Determining the stages of exercise in a convenience sample of differing genders and ages at a Midwest health science center

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Determining the Stages of Exercise in a Convenience Sample of Differing Genders and Ages at a Midwest Health Science Center

Submitted by
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In partial fulfillment of the requirements for the degree of Master of Science in Biomedical Sciences

Date of Presentation:
December 15, 2005

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I would like to acknowledge Chair Patricia Hogue as my major advisor, who spent a large amount of time reading my papers through email, making corrections, and guiding me through this project. I would also like to acknowledge Jane Zbinden who introduced me to the Perseus software and was able to get me started with the process of creating my survey. Also, I would like to thank Dr. Bork who helped guide me with the type of statistical analysis that my project required in order to get results. Thank you to all of you, for without you this project would have been nearly impossible to complete.
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Chapter 1: Introduction and Background

The lack of physical activity among Americans of all ages is considered to be a major health risk factor that sets the stage for a lifetime of obesity and associated chronic illnesses like cardiovascular disease, high blood pressure, diabetes, stroke, heart disease, osteoporosis, cancer, and even depression (Rippe, J., 1998). Physical activity is a promising component of cardiovascular disease prevention among women, yet over 60% of the population does not participate in regular physical activity. Cardiovascular disease is the leading killer of women in the United States today (Clement, J., Schmidt, C., Bernaix, L., Covington, N., and Carr, T., 2004). One of the major risk factors for the development of cardiovascular disease is obesity (Clement et al., 2004). Obesity, lack of adequate exercise, and poor nutrition together form the second leading cause of illness and death in the U.S. The rates of cardiovascular disease, diabetes, hypertension, arthritis, and hypercholesterolemia increase with excess weight (Davis, R. and Turner, L., 2001).

For an individual to make a life change, such as reverting to a healthy lifestyle, an assessment can be made using the stages of change in the transtheoretical model of behavior change (Prochaska, Redding, and Evers, 1997; Prochaska, Redding, Harlow, Rossi, and Velicer, 2001). Prochaska and colleagues (1997) emphasized the importance of considering change as a series of five stages, and although individuals typically remain stable over time, they are capable of transitioning between stages. The five stages of this model include pre-contemplation, contemplation, preparation, action, and maintenance (Zimmerman, G., Olsen, C., and Bosworth, M., 2000).
According to Prochaska, the first stage, pre-contemplation, is when there is no intention to change a behavior or lifestyle in the future and no history of physical activity over the past six months. Individuals may be in this stage because of lack of information about the consequences resulting from their behavior or may try to change numerous times but become demoralized about their inability to change. These individuals are often classified in other theories such as resistant, unmotivated or not ready for health promotion programs (Prochaska and DiClemente, 1983, 1985; Prochaska and Velicer, 1997).

The second stage, contemplation, is when there is awareness that physical inactivity is a problem and action is considered to address the problem within the next six months. Individuals are more aware of the positive aspects of change but are also aware of the consequences. The balance between the benefits and costs of change can produce profound uncertainties that can prevent individuals from leaving this stage for long periods of time. This, in turn, may also inhibit these individuals for health promotion programs (Prochaska and DiClemente, 1983, 1985; Prochaska and Velicer, 1997).

The third stage, preparation, is when there is intention to take action in the immediate future, usually within the next month. Individuals have a plan of action, such as joining health education classes, starting an exercise program, or consulting a counselor (Prochaska and DiClemente, 1983, 1985; Prochaska and Velicer, 1997).

The fourth stage, action, is when physical activity has incurred in the last six months and there is intention to stay active. The action stage is also where vigilance against relapse is critical (Prochaska and DiClemente, 1983, 1985; Prochaska and Velicer, 1997).
The fifth stage, maintenance, is when there is a stable pattern of physical activity more than six months in duration with developed strategies to avoid relapse. Individuals are less tempted to relapse and are increasingly more certain that they can continue their change (Prochaska and DiClemente, 1983, 1985; Prochaska and Velicer, 1997).

**Problem**

America is becoming less active and more obese due to barriers that keep them from exercising. If Americans would exercise for 30-60 minutes a day for most days of the week, then there would be less obese people, fewer health problems, fewer primary care visits, less medical care costs, and a decrease in morbidity and mortality.

**Purpose**

The purpose of this study was to determine what level of physical activity people in the Medical University of Ohio community are currently engaged and determine what barriers limit subjects from exercising.

