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Physical Activity And Gender Differences; A Study on Health Benefits Derived From Physical Exercise

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Abstract

Males are consistently reported as more physically active than females regardless of age or measure. Often, this difference results in females identified as under active and at risk of long- term poor health outcomes. In this paper a different perspective drawing on evidence from many sources is offered. Males and females gain different health benefits according to the level, mode and intensity of the physical activity. Some potential ramifications of these gender differences in health benefits are evident in the prevalence of hypokinetic diseases across the life span and the interpretation of measured physical activity levels and intensities. By focusing on these differences, this papers highlights the need to take a more divergent view of what exercise really means, and how it provides health needs differently for males and females. We identified important implications for public policy and physical activity guidelines.2019 might well be the year of women's sport. While coverage has long been overshadowed by the male leagues, viewing opportunities and public engagement has been growing. Public excitement perhaps peaked during the Women's Football World Cup, with television audiences across the world increased by millions on previous years. As female athletes challenge inequalities over pay and investment and shift social expectations, could their example be used to tackle the gender gap in physical activity in the wider population?

Keywords

Gender difference; Sex difference; Exercise; Health; Physical activity guidelines

Introduction

The benefits of being physically active have been well documented for all age groups including controlling body weight, promoting musculoskeletal functions, enhancing cardiovascular fitness, reducing the risks of coronary heart diseases, stroke, diabetes, colon cancer, breast cancer and falls. Regularly engaging in physical activities can improve psychological statuses such as increasing self-confidence, promoting social interaction, and preventing depression The American College of Sports Medicine recommends that adults should perform either moderate aerobic exercise for a minimum of 30 minutes five days a week, or vigorous exercise for a minimum of 20 minutes three days a week, or an equivalent combination of moderate- and vigorous-intensity activities to gain health benefits [3]. However, in an international prevalence study, 42.3% of the Taiwanese population was in the low activity category defined by the International Physical Activity Questionnaire (IPAQ), which means that people engage in physical activities less than three days a week and in a mild intensity. Another study by Wen et al. (2007) compared the intensity of leisure time physical activity between Taiwan and United States. The authors found that the prevalence of leisure time physical activity is lower in the Taiwanese population generally. Moreover, they found that the prevalence decreased with age in the U.S., but peaked with the elders (65 years of age or older) in Taiwan [8]. The most serious deficiency was found among the young adults (25–44 years of age).

Understanding the determinants that influences the behavior of being physically active is important for developing interventions of regular exercise. Currently known positive influential factors of physical activity include male gender, younger age, higher education level, being married, positive attitudes and social support. Self-efficacy, enjoyment gained in physical activities, and social support have been found to be significant correlates of physical activity in Singapore adolescents. Self-efficacy is defined as belief in one's ability to be physically active, meet goals, and overcome barriers. Social support can be attained from family or friends. The likelihood of meeting the recommendations for physical activity in American adults at least doubled when people have company to exercise with.

Barriers to exercise include environmental barriers, cost considerations, poor health condition, fear of injury, and lack of time. Individuals who perceive more barriers to being physically active are less likely to have a regular exercising behaviour. Child care needs and health problems have been found to be common barriers to regular exercise for low income women. Lack of time and potential for injury are the primary barriers to regular exercise in older adult populations. Having no access to exercising facilities or environments (such as parks) were also considered a barrier.

Several studies have noted gender differences in exercise participation. Men usually participate more in regular exercise than women. Gender roles may affect regular exercise behavior in traditional oriental cultures, in which women mostly play the role of caregivers in the family and have less time for exercise. Only two studies have explored the gender difference of motivation to exercise in Asian countries. One study in Malaysia indicated that the motivations to exercise for men were more related to intrinsic factors, such as gaining strength, competition, and challenge. In contrast, women's motivations were more related to extrinsic factors, such as weight management and attaining an attractive appearance. The other study in Taiwan suggested that men's intention to exercise was to improve their appearance and because of their personal interest in sports. On the other hand, women were more motivated to do exercise when Taiwanese athletes performed well in international sporting competitions as a result of the celebrity effect.

Few studies have analyzed the determinants of exercise behavior in Asian countries. However, self-rated health, self-perceived happiness, perceptions of exercise, having company to exercise, and barriers to exercise have not been analyzed in previous studies. Therefore, the purpose of this study was to attain a better understanding of the exercise behavior in an Asian population and to examine the influential factors of regular exercise behavior. We also examined gender differences in the influential factors that enhanced or hampered regular exercise in order to provide implications for future health policies and health promotion practices.

