both samples. Perceived barriers to physical activity ( $r = -.27, p < .001$  for healthcare staff;  $r = -.29, p < .001$  for student nurses) were negatively correlated with level of physical activity in both samples. Knowledge of physical activity was significantly correlated with level of physical activity in student sample only ( $r = .16, p < .01$ ). Mood was significantly positively correlated with level of physical activity in healthcare staff sample only ( $r = -.11, p < .001$ ). In addition, self-efficacy was positively correlated with level of physical activity ( $r = -.42, p < .001$  for healthcare staff;  $r = -.41, p < .001$  for student nurses) and social support for physical activity ( $r = -.14, p < .001$  for healthcare staff;  $r = -.28, p < .001$  for student nurses), and negatively correlated with perceived barriers to physical activity ( $r = -.40, p < .001$  for both healthcare staff and student nurses) in both samples, which supported the study hypotheses. Table 2 shows the correlation between variables in the study.

[insert Table 2 here]

### **Model of physical activity for the healthcare staff sample**

#### **Measurement model**

Results of CFA showed that the overall model yielded a satisfactory fit,  $\chi^2 (49) = 44.27, p = ns, NFI = .99, IFI = .99, RMSEA = .01$ . Standardized factor loadings ranged from .57 to .87 and were all significant at the  $p < .001$  level. The standardized factor loadings of all indicators in the measurement model are shown in Figure 1.

[insert Figure 1 here]

## **Structural model**

Results of SEM showed that the hypothesized model yielded a satisfactory fit to the data:  $\chi^2 (45) = 82.25$ ,  $p < .001$ , NFI = .98, IFI = .99, RMSEA = .03. Barriers to physical activity and support for physical activity were directly related to self-efficacy for physical activity, which significantly predicted level of physical activity. Barriers to physical activity and support for physical activity were also significantly related to level of physical activity. Knowledge of physical activity had no effect on self-efficacy for physical activity and level of physical activity. Also, bootstrap analyses showed that the direct and indirect effect of social support for physical activity (direct effect = .17,  $p < .05$ , 95% CI .11 to .22; indirect effect = .05,  $p < .05$ , 95% CI .03 to .08) and barriers to physical activity (direct effect =  $-.06$ ,  $p < .05$ , 95% CI  $-.11$  to  $-.01$ ; indirect effect =  $-.18$ ,  $p < .01$ , 95% CI  $-.21$  to  $-.15$ ) on level of physical activity were significant, suggesting a partial mediation as proposed by Baron and Kenny (1986). Level of physical activity had a significant positive effect on mood. Figure 1 shows the standardized path coefficient of variables in the structural model, and Table 3 shows the total, direct, and indirect effects of the mediation model.

## **Model of physical activity for the student sample**

### **Measurement model**

Results of CFA showed that the overall model yielded a satisfactory fit,  $\chi^2 (49) = 68.15$ ,  $p < .01$ , NFI = .92, IFI = .97, RMSEA = .05. Standardized factor loadings ranged from .58 to .80 and were all significant at the  $p < .001$  level. The standardized factor loadings of all indicators in the measurement model are shown in Figure 2.

## **Structural model**

Results of SEM showed that the hypothesized model yielded a satisfactory fit to the data:  $\chi^2 (45) = 90.13$ ,  $p < .001$ , NFI = .92, IFI = .92, RMSEA = .06. Barriers to physical activity and support for physical activity were directly related to efficacy of physical activity, which significantly predicted level of physical activity. Barriers to physical activity and support for physical activity had no significant effect on level of physical activity. Knowledge of physical activity had no effect on self-efficacy for physical activity and level of physical activity. Also, bootstrap analyses showed that the indirect effect of social support for physical activity (.13,  $p < .001$ , 95% CI: .06 to .22) and barriers to physical activity (-.17,  $p < .001$ , 95% CI -.28 to -.10) on level of physical activity were significant but their direct effects were insignificant, suggesting a full mediation as proposed by Baron and Kenny (1986). Level of physical activity had no significant effect on mood. Figure 2 shows the standardized path coefficient of variables in the structural model, and Table 3 shows the total, direct, and indirect effects of the mediation model.

## **Discussion**

This study investigated the relationship between knowledge of physical activity, perceived barriers to physical activity, social support, self-efficacy, level of physical activity, and psychological health amongst healthcare staff and nursing students in an NHS Trust setting. The mediating role of self-efficacy was also examined. Results from the SEM showed that self-efficacy mediated the relationship between social support, barriers to exercise, and levels of physical activity fully in the student sample and mediated partially in the healthcare staff



sample. Knowledge had no effect on self-efficacy and level of physical activity in either sample. Finally, level of physical activity had a positive effect on mood in the healthcare staff sample.