**Research Questions and Hypotheses**

**RQ₁:** Will the stages of change exercise survey show majority of participants in the preparation stage?

**H₁:** The survey will not show the majority of participants in the preparation stage.

**RQ₂:** Will the survey show that time is the greatest barrier to exercise?

**H₂:** The survey will show that time is the greatest barrier to exercise.

**Terminology**

*Exercise* – Active: bodily exertion for the sake of restoring the organs and functions to a healthy state or keeping them healthy. Passive: motion of limbs without effort by the patient (Dirckx, 2001).
Transtheoretical Model - The Transtheoretical Model of Behavior Change was developed by Dr. James Prochaska and his colleagues at the University of Rhode Island Cancer Prevention Research Center. It has been operationalized and used extensively to promote optimal health by promoting behavioral change in the areas such as smoking, diet, alcohol and substance, eating disorders, panic disorders and others. One of the model’s major contributions is the recognition that behavioral change unfolds through a series of stages. That is, individual progress through a series of stages in recognizing the need to change, contemplating a change, making a change, and finally sustaining the new behavior. Most important, they have learned that it is critical to understand and identify the stage an individual is in before a successful change intervention can be designed and applied. The five stages of change are precontemplation, contemplation, preparation, action, and maintenance (Scholl, 2002).

Barriers – An obstacle or impediment. A conflictual agent that blocks behavior that could help resolve a personal struggle (Dirckx, 2001).

Scope

This survey focused on students, employees, and volunteers ranging from ages 18 and older who either attend or are employed at a midwest academic health science center. The survey was distributed through email by the computer system, Perseus software.
Chapter 2: Literature Review

Benefits of Exercise

Increased physical activity lowers the risk of obesity, may favorably influence distribution of body weight, and confers a variety of health-related benefits even in the absence of weight loss (Rippe, J. M., 1998). The known or suspected health benefits of increased physical activity were found in two major reviews by the Centers for Disease Control and Prevention and the American College of Sports Medicine (Pate, R., Pratt, M., Blair, S., Haskell, W., Macera, C., Bouchard, C., Buckner, D., Casspenson, C., Ettinger, W., Heath, G., King, A., Kriska, A., Leon, A., Marcus, B., Morris, J., Paffenbarger, R., Patrick, K., Pollock, M., Rippe, J., Sallis, J., and Wilmore, J., 1995). A benefit identified is that increased physical activity substantially lowers the risk of coronary heart disease, certain forms of cancer (eg, breast and possibly colon), type-2 diabetes, hypertension, and osteoporosis (Pate, et. al., 1995).

Increased physical activity may improve psychological health by reducing incidence or severity of conditions such as anxiety or depression and may also enhance quality of life (Stewart, A., Hays, R., Wells, K., Rogers, W., Spritzer, K., and Greenfield, S., 1994). Stewart, et al. (1994) did an observational 2-year longitudinal design to determine whether levels of physical activity of patients with various chronic diseases are associated with subsequent functioning and well-being. The study included 1758 adult patients with one or more of the following: diabetes, hypertension, congestive heart failure, recent myocardial infarction, depressive symptoms, or current depressive disorder. Cross-sectional (baseline), 2-year endpoint, and change score relationships were evaluated between baseline levels of physical activity and each outcome. Higher
baseline levels of exercise were uniquely associated with better functioning and well-being at baseline and 2 years later for some measures. The magnitude of the differences varied by disease group were between 0.17 and 0.39 of the baseline SD. Greater levels of exercise are associated with feeling and functioning better for patients with chronic conditions over a 2-year period.

In addition to its role in disease prevention, physical activity is also an important component of treatment for established disease (Goldfine, H., Ward, A., Taylor, P., Carlucci, D., and Rippe, J., 1991). Regular physical activity will reliably lower blood pressure in previously sedentary persons with hypertension (Kelley and McClellan, 1994). Exercise improves circulating lipid profiles, alters lipoprotein metabolism (Williams, 1997), reduces blood coagulation and platelet aggregation, and decreases risk of cardiac arrhythmias (El-Sayed, 1996). When physical activity is incorporated into comprehensive cardiac rehabilitation programs, it lowers the risk of cardiovascular morbidity and mortality in persons with established coronary heart disease (Wenger, N., Froelicher, E., Smith, L., Ades, P., Berra, K., Blumenthal, J., Certo, C., Dattilo, A., and DeBusk, R., 1995). Physical activity improves glucose handling and insulin sensitivity in people with type-2 diabetes (Barnard, Jung, and Inkeles, 1994). The positive effects of physical activity may be attributed to increased skeletal muscle contractions that mimic the action of insulin, thereby increasing glucose uptake and metabolism (Bergman, B., Butterfield, G., Wolfel, E., Lopaschuk, G., Casazza, G., Horning, M., and Brooks, G., 1999).

Increased physical activity plays a critical role in the prevention and treatment of obesity and is crucial for maintenance of weight loss. Participating in physical activity
during weight loss can improve a person’s metabolism, body composition, psychological well-being, and quality of life (Klem, M., Wing, R., McGuire, M., Seagle, H., and Hill, J., 1997). According to Klem, his study consisted of 629 women and 155 men who lost an average of 30 kg and maintained a required minimum weight loss of 13.6 kg for 5 years. Both groups reported having used both diet and exercise to lose weight. Nearly all subjects indicated that weight loss led to improvements in their level of energy, physical mobility, general mood, self-confidence, and physical health.