Physical Activity and the Gender Gap

Insufficient physical activity is a leading risk factor for non-communicable diseases and can also negatively affect mental health and quality of life. WHO recognises physical inactivity as a serious and growing public health problem and aims to reduce it by 10% by 2025. An analysis published in *The Lancet Global Health*, in 2018, found that more than a quarter of adults globally are insufficiently physically active. Across most countries, women are less active than men (global average of 31·7% for inactive women *vs* 23·4% for inactive men). Policies that tackle the gender gap in physical activity could therefore have a substantial impact on overall population health.

The barriers to women's involvement in sports are numerous and complex. The physical activity gap between boys and girls begins early. A report from Sport England found that girls aged 3–11 years experienced less enjoyment from being physically active and less confidence in their sporting ability than boys as they got older. Children's exposure to narrow gender norms around boy's versus girl's activities and a failure to adapt the types of sports offered can instil this lack of enjoyment and body confidence, and in turn shape attitudes to physical activity into adulthood. Indeed, many women are put off by certain physical activities over concerns about stereotypes, because of insecurities around body image, or feeling constrained by cultural acceptability. Women and girls' sport generally receives less investment at the grassroots level—including access to equipment, transport, and coaching, and to safe and welcoming facilities. Women still often play the lead role in childcare and managing households—for many, in addition to paid work—which means they generally have less leisure time.

Addressing the gender gap in physical activity could therefore start with better access, investment, and shifting sociocultural norms. Changes to the built

environment and providing exercise facilities to the public is one approach, and some evidence suggests that more walkable cities had lower gender gaps in physical activity. However, built environment is not the whole picture. The study by Claire Nightingale and colleagues in this issue of *The Lancet Public Health* found that residents who moved to a neighbourhood created along active design principles (the former London 2012 Olympic and Paralympic Games Athletes' Village) showed no significant increase in their average physical activity. Changes in urban environment should probably be accompanied by community and behavioural public health interventions.

One example of a promising intervention has been the This Girl Can campaign in England. Launched in 2015, the multimedia campaign focused on projecting an inclusive, positive message about physical activity and could have helped an estimated 3 million women and girls become more physically active. However, such campaigns still face the challenge of widening participation to reach women from low income and from ethnic minority backgrounds. Adapting interventions and opportunities to these groups will be important. It is also unclear to what extent such a campaign might be adapted to low-income or middle-income countries—and this should be the focus of future research.

The universality of sport offers an opportunity to challenge social and cultural norms on a large scale and narrow the gender gap. By making female athletic success more visible, girls and their parents can aspire for them to be professional athletes or simply to take part in whatever physical activity they enjoy. A greater audience for women's professional sport could mean more investment in grassroots and crucially, visibility of women at all sporting levels.

Ultimately, if current trends continue, the 2025 global physical activity target of a 10% relative reduction in insufficient physical activity will not be met. Multi- sectoral approaches to increase physical activity need to be prioritised urgently. Public health professionals and policy makers should capitalise on moments like the Women's World Cup to encourage and support all to be physically active. It can't be a missed opportunity.

Physical Fitness Measures

Queens College step test. This is a step test used to determine aerobic fitness. It is a submaximal aerobic test that uses recovery heart rate to estimate maximal oxygen consump- tion. Test–retest reliability measures for recovery heart rate have been demonstrated to be .92, and correlation measures between recovery heart rate and direct measures of maximal oxygen consumption have been reported as −.75 (McArdle, Katch, Pechard, Jacobson, & Ruck, 1972). Absolute values for VO_2 (rate of oxygen consumption), on average, are higher for men than for women. In an effort to more accurately compare VO_2 measures, comparisons were made on relative VO_{2max} measures. Oxygen consumption is expressed per kilogram of body weight and thus measures of oxygen consumption for each participant were compared after VO_{2max} was divided by body weight in kilograms.

Bioelectrical impedance analysis (BIA). This technique is used to assess body composition (percentage of body fat and percentage of lean body mass). BIA is a type of body composition assessment that is used routinely in health/fitness testing settings. According to the ACSM (2013), " . . . the accuracy of BIA is similar to skinfolds, as long as stringent protocol adherence is followed" (p. 72). The mean score for body fat measurements in the current study was 21.16% (*SD* = 10.12).