Social support, self-efficacy, and perceived barriers were found to be influential factors in predicting physical activity amongst healthcare staff and nursing students. These findings are consistent with the literature linking physical activity to socio-cognitive variables. The importance of self-efficacy is further emphasized by the indirect influence of social support and perceived barriers on physical activity through self-efficacy. Consistent with the proactive agentic model and previous research on the mediational role of self-efficacy (Benight & Bandura, 2004; Cheung & Sun, 2000; Dutton et al., 2009), our findings showed that self-efficacy was a significant mediator between social support and level of physical activity, as well as barriers to physical activity.

Increasing self-efficacy for physical activity in healthcare staff should therefore be considered, and this might be achieved by supportive others (such as peers or workplace health champions) offering encouragement or modelling positive coping skills. It is also conceivable that individuals who perceive more barriers to physical activity would be less likely to believe that he/she has the ability to initiate or adhere to physical activity. Findings support Bandura's social cognitive theory and suggest that self-efficacy is a crucial variable in explaining health behaviour.

In this study, self-efficacy fully mediated the relationship between perceived barriers, social support, and level of physical activity in the student sample and partially mediated the relationship between barriers, social support, and level of physical activity in the healthcare staff sample. One possible explanation might

be that participants in the nursing student sample are younger than those in the healthcare staff sample. Bandura (1995) postulates that age is an important factor affecting self-efficacy judgment as many human behaviours develop through observing and modelling others. Based on this speculation, seeing similar people performing the behaviour would influence the belief that one has the ability to perform that particular behaviour. Participants in our student sample may be more easily influenced by their peers and perceive a higher level of similarity between them. Therefore, self-efficacy might exert a greater influence than the other variables in the student sample.

Despite the fact that participants in our study generally had a high level of knowledge about the benefits of physical activity (as might be expected from those education in health promotion), it is important to note that knowledge of physical activity had no significant effect on physical activity or self-efficacy. In other words, factual understanding of the benefits of physical activity contributes a negligible role in influencing self-efficacy and physical activity level and instead, social support and perceived barriers to physical activity appear to be more significant and consistent in explaining self-efficacy and level of physical activity. These findings have important implications as they suggest that interventions to promote physical activity should redirect their focus. Rather than simply educating healthcare staff and students about the benefits of being active, a stronger emphasis on enhancing perceived social support, self-efficacy, and overcoming perceived barriers may be more likely to result in behavioural change.

### **Study limitations**

There are several methodological limitations that must be taken into account. First of all, the original studies employed a cross-sectional design that precludes the opportunity to conclude cause-and-effect relationships among the variables, which require longitudinal data. In addition, the available data were self-reported and therefore, there is a risk that level of physical activity and health might be over-estimated due to social desirability.

Future research may consider incorporating objective assessment of level of physical activity in these populations. There is evidence to suggest that people who engage in physical activity are more likely to practice other health behaviours also (Berrigan et al., 2003; Johnson, 1998). However, other health behaviours, which might have a confounding effect on level of physical activity, have not been controlled for in this study. Future studies should seek to incorporate other health behaviours in the model and examine how they, together with the social cognitive and structural factors, relate to physical activity.

### **Practice implications**

Our analysis suggests that increasing individual's perceived level of social support and removing barriers to physical activity may enhance self-efficacy, which in turn may increase level of physical activity among healthcare staff and students. There is a need to focus on potential ways to increase perceived level of social support in physical activity for healthcare staff and students and also to remove the perceived barriers that might prevent these populations from exercising. This study shows that lack of time, feeling tired, and lack of motivation are important barriers to physical activity in these populations. To enhance the motivation to engage in physical activity, there is a need to foster

the belief that exercise will bring about numerous benefits that outweigh the potential costs. In addition, the lifestyle approach of physical activity, which involves incorporating multiple low-intensity physical activities into a daily routine, is considered one of the least intimidating strategies for individuals who have no prior experience in exercising (Heesch et al., 2003). It seems appropriate therefore to encourage a lifestyle approach to physical activity amongst healthcare staff. In addition, an institutional-level strategy, such as the offering of extended lunch hours, reducing staff workload, or the provision of physical activity classes, might be used to help NHS staff and students cope with time restraints and feeling tired too tired to exercise after work.