**Obesity due to physical inactivity**

Physical inactivity and poor diet have been identified as a leading cause of death in the United States. In 2000, about 400,000 deaths were linked to these behaviors (Mokdad, A., Marks, J., Stroup, D., and Gerberding, J., 2004). This figure represents a 33% increase in deaths attributable to these behaviors since 1990 (McGinnis and Foege, 1993) where the prevalence of overweight and obesity is considered to be the major mediator of this increase. If the trend of escalating overweight and obesity is not reversed in the near future, the combination of poor diet and inactivity may become the number one cause of death (Mokdad et al., 2004).

In the USA, the prevalence of overweight has risen by about 1% per year in absolute terms since the early 1980’s, while the prevalence of obesity has risen by 0.5% (Araujo-Vilar, D., Osifo, E., Kirk, M., Garcia-Estevez, D., Cabezas-Cerrato, J. and Hockaday, T., 1997). Although genetic susceptibility may explain up to 40% of the obesity phenotype, technological, lifestyle and cultural changes over the past 50 years are being implicated as the most likely cause of the recent obesity epidemic (Bouchard, C., and Perusee, L., 1998). It is becoming increasingly clear that maintenance of a healthy
adult weight, through proper balance of caloric intake and regular physical activity, is a key factor in chronic disease prevention. According to the U.S. Department of Health and Human Services (DHHS), 56% of women in the United States are considered to be either overweight or obese (Clement, J., Schmidt, C., Bernaix, L., Covington, N., and Carr, T., 2004). In 2000, the prevalence of obesity among women was 19.4%, which reflected an increase of 62.9% since 1991 (Clement et. al., 2004). Overweight adolescents have a 70% chance of becoming overweight or obese adults, and their chance increases 80% if one or both parents are overweight or obese (Clement et. al., 2004).

Data obtained in 2001 from the Behavioral Risk Factor Surveillance System indicates that only 22% of US adults are achieving the recommended amount of regular physical activity, more than 60% of US adults are not physically active on a regular basis, and 25% of all adults are not active at all. Physical inactivity was more prevalent among women then men, older than younger adults, and African American or Hispanic ethnicity than white ethnicity (Williams, 1997).

Physical inactivity and poor diet have been identified as a leading cause of death in the United States. If the trend of increasing overweight and obesity is not reversed in the near future, the combination of poor diet and inactivity may become the number one cause of death (Mokdad et al., 2004).

**Physical activity in adolescence as predictors of physical inactivity in adulthood**

Even though the clinical symptoms do not become apparent until much later in life, it is known that the origin of many chronic diseases lies in early childhood (Van Mechelen, W., Twisk, J., Post, G., Snel, J., and Kemper, H., 2000). It is therefore often argued that prevention of chronic diseases has to start as early in life as possible. The
adolescent period seems to be especially important (Van Mechelen, et. al., 2000). Van Mechelen and colleagues performed a study to describe the natural development of habitual physical activity behavior (HPA) of young male and female subjects between the ages 13 and 27. A total of 181 subjects were used for this study. Data showed regarding total HPA that subjects had a significant decrease in weekly time spent on HPA between the ages 13 and 27 over a 15 year period of time.

The adolescent period seems to be critical with regard to adult physical activity. Activity is reported to decline dramatically during the transition from adolescence to adulthood (Telama and Yang, 2000). The aim of Telama’s study was to analyze age-related decline of physical activity among Finnish young people. The number of subjects at the beginning of the study in 1980 was 2309, representing both genders and ages 9, 12, 15, and 18. The data cover ages from 9-27. The questionnaire consisted of items concerning frequency and intensity of physical activity, way of spending leisure-time, and participation in organized sports. Results showed a remarkable decline after age 12 in frequency of physical activity and sport participation. In younger age groups, the boys were more active than girls, but the decline of activity was steeper among male than female subjects, and after the age of 15 the female subjects participated in physical activity more frequently than male subjects.

The aim of one study (Tammelin, T., Nayha, S., Laitinen, J., Rintamaki, H., and Zitting, P., 2002) was to examine how physical activity status in adolescence is associated with physical inactivity in adulthood, taking into account the social environment prevailing in adulthood. A questionnaire was sent out to 11,399 children aged 14 years and 8,767 adults aged 31 years. The 14 year olds were asked how frequent
they participated in sports after school and the 31 year olds were categorized as very active, active, moderately active, or inactive. A cross-tabulation was used to evaluate the association between background characteristics and physical activity at 14 and 31 years of age. The results were that frequent participation in sports in adolescence seemed to reduce the probability of being physically inactive in adulthood, independent of many adulthood social factors associated with adult inactivity. Also, not being a member of after school sports in adolescence was associated with inactivity in adulthood (Tammelin et al., 2002).

The long-term benefits of promoting children’s physical activity can be found in reduced disease and obesity rates. If physical activity and healthy eating habits are developed early in life, then this will be the best determinant of a healthier future.