Sit-and-reach flexibility test. Flexibility is the ability to move a joint through its complete range of motion. Flexibility measures are valid only for a specific joint. The sit-and-reach test has been commonly used to assess low back and hamstring flexibility. This test has been used extensively, and norms have been established for both men and women aged 20 to 69 years. In the current sample, the average participants sit-and- reach score was 30.35 cm (*SD* = 8.4).

Muscular endurance. Muscular endurance is the ability to exe- cute muscle actions over a longer period of time. The push-up test and partial curl-up test are field-tests used to assess upper body muscles and abdominal muscles (ACSM, 2013). The push-up protocol is modified based on sex. The protocol uti- lizes a modified push-up position for women. These tests have been used extensively, and norms have been established for

both men and women aged 20 to 69 years. Average number of push-ups and partial curl-ups in the present study were 21.68 (*SD* = 12.12) and 25.48 (*SD* 18.1), respectively.

Satisfaction With Life Scale (SWLS). The SWLS was used to measure a global sense of well-being and adjustment. The SWLS has correlated adequately with interviewer estimates of life satisfaction and with several other measures of well- being (Diener, Emmons, Larse, & Griffin, 1985). Previous studies demonstrated that the SWLS highly

correlates (r = .81, p <. 05) with the Life Satisfaction Index (LSI-A) as well as daily satisfaction (r = .51, p < .05) and with peer evalua- tions as well such as peer SWLS (r = .54). The SWLS dem- onstrated good reliability (α = .87) in the present sample.

Gender differences in health benefits derived from exercise

Gender differences exist in the benefits of different levels of physical activity specific to a range of poor health outcomes. For example, low to moderate intensity physical activity, including brisk walking, provides protection from cardiovascular disease and diabetes to a greater extent among women compared to men. In a recent meta-analysis of 33 studies, Sattelmair et al. showed that the relative risk for coronary heart disease reduced more rapidly with lower levels of physical activity for women than it did for men.

In some forms of cancer there is a relationship between level of physical activity and risk reduction in which gender may also play a role. For example Friedenreich et al. identified that in colon cancer, risk reduction was related to increased leisure time activity among females. However for males the risk reduction was associated with both leisure and occupational physical activity. With regards to lung cancer, they reported that physical activity does not seem to be related to risk reduction for non-smokers, whereas there is evidence that it confers some protection for smokers. Friedenreich et al. reported that this effect is more apparent in recreational activity for men than in women compared to work-related physical activity. In gender-related cancers there are also different responses to risk reduction with exercise. Breast and endometrial cancer risks are reduced by many types of activity including household and recreational activity, with endometrial cancer risk showing a reduction with light to moderate activity [30]. There is some evidence to support an association between reduced risk of prostate cancer and higher levels of physical activity, however it varies with the type of prostate cancer. The more aggressive forms are more likely to show reduced risk with physical activity. It appears that there is still a need to better understand the type of physical activity and the dose response to achieve significant reductions in many forms of cancers.

Gender effects are further complicated when one considers mental health benefits derived from physical activity. From a national survey of over 6000 24 to 65-year-old adults Asztalos et al. found that for men, participation in vigorous intensity physical activity lowered feelings of depression, anxiety and physical symptoms of such mental stress (somatisation). The fact that men are engaging in higher levels and greater intensity of physical activity could be less detrimental to their mental health. On the other hand, the authors found that for women, walking was positively related to emotional well-being and moderate intensity physical activity reduced symptoms of somatisation. They propose that walking, in particular, may enable opportunities for social interaction and bonding which is highly valued among women. They concluded that men gain more benefit from vigorous physical activity whereas women gain from lighter activity. Morimoto et al. found differential effects of physical activity on health-related quality of life in both men and women, but women had more preferable effects than men. It appears that by participating in lower intensity physical activity, women are likely to be better off in terms of their mental health. For example, the physical activity requirements of a new mother are likely to be affected by biological, environmental and psychological influences which would differ from their male counterparts. These are just a few examples showing different sex-related responses to varied levels of physical activity when mental health outcomes are considered. In summary, we argue that mental health related benefits can be achieved by women with moderate exercise, which seems to be their preferred level. The differences in response to physical activity may be explained by biological differences between males and females.

