***Suggestions for Research Projects for MA 207 Students***

***With an Interest in Nursing or Healthcare Fields of Study***

***Description of Resource:***

These are nine suggestions for simple/brief research projects that can be performed by MA 207 students who may have an interest in Nursing or other health-related fields of study. Most of these suggested studies could utilize the students, faculty and staff as participants. There are a couple suggested studies that would require an older population, so depending on the number required, some faculty and staff may qualify for some of these age ranges, otherwise a students could obtain participants from a local assisted-living facility if approved by IRB.

I have limited the studies so they require only minimal health assessment skills, such as checking/counting a pulse, measuring height/weight, measuring blood pressure (can be done with an automatic blood pressure machine) and measuring waist circumference.

**1**. Body Mass Index can be an important potential indicator of health status. The Centers for Disease Control state that individuals with a higher BMI have an increased risk of heart disease, Type II diabetes mellitus, mortality and many other illnesses such as cancer, stroke and chronic inflammation (retrieved May 31, 2016 at <http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/>). Additionally, a 2011-research study demonstrated a correlation between Body Mass Index (BMI) and cardiovascular mortality in both genders (retrieved May 31, 2016 at <http://www.ncbi.nlm.nih.gov/pubmed/21642320>). Therefore, accurate assessment of a client’s BMI is important as healthcare providers promote wellness and disease prevention.

In the Journal of American Dietetic Association, as study was conducted titled the, *“Effects of Age on Validity of Self-Reported Height, Weight, and Body Mass Index”* (retrieved May 31, 2016 at <http://www.sciencedirect.com/science/article/pii/S0002822301000086>). The study concluded that age is an important factor when utilizing self-reported heights and weights to calculate BMIs. Please review the research study for detailed results. However, basically, it concluded that reported heights and weights for calculating BMI were more accurate in younger participants when compared to older participants.

Therefore, a suggestion for a student research study would be to conduct a similar study to compare the self-reported heights and weights and the subsequent calculated body mass index (BMI) to measured heights and weights and the calculated BMIs in different age groups. It would be important for the student to obtain a sufficient number of participants in the various age groups. Perhaps participants from a local assisted living facility could be obtained if approved by the IRB, so as to ensure elderly participants were included.

**2.** The main purpose of the heart is to pump blood and circulate it throughout the body. The circulatory system of the body carries essential nutrients and oxygen to the cells of the body. Excess body fat and weight can increase the workload of the heart. The American Heart Association published in *Circulation* that, “Obesity produces an increment in total blood volume and cardiac output that is caused in part by the increased metabolic demand induced by excess body weight” (retrieved on June 1, 2016 at <http://circ.ahajournals.org/content/113/6/898.full>).

Therefore, a suggestion for a student research study would be to measure or have participants self-report their heights and weights so as to calculate body mass index (BMI). Then, compare their BMI to a measured resting pulse/heart rate and a measured resting pulse/heart rate after an exercise activity, such as running stairs or jumping jacks for five minutes. The purpose of the study would be to evaluate the relationship between the BMI and pulse rate (resting and after exercise).

**3.** “Physical exercise is known to lower blood pressure and reduce cardiovascular risk through a wide range of mechanisms. Nevertheless, hypertension is the most prevalent cardiovascular disease among athletes and physically active subjects. (retrieved on June 2, 2016 at <http://www.medscape.com/viewarticle/747755_1>). According to Up-To-Date, “Hypertension is among the most common conditions seen in primary care and the most common cardiovascular condition affecting athletes (retrieved June 1, 2016 at <http://www.uptodate.com/contents/hypertension-in-athletes>). The role of hypertension in the development of cardiovascular disease has been well established. It is crucial that healthcare provider identify individuals at high risk for cardiovascular disease so as to intervene with health promotion and disease prevention strategies.

A retrospective 2013 study conducted at Vanderbilt University Medical Center concluded that there was an increased prevalence of hypertension and pre-hypertension among male collegiate football athletes when compared to non-football athletes (retrieved June 1, 2016 at (<http://www.uptodate.com/contents/hypertension-in-athletes/abstract/6?utdPopup=true>). It is thought that this incidence of elevated blood pressure may be related to athletes with an increased BMI, such as football linemen, etc.

A suggestion for a student research study would be to record body mass index (either measured to self-reported) and compare the BMI to measured blood pressure. Blood pressures would be performed by a trained investigator (nursing student) or an automatic blood pressure machine could be utilized. The question would be to compare the relationship of blood pressure to BMI. Also recording gender, then comparing gender to blood pressure and BMI could make another comparison.