**Differences in physical activity among genders and race/ethnicity**

Population-wide surveillance data indicate that inactivity rates are particularly prevalent among women, older adults, adults with lower educational attainment, and based on the relatively few data currently available, ethnic minorities (Jones, D., Ainsworth, B., Croft, J., Macera, C., Lloyd, E., and Yusuf, H., 1998). The Third National Health and Nutrition Examination Survey, 1988-1994 (Crespo, C., Smit, E., Anderson, R., Carter-Pokras, O., and Ainsworth, B., 2000) looked at race/ethnicity, social class, and their relation to physical inactivity. This study revealed that physical inactivity is more prevalent among racial and ethnic minorities than among Caucasians. The age-adjusted prevalence (per 100) of adults reporting leisure time inactivity is lower among Caucasians (18%) than among African Americans (35%) and Mexican Americans (40%). African American and Mexican American men and women reported higher prevalence of
leisure time inactivity than their Caucasian counterparts across almost every variable, including education, family income, occupation, employment, poverty, and marital status. Women had a higher prevalence of leisure time inactivity than men, regardless of race or ethnicity.

Utilizing the CDC and American College of Sports Medicine (ACSM) recommendations, Martin, Morrow, Jackson, and Dunn (2000) surveyed 2,002 American adults about their current level of physical activity. When women 18-25 years old were asked about their current level of moderate and vigorous physical activity, 65.9% did not meet the CDC/ACSM guidelines. Across all age groups, women (71.4%) were less likely than their male counterparts (62.9%) to engage in physical activity that meets the CDC/ACSM recommended guidelines. The finding that women were less likely to participate in moderate-to-vigorous exercise then were men is consistent with previous research on physical inactivity and gender (Conn, 1998; DHHS, 1996).

The Stages of Change in Physical Activity Model

The stages of change model examines the physical and psychological stages that occur as individuals make changes in health risk behaviors. Prochaska and colleagues emphasized the importance of considering change as a series of five stages, and although individuals typically remain stable over time, they are capable of transitioning between stages (Prochaska et. al., 1997). The five stages of this model include pre-contemplation, contemplation, preparation, action, and maintenance (Zimmerman et al., 2000).

The purpose of one study (Juniper, K., Oman, R., Hamm, R., and Kerby, D., 2004) was to use concepts of the Health Belief Model (HBM) to identify how perceptions of physical activity differ among stages of change in a sample of African American
college women (Juniper et. al., 2004). Individuals were categorized by their self-reported stage of regular physical activity. This cross-sectional survey sampled African American women aged 18-30 who were enrolled in one of the three Oklahoma universities. The survey contained items that were scored by a Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The primary descriptive analysis resulted in a classification of 3.9% (N=9) of the participants in the pre-contemplation stage, 18.0% (N=42) in the contemplation stage, 32.2% (N=75) in the preparation stage, 18.0% (N=42) in the action stage, and 27.9% (N=65) in the maintenance stage (Juniper et al., 2004).

The purpose of another study by O’Hea, E., Wood, K., and Brantley, P. (2003) was to determine if men and women differed in their descriptive stages of readiness for change in exercise. There were five hundred fifty-four medical patients (males=107; females=447) that participated in this study. Fifty-nine percent of the sample was African American, 41% were white, and less than 1% were Hispanic/Asian. Participants used a 5-point Likert format, 1(not important) to 5(extremely important), to rate how important each statement was to their exercise behavior. Results showed that gender differences were found in contemplation and maintenance stages. A larger percentage of males were in the maintenance stage (28.4%) compared to females (16.8%), and more females (36.8%) were in the contemplation stage of change compared to males (26.5%). Although the differences did not appear as large in the other stages of change, there was a trend that females also had a greater proportion of individuals in the preparation stage of change and males predominately in the action stage of change for exercise.

For an individual to make a life change, such as reverting to a healthy lifestyle, an assessment can be made using the stages of change in the transtheoretical model of
behavior change (Prochaska, Redding, and Evers, 1997; Prochaska, Redding, Harlow, Rossi, and Velicer, 2001). Prochaska and colleagues (1997) emphasized the importance of considering change as a series of five stages, and although individuals typically remain stable over time, they are capable of transitioning between stages.

**Barriers to exercising**

Given the health benefits of regular physical activity Americans are still not as active at the recommended levels. This could be due to barriers that keep Americans from being or becoming physically active. The most commonly reported barrier to women’s participation in physical activity is lack of time due to family responsibilities (Dunlap and Barry, 1999). Also, other barriers include lack of motivation, poor perception of health, lack of self-efficacy, lack of support, culture, health problems, environment, lack of safe place to exercise, and lack of money (Dunlap and Barry, 1999).

In a study by Yoshida, Allison, and Osborn (1988), they surveyed a sample of 233 women aged 18 and older and found that the most commonly perceived barriers were lack of time, health reasons, and lack of motivation, energy, or need. Other researchers, such as Godin, G., Desharnais, R., Valois, P., Lepage, L., Jobin, J., and Bradet, R. (1994) found lack of time to be repeatedly shown as the most common barrier. Their study consisted of a sample of 349 adults, with an average age of 38 years, who stated lack of time as the number one barrier to exercise.