Given self-efficacy is an important predictor to physical activity, future studies should seek to enhance individual's belief in the competency of initializing and adhering to physical activity. One method of doing this is through cognitive restructuring of perceived ability in initiating and adhering to physical activity. A recent meta-analysis on physical activity self-efficacy intervention revealed that interventions that used vicarious experience, and feedback on past or others' performance produced significantly higher levels of physical activity self-efficacy (Ashford, Edmunds, & French, 2010). To this end, NHS workplace health champions may be well placed to act as peer role models to both staff and students (Blake & Chambers, in press). These individuals could provide advice and reassurance, signpost to relevant services, and also provide ongoing feedback to staff and students regarding their successes and goal achievements in physical activity (and indeed other health behaviours) that may serve to enhance self-efficacy.

Whilst encouraging health behaviours is undoubtedly positive, the recent emphasis on NHS staff as 'role models for health' (Department of Health, 2009b) may add to the pressure on these individuals, whilst they undertake what can already be perceived as a stressful job role (Hillhouse & Adler, 1997; Kirkcaldy & Martin, 2000; Watson et al., 2009). It is necessary, therefore, to introduce interventions for health behaviour change in this group with caution and encouragement rather than imposing health behaviour change upon them.

### **Conclusion**

This study suggests that social support, perceived barriers to physical activity, and self-efficacy are important predictors of physical activity amongst healthcare staff and students in an NHS Trust setting. To increase physical activity levels in these populations, interventions are warranted that remove perceived barriers to participation in physical activity and enhance both perceived social support and self-efficacy for exercise.

### **Acknowledgement**

We would like to express our heartfelt thanks to Dr Sandra Lee for her involvement in data collection for the staff study, and Charlotte Pisano for her involvement in data collection for the student survey in the paper.

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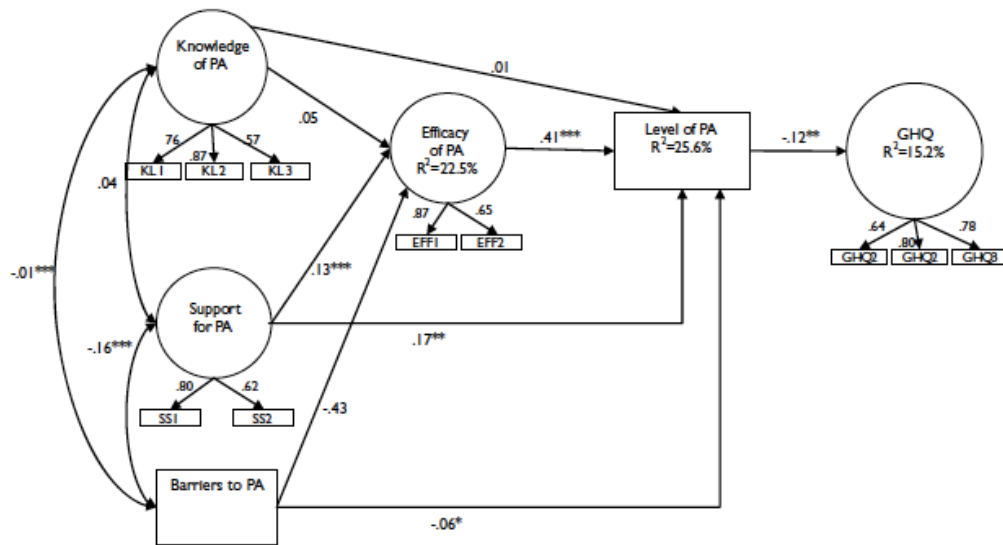
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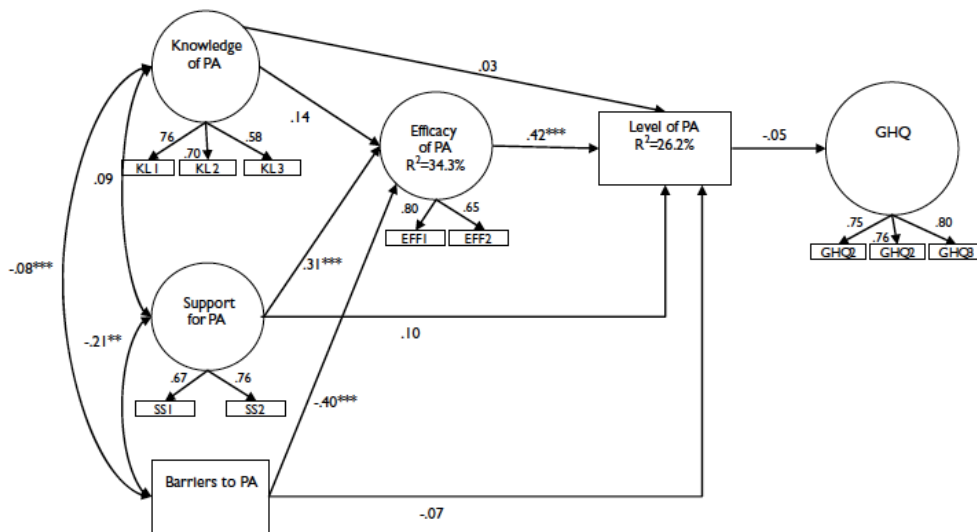
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**Figure 1.** Measurement and structural model of the healthcare staff sample. All path coefficients shown were averages from 1,000 bootstrap samples and were standardized. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p > .001$ ; PA, physical activity; GHQ, General Health Questionnaire-12.