Physical Fitness, Gender, and Life Satisfaction

According to the World Health Organization (WHO; 2015), across the world, one in four adults does not get sufficient physical activity (PA) for health benefits. Insufficient PA is one of the most important modifiable risk factors for the development of non-communicable, chronic diseases (Booth & Lees, 2007). Current PA recommendations designed to promote health are based on frequency, duration, and the intensity of PA per week, and reflect a belief in a dose– response relationship between PA and health benefits. These health benefits include a reduction in all-cause mortality, chronic diseases, and health indicators (e.g., blood pressure, obesity, and heart disease).

A systematic review of the research literature by Warburton, Charlesworth, Ivey, Nettlefold, and Bredin (2010) concluded that there was a clear dose–response rela- tionship between PA and all-cause mortality and PA and some health indicators. Although a number of studies dem- onstrate a relationship between PA and health indicators, the existing research suggests that improvements to physical fit- ness measures show the greatest reduction in certain health indicators (Rankinen, Church, Rice, Bouchard, & Blair, 2007). In fact, Williams (2001) demonstrated that, when rel- ative risks were plotted, PA alone has a relationship to health indicators, but it is the relationship between physical fitness and health indicators which is steeper than that of PA.

suggests that the effects of PA and physical fitness on health indicators are independent of one another, and that physical fitness has a greater effect of health indicators than that of PA, and being unfit should be considered a risk factor dis- tinct from inactivity (Williams, 2001).

Current research literature also suggests a dose–response relationship between PA and mental health variables. The effect of PA on mental health appears to be related to a num- ber of factors including the type of activity, the duration the activity is performed, and the intensity at which the activity is performed. Attempts have been made to clarify the interac- tion of these factors by suggesting guidelines to help maxi- mize the benefits of PA and exercise on mood states and anxiety (Berger, 1996; Berger & Owen, 1988). Based on their meta-analysis of previous studies, activities that are enjoyable, which emphasize rhythmical breathing, done at a moderate intensity for approximately 30 min, on most days of the weeks have been suggested to maximize the benefits of PA on some mental health variables. The relationship between PA and life satisfaction is also unclear. For example, research suggests that, among adolescents, as participation in PA declines, life satisfaction declines as well (Kaplan, Lazarus, Cohen, & Leu, 1991), higher life satisfaction scores are reported in younger adults participating in PA (Tasiemski, Kennedy, Gardner, & Taylor, 2005), and older adults partici- pating in the most leisure-time activities report the highest life satisfaction (Heo, Stebbins, Kim, & Lee, 2013). On the contrary, Guven, Ozcan, Tasgin, and Arslan (2013) found that while life satisfaction scores did improve as PA fre- quency or duration increased, there was no significant rela- tionship between PA and life satisfaction. Similar results were found in a study by Eime, Harvey, and Payne (2014), who found that life satisfaction was not significantly related to the level of participation in PA.

Conclusion

There were gender differences in regular exercise participation and related influential factors among people in Taiwan. These findings give health promoters a clear picture of the type of men and women more likely to be physically active and more willing to perform exercise regularly. This can be used for future interventions and policies. Future research is needed to find the causal relationship between these factors and the frequency of exercise to further support our results. Among the factors, we are particularly interested in the different barriers that hinder men and women. Longitudinal studies can be conducted to analyze whether there is an increase in the frequency of exercise participation in companies that give employees time off to exercise, and whether the impact on men is more significant than that of women. In addition, in Taiwan, there are already some companies and department stores providing temporary care services. Future studies can be made to investigate whether the sports centers with this service can increase the participation of their members, and whether the impact on women is more significant. In addition, more factors relevant to exercise behavior, for example health knowledge and self-efficacy, should be included in the models, and age groups can be analyzed separately. Increasing physical activity levels in child and adult populations is a health-related priority. However, the differential influences of sex- related biological and genetic factors in response to environmental and cultural factors are largely ignored. When interpreting physical activity related information, for example in the formation of guidelines, there needs to be consideration of different needs across the lifespan, as gender differences fluctuate with age. To conclude, males and females are predisposed to engage in different levels of intensity and type of physical activity. We need to reconsider how these differences are reported and responded to in both policy and practice. Future research and debate is recommended to examine the complex interactions between environmental, behavioural and biological factors with gender and physical activity.

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