Eyler, A. (2003) sent a mailed survey to 1,000 rural white women aged 20-50 years and had a goal to determine which barriers prevent people from exercising. The results showed that of the 1,000 women in the study, 53% met recommendations for moderate or vigorous physical activity, 40.1% were insufficiently active, and 7.9% were
inactive. Women in the youngest age group (20-30 years) were more likely to meet the recommendations for physical activity than were women in the oldest age group (40-50 years). Also, the responses suggested that lack of time, health concerns, and lack of motivation were the top three barriers to exercise (Eyler, A., 2003).

Lifestyle changes will be necessary for women to maintain regular physical activity for a lifetime. A frequently identified barrier to activity maintenance in women is lack of time due to work and family obligations. Understanding the common barriers to physical activity and creating strategies to overcome them may help people make physical activity a part of daily life.
Chapter 3: Methods

Design

This project used a cross-sectional design. A “snapshot” of a group of subjects at one point in time was taken simultaneously to assess the occurrence of outcomes of interest and factors that may be associated with those outcomes (e.g. survey).

Variables

Independent – The independent variable is the intervention, or what is being manipulated (Norman and Streiner, 2000).

Physical activity

Dependent – The dependent variable is the outcome of interest, which should change in response to some intervention (Norman and Streiner, 2000).

Stages of change

Procedure

This study was first approved by the Institutional Review Board (IRB) at the Medical University of Ohio (MUO) before survey delivery. A survey was distributed to all students, employees, and volunteers at MUO who ranged from ages 18 and older. Survey delivery, collection, and interpretation was conducted over the internet using Perseus Research software. The Perseus software will not allow the investigator to identify those who respond. This software is designed to protect confidentiality and email addresses are not revealed when the responses are returned. Completed surveys were received in the investigator’s email account, then, added to the Perseus database. A consent form was attached with the survey to explain the purpose of the project before they decide to participate. The survey consisted of 15 questions with the first four
questions asking about age, gender, ethnicity, and whether or not they were a student, employee, or volunteer. The next ten questions pertained to the stages of change model using a Likert scale strongly agree, agree, undecided, disagree, and strongly disagree were the choices. Finally, the last question was a ranking list of which barrier affects them the most from exercising.

All data was recorded in a spreadsheet through SPSS based on the criteria collected. In SPSS, the results were analyzed by using non-parametric measures and chi-square.
Chapter 4: Results

Overall Percentages

There was an 18% overall response rate to the survey 924 responses out of 5000 surveys sent. Males accounted for 33% of the respondents (306/924) and females accounted for 67% of the respondents (618/924) as shown in Figure 1. The 18-29 age group accounted for 57% of response rate (525/924), while the 70+ age group accounted for near 0% of the total response (1/924) (Figure 2). Figure 3 shows the ethnic responses with Caucasians making up 84% of the total response (776/923). Native Americans accrued almost 0% of the total response (1/923). Figure 4 shows the categorical responses with students accounting for 56% of the total response (513/923), and volunteers accounting for only 1% of the total response (8/923).

According to the stages of change, the majority of the MUO community was placed within the contemplation stage. This was determined by combining the responses of strongly agree and agree against the responses of strongly disagree and disagree. When participants were asked questions 13 (I really think I should work on getting started with a regular exercise program in the next 6 months) and 14 (I have been thinking that I might want to start exercising regularly), which pertain to the contemplation stage, the majority (62%) of the respondents agreed, while 29% disagreed. Since 62% of the total response agreed with questions pertaining to the contemplation stage, a valid conclusion can be inferred about the placement of the MUO community within a specific stage (stage two, contemplation) of the five stages of change (Figure 5).

When participants were asked questions 11 (As far as I am concerned, I do not need to exercise) and 12 (I know that regular exercise is worthwhile, but I do not have
time for it in the near future), which pertain to the pre-contemplation stage, the majority (80%) of the respondents disagreed, while 15% agreed. Since 80% of the total response disagreed with questions pertaining to the first stage (pre-contemplation), this infers that the respondents do not lie in this stage (Figure 6).

When participants were asked questions 9 (I am preparing to start a regular exercise group in the next few weeks) and 10 (I have set up a day and a time to start exercising regularly within the next few weeks), which pertain to the preparation stage, the majority (61%) of the respondents disagreed, while 25% agreed. Since 61% of the total response disagreed with questions pertaining to the third stage (preparation), then this suggests that the respondents do not lie in this stage (Figure 7).

When participants were asked questions 7 (I just started exercising regularly, and I plan to continue) and 8 (I just started exercising regularly within the last 6 months), which pertain to the action stage, the majority (73%) of the respondents disagreed, while 19% agreed. Since 73% of the total response disagreed with questions pertaining to the fourth stage (action), then this suggests that the respondents do not lie in this stage (Figure 8).

When asked questions 5 (I have been exercising regularly for a long time, and I plan to continue) and 6 (I have managed to keep exercising regularly through the last 6 months), which pertain to the maintenance stage, 47% of the respondents disagreed, while 47% agreed. Since the total response was equally split at 47%, therefore I could not determine whether or not the respondents agreed or disagreed with this stage of change (Figure 9).
Figure 10 represents the true ranking scale of barriers to exercise (Question 15), with time as the number one barrier to exercise (59% of the response) followed by lack of a buddy (15%), weather conditions (8%), lack of self-esteem (6%), lack of skill (5%), lack of resources (4%), and fear of injury (2%).