**Figure 2.** Measurement and structural model of the student sample. All path coefficients shown were averages from 1,000 bootstrap samples and were standardized. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p > .001$ . PA, physical activity; GHQ, General Health Questionnaire-12.

**Table 1.** Descriptive statistics

Variables	Range	Healthcare staff (N = 1,452)	Student nurse (N = 325)
		M (SD)	M (SD)
Level of physical activity	0–5	3.28 (1.85)	3.13 (1.64)
Self-efficacy for physical activity	0–2	.99 (.54)	.79 (.45)
Knowledge about physical activity	0–4	2.60 (.55)	2.62 (.49)
Social support for physical activity	0–4	1.40 (1.03)	1.51 (.96)
Mood on GHQ-12	0–12	5.77 (2.34)	6.27 (2.47)
Barriers to physical activity			
I do not have time to be physically active		62.6%	70.6%
I cannot afford it		18.6%	57.4%
I am too tired		34.1%	48.6%
No motivation		23.7%	36.4%
Cannot be bothered		14.7%	32.3%
I need to rest and relax in my spare time		22.1%	31.9%
There is no-one to be physically active with		17.5%	27.6%
There are no suitable facilities		9.5%	23.2%
I am not the sporty type		15.1%	17.1%
I do not enjoy it		11.2%	11.6%
I have got young children to look after		16.1%	10.4%
Traffic is too heavy/I do not feel safe		7.2%	9.7%
My health is not good enough to be physically active		6.9%	8.4%
I am active enough		19.6%	8.1%
Too fat/overweight		5.8%	7.8%
I am injured		5.0%	5%
I have lost contact with family/friends		1.6%	2.3%
I might get injured or damage my health		1.7%	1.6%
I am too old		1.4%	0.9%
I do not think it's important		.8%	0.9%

**Table 2.** Correlation between variables

	1	2	3	4	5	6
1 Level of PA	-	.42***	-.27***	.01	.22***	-.11***
2 Self-efficacy of PA	.41***	-	-.04***	.04	.14***	-.08***
3 Perceived barriers	-.29***	-.40***	-	.01	-.13***	.16***
4 Knowledge of PA	.16**	.18***	-.07	-	.02	.02
5 Support for PA	.24***	.28***	-.18***	.09	-	-.12***
6 General health	-.05	-.06	.31***	-.01	-.10	-

PA, physical activity. The left diagonal presents correlations between variables for the student sample while the right diagonal presents correlations between variables for the healthcare staff sample. \*\* $p < .01$ ; \*\*\* $p > .001$ .

**Table 3.** Bootstrap analyses of total, direct, and indirect effects of the mediation model

Mediated effect	Total effect (95% CI) <sup>a</sup>	Direct effect (95% CI) <sup>a</sup>	Indirect effect (95% CI) <sup>a</sup>
<b>Healthcare staff</b>			
Knowledge of PA → Level of PA	.03 (-.02, .08)	.01 (-.04, .05)	.02 (-.01, .05)
Support to PA → Level of PA	.22** (.17, .28)	.17** (.11, .22)	.05* (.03, .08)
Barriers to PA → Level of PA	-.24** (-.28, -.19)	-.06* (-.11, -.01)	-.18** (-.21, -.15)
<b>Student nurses</b>			
Knowledge of PA → Level of PA	.09 (-.02, .21)	.03 (-.07, .15)	.06 (-.01, .13)
Support to PA → Level of PA	.23*** (.07, .35)	.10 (-.03, .23)	.13*** (.06, .22)
Barriers to PA → Level of PA	-.24** (-.32, -.12)	-.07 (-.19, .07)	-.17*** (-.28, -.10)

<sup>a</sup>Bias-corrected confidence intervals (CIs) were reported. Reported effects were averages from 1,000 bootstrap samples. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .01$ .