When comparing the age groups with the stages of change, the youngest age group (18-29 yrs) complied with the maintenance and contemplation stages. This suggests the younger population is more physically active when compared to the older group (70+ yrs). When comparing ethnicity with the stages of change, Caucasians (84% of the total response) also agreed with the contemplation stage (Table). As previously mentioned, these findings show the majority of the population is in the contemplation stage.
Figure 1: Number of participants (as %) that responded to the survey (indicated by male or female).
*indicates significantly different (p=0.00)(p<0.05)

Figure 2: Number of participants (as %) that responded to the survey (indicated by different age groups).
*indicates significantly different (p=0.00)(p<0.05)
Figure 3: Number of participants (as %) that responded to the survey (indicated by different ethnicities).  
*indicates significantly different (p=0.00)(p<0.05)

Figure 4: Number of participants (as %) that responded to the survey (indicated by different status).
Figure 5: Number of participants (as %) that lie within the contemplation stage of change (indicated by likert scale: strongly agree – strongly disagree).
*indicates significantly different (p=0.00)(p<0.05)

Figure 6: Number of participants (as %) that lie within the pre-contemplation stage of change (indicated by likert scale: strongly agree – strongly disagree).
*indicates significantly different (p=0.00)(p<0.05)
Figure 7: Number of participants (as %) that lie within the preparation stage of change (indicated by likert scale: strongly agree – strongly disagree).
*indicates significantly different (p=0.00)(p<0.05)

Figure 8: Number of participants (as %) that lie within the action stage of change (indicated by likert scale: strongly agree – strongly disagree).
*indicates significantly different (p=0.00)(p<0.05)
Figure 9: Number of participants (as %) that lie within the maintenance stage of change (indicated by likert scale: strongly agree – strongly disagree).

Figure 10: Number of participants (as %) that responded to the survey (indicated by ranking scale of barriers to exercise). *indicates significantly different (p=0.00)(p<0.05)
Chapter 5: Discussion and Conclusion

Discussion

This study examined the stages of change in the MUO community and elicited the barriers of exercise. Based on the results from this survey, the majority (62%) of the MUO community fall within the contemplation stage of change (Stage 2). The overall prevalence is encouraging because this stage shows people are considering change and may start an exercise program in the near future. The hypothesis projected that the majority of the MUO population would be in the preparation or action stages. These results reject the hypothesis. The fitness center is proximal to the hospital (no traveling) and students do not have to pay an extra fee. Faculty and volunteers must pay a fee and therefore, due to extra expenses, faculty and volunteers are less likely to exercise.

One surprising result was that 67% of the respondents were females as shown in Figure 1. This corresponds to results found by O’Hea et al. (2003), which concluded that the majority of the females placed themselves in the contemplation stage, whereas males placed themselves in the maintenance stage. These results, however, contrast those of Juniper et al. (2004). They revealed the majority of the female responses were within the preparation stage. This could be due to the low response rate (18%), which was lower than expected.

The highest response (57%) occurred in the 18-29 age group (56% students, 84% Caucasian). The higher response from the younger age group could be due to on campus accessibility to computer system or increased interest due to increased levels of physical activity. The high response rate from the Caucasian ethnicity directly represents the majority of the MUO population.
The results from the true ranking scale of barriers to exercise (Figure 10) indicate time as the number one barrier with 59% of the respondents. This result is comparable to Godin and Colleagues (1994) who found that lack of time is the most commonly reported barrier in women aged 18 and older. This also is in accordance with Dunlap and Barry (1999) who found lack of time as the number one barrier to physical activity.

There were a number of notable limitations of this study. One limitation to this study is that only 18% of the MUO community responded to the survey. This limitation could easily affect the statistical outcome of not only the stages of change with which the community placed themselves, but also the barriers to exercise. Further study is warranted to increase the number of respondents and/or evaluate different population groups to truly determine the stages of change and barriers to exercise. Another limitation is that the sample consisted of significantly more females than males and more equivalent sample sizes would have been best. Finally, this project was the first of its kind to evaluate these constructs at the MUO community. Therefore, findings are important, but are not generalizeable to other demographic populations. The presented results should be considered as preliminary and should be investigated in more depth.

Conclusion

The results of this study revealed the majority of the MUO respondents are in Stage 2 (Contemplation) of the five stages of change. Time is the number one barrier to exercise. These results indicate that the majority of individuals are only thinking about exercising. This could be indicative that the majority of the population in the United States is obese. If a simple intervention (such as providing education) could be used to initiate a change from contemplation to action on the five stages of change, obesity and
its associated diseases could potentially be reduced. These results are important not only to the physician assistant profession, but the entire health care profession. It is imperative to know higher percentages of the health care population do not exercise even when the adverse effects are known. As physician assistants, we can encourage not only the patient population to start an exercise program, but our colleagues in health care. This may make it easier to convince patients that exercising is beneficial.

Increased physical activity plays a role in the prevention and treatment of obesity. Engaging in physical activity can improve a person’s quality of life. For this reason, all health care professionals, especially physician assistants, should be knowledgeable about the basic principles and practices of physical activity prescription. Further studies should be aimed at other barriers to exercise measured within a different population.
References


Appendix A

Consent:

Dear survey recipient,

My name is Jackie Dight and I am a student in the physician assistant program at the Medical University of Ohio (MUO). I am conducting a research study to examine the physical activity status of individuals at MUO.

The purpose of this study is to determine what level of physical activity people in the MUO community are currently engaged and find out what barriers limit subjects from exercising.

The survey will be conducted entirely online using Perseus Research software. There are 15 questions, and the survey takes less than five minutes to complete. It is your right to choose not to answer any question at your discretion, and your participation in this research is voluntary.

The Perseus Research software will not allow me to identify any respondent; therefore, your anonymity will be preserved. Perseus software is designed to protect confidentiality and your email address will not be revealed when you return the response.

Thank you very much for taking the time to complete the questionnaire. I look forward to compiling the results and analyzing the data. The results of my project will be presented in December 2005 at MUO. Please submit the attached survey ASAP.

Determining the Stages of Exercise in a Convenience Sample of Differing Genders and Ages at a Midwest Health Science Center.

1. What is your age?
   - 18-29
   - 30-39
   - 40-49
   - 50-59
   - 60-69
   - 70 or older

2. Gender?
   - Male
   - Female
3. Ethnicity?
   - Caucasian
   - African American
   - Hispanic/Latina
   - Native American
   - Asian/Pacific Islander
   - Multiracial
   - Other

4. Status?
   - Employee
   - Student
   - Volunteer

For the following questions, indicate your level of agreement with the statements: strongly agree, agree, undecided, disagree, strongly disagree.

5. I have **been** exercising regularly for a long time, and I plan to continue.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

6. I have managed to keep exercising regularly through the last 6 months.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

7. I **just started** exercising regularly, and I plan to continue.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

8. I **just started** exercising regularly within the last 6 months.
   - Strongly agree
9. I am preparing to start a regular exercise group in the next few weeks.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

10. I have set up a day and a time to start exercising regularly within the next few weeks.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

11. As far as I am concerned, I do not need to exercise regularly.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

12. I know that regular exercise is worthwhile, but I do not have time for it in the near future.
   - Strongly agree
   - Agree
   - Undecided
   - Disagree
   - Strongly disagree

13. I really think I should work on getting started with a regular exercise program in the next 6 months.
   - Strongly agree
   - Agree
   - Undecided
14. I have been thinking that I might want to start exercising regularly.

- Disagree
- Strongly disagree
- Strongly agree
- Agree
- Undecided
- Disagree
- Strongly disagree

For the last question, rank in order from 1-7 which barrier keeps you from being able to exercise the most (#1 is the greatest barrier and #7 is the least barrier).

15. True Ranking from 1-7:

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<th>Rank</th>
<th>Lack of a buddy</th>
<th>Lack of time</th>
<th>Fear of injury</th>
<th>Lack of self-esteem of body image</th>
<th>Lack of resources</th>
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Appendix B

Abstract

**Objective:** To determine what level of physical activity individuals in the Medical University of Ohio community are currently engaged and determine what barriers limit subjects from exercising.

**Methods:** A 15-item questionnaire was distributed to all MUO employees, students, and volunteers and was conducted over the internet using Perseus Research software.

**Results:** There was an 18% overall response rate to the survey. Females accounted for 67% (618/924) and males accounted for 33% (306/924). The majority of the responses 57% (525/924) were from the 18-29 age group, Caucasians had an 84% (776/923) response, and students accounted for 56% (513/923). The majority 62% of the MUO community fell within the contemplation stage of change (Stage 2) and 59% showed time as the number one barrier to exercise.

**Conclusion:** The results revealed the majority of the MUO respondents are in Stage 2 (Contemplation) of the five stages of change and time as the number one barrier to exercise.
Appendix C

MEMORANDUM

TO: Patricia F Hogue, M.S.
MCO Department of Physician Assistant Studies

FROM: Eric A. Schaub, M.D., M.P.H.
Daniel Cipriani, Ph.D., P.T., Chair Designee
MCO Institutional Review Board

DATE: April 29, 2005

SUBJECT: IRB # 104928 – Determining the Stages of Exercise in a Convenience Sample of Differing Genders and Ages at a Midwest Health Science Center

The Chair and Chair Designee of the Medical College of Ohio Institutional Review Board determined that this project be designated as exempt research (category # 2). This review and approval includes the protocol, survey tool, informational letter, and follow-up e-mail submitted with the MCO IRB application. The requirement to obtain a signed consent/authorization for use and disclosure of protected health information form has been waived as this research is determined to be minimal risk and a signed consent/authorization document would be the only record linking the subject to the data. It was determined that this waiver for signed consent/authorization for use and disclosure of protected health information form will not adversely affect the rights and welfare of the participants. No protected health information is being collected as part of this research. The Principal Investigator must provide a copy of the informational letter with the survey tool to all participants prior to participation. The full board will be notified of this action at its meeting on 05/19/2005.

DESIGNATED as EXEMPTED RESEARCH on: 4/28/2005

It is the Principal Investigator's (P.I.'s) responsibility to:
1. Abide by all federal, state, and local laws and regulations; the MCO federal assurance and institutional policies for human subject research and protection of individually identifiable health information including those related to record keeping and be sure that all members of your research team have completed the required education in these areas.
2. Provide a copy of the Informational Letter along with the survey tool to all participants prior to participation.
3. Comply with the Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule Privacy Rule (45 CFR 164) and institutional policy regarding the accounting and tracking of uses and disclosures of protected health information.
4. Promptly notify the MCO IRB at (419) 383-6796 of any untoward incidents or unanticipated adverse reactions that develop in the course of your research on human subjects. Please complete and submit RGA Form 317 for ALL SUCH REPORTS for this protocol. The Principal Investigator is also responsible for submitting to the MCO IRB reports of adverse events that occur at other sites conducting this study and for maintaining an up-to-date cumulative table of adverse events (RGA Form 316) and submitting it to the MCO IRB for each research project. The Principal Investigator is responsible for reporting adverse events to the appropriate federal agencies and the sponsor (when one exists).
5. Report promptly to the MCO IRB any deviations, violations or participant non-compliance from the MCO IRB approved protocol in accordance with the procedures outlined in RGA Form 309. In your report include the protocol number and title, the subject's initials and study I.D. number (if known), date of the event, a brief description of the occurrence and a description of any corrective actions taken. The Principal Investigator is responsible for reporting deviations, violations and participant non-compliance to the appropriate federal agencies and the sponsor (when one
exists) in accordance with federal regulations, institutional policy and any other legal agreements with these organizations.

6. Obtain prior MCO IRB review and approval for changes in procedures, inclusion/exclusion criteria, study personnel, source of participants, new or additional advertising materials, modifications to subject payments, and for any and all changes to the cover letter and survey tool.

7. Report promptly to the MCO IRB, sponsor (if this research is sponsored) and all other required federal and state agencies all new information affecting the risk/benefit ratio and obtain prior MCO IRB approval for any changes in the study documents that may be required by the new information.

8. Obtain prior MCO IRB review and approval for all modified and/or added incentives going to the P.I., study coordinator, other study personnel, and/or the institution. These incentives may be in the form of money or other items of value, including, but not limited to, equipment, such as computers, and intangibles, such as frequent flyer miles.

9. Promptly notify the MCO IRB; other required MCO committees, departments or individuals; the sponsor (if this research is sponsored); and all other required federal and state agencies of all potential conflicts of interest before beginning this research and, during the course of this research report to these committees, individuals and agencies any changes that may affect conflict of interest for any of the study personnel. Prior MCO IRB approval must be obtained for any changes in the study documents that may be required by information related to conflict of interest or any changes in this information during the course of the research.

10. Promptly notify the MCO IRB of any changes in contracts, budgets, grants or other agreements with sponsors, agencies or individuals regarding the conduct of this research before initiating these changes. The IRB reserves the right to review these study related documents and changes to them to verify accuracy and consistency with regard to the research protocol in order to protect the rights and welfare of the study subjects. Changes in these documents that have the potential to affect the rights, welfare or willingness of the study subjects to participate in or continue to participate in this research and changes in subject documents (such as informed consent, assent or authorization for use and disclosure of protected health information forms, etc.) that are a result of these changes must be reviewed and approved by the MCO IRB prior to being instituted.

Additional Information:

➢ Other Required Review(s) or Approval(s)
Review or approval by the MCO Institutional Review Board does not take the place of any other review or approval required by the Medical College of Ohio, non-MCO performance sites, the government and/or the study sponsor.

➢ Required Procedure to Request Review and Approval for Changes/Updates to MCO IRB Approved Research:
Please complete and submit the Request for Amendment/Changes/Updates (RGA Form 314 found at <http://www.mco.edu/research/rga_frmis/rga314.doc>) with a copy of all materials relevant to the requested change (including consent/assent/authorization for use and disclosure of protected health information forms if applicable) with the changes underlined. If you are requesting review and approval of consent/assent/authorization for use and disclosure of protected health information forms, please attach a clean copy of the revised forms for the MCO IRB to stamp. Please remember that all changes and correspondence submitted to the MCO IRB (regardless if they are generated by a sponsor, the P.I. or requested by the MCO IRB) must be in writing, signed and dated by the Principal Investigator.

➢ Required Final Report Upon Termination of Research:
When you decide to stop this research, you are responsible for completing and submitting a Final Report (RGA Form 320 found at <http://www.mco.edu/research/rga_frmis/rga320.doc>) to the MCO IRB for review.