**4.** “It is now well established that repetitive participation in vigorous physical exercise results in significant changes in myocardial structure and function” (retrieved on Juen 2, 2016 at <http://circ.ahajournals.org/content/123/23/2723.full.pdf+html>).

As a healthcare provider, it is important for us to understand the role of exercise in cardiac function. “Regular and long-term participation in intensive exercise (minimum of 4 h/week) is associated with unique electrical manifestations that reflect increased vagal tone and enlarged cardiac chamber size” (retrieved on June 2, 2016 at <http://www.medscape.com/viewarticle/778363_2>). Increased vagal tone can result in decreased heart rate.

A suggested student research study would be to measure the pulse rate of athletes and non-athletes at rest and then after an exercise activity. Then, a statistical analysis would be performed to discover if there was a correlation between the pulse rate and being an athlete. Additional data on gender and type of sport could be also measured, if desired to search for further correlations.

**5. “**The increase in blood pressure with age is mostly associated with structural changes in the arteries and especially with large artery stiffness. It is known from various studies that rising blood pressure is associated with increased cardiovascular risk. In the elderly, the most powerful predictor of risk is increased pulse pressure due to decreased diastolic and increased systolic blood pressure (retrieved on June 2, 2016 at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2805932/>). Pulse pressure is the difference between the systolic and diastolic pressure readings. According to Taber’s Medical Dictionary, normal pulse pressure is approximately 40 mmHg with a normal range of 30-50 mmHg.

According to the Journal of the American Medical Association, “Pulse pressure, an easily measurable correlate of pulsatile hemodynamic load, is an independent predictor of risk of CHF in this elderly cohort” (retrieved on June 2, 2016 at <http://jama.jamanetwork.com/article.aspx?articleid=188787>). A healthcare provider must be able to identify risk factors when assessing patients.

A suggested student research study is to measure blood pressure on individuals of various ages, including, if possible, some elderly individuals. The investigator could then calculate the pulse pressure.

The research questions would be the following:

Is there a correlation between age and blood pressure?

Is there a correlation between age and pulse pressure?

**6.** According to the *The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, produced by the National Heart, Lung, and Blood Institute, “although waist circumference and BMI are interrelated, waist circumference provides an independent prediction of risk over and above that of BMI. Waist circumference measurement is particularly useful in patients who are categorized as normal or overweight on the BMI scale. At BMIs reater than or equal to 35, waist circumference has little added predictive power of disease risk beyond that of BMI. It is therefore not necessary to measure waist circumference in individuals with BMIs reater than or equal to 35” (retrieved on May 31, 2016 at <http://www.nhlbi.nih.gov/health-pro/guidelines/current/obesity-guidelines/e_textbook/txgd/4142.htm>).

Healthcare providers measure waist circumference to screen for potential health risks that are associated with obesity. If most of an individual’s fat is located around the waist area, then they are most likely at greater risk for cardiovascular disease and Type II diabetes mellitus. In 2008, the World Health Organization consulted to discuss possible cut-points for measurements of waist circumference. Waist circumference is affected by body composition, body weight and fat distribution (retrieved on June 1, 2016 at <http://www.ncbi.nlm.nih.gov/pubmed/19738633>). In 2009, Stevens, Katz and Huxley, published a paper that examined the impact of gender and age on waist circumference (retrieved on June 1, 2016 at <http://www.nature.com/ejcn/journal/v64/n1/full/ejcn2009101a.html>).

Gender does play a role in body composition and fat distribution, due to sex hormones. In addition, waist circumference increases with age. Therefore, health care providers must fully understand the associations between gender, age and waist circumference so that we may better promote health and wellness.

Therefore, to further explore this issue, a suggestion for student research would be to gather data on participants of various ages and record their gender and waist circumference. Then statistically evaluate to answer the following questions:

Is there a correlation between waist circumference and gender?

Is there a correlation between age and waist circumference?

What is the relationship of age, gender and waist circumference?

**7.**  In the *International Journal of Basic and Applied Physiology,* a study was published in 2012 that assessed the use of smart phones on digital dexterity and audiovisual reaction time. The study concluded the following“Mobile phone texting showed non significant improvement in finger dexterity. However, it showed significant improvement in reaction time task” (retrieved on May 31, 2016 at <http://oaji.net/articles/2014/1021-1405081609.pdf>). In this particular study, all participants were in the age group of 17-19 year olds. It did not demonstrate that mobile phone texting affected finger dexterity. We know that manual dexterity can diminish with age, which may be due to arthritis or other age related changes. However it would be interesting to assess, with the increase in mobile phone use across all age groups, at what age does manual dexterity begin to decline? Is there a correlation with texting?

A suggested student study would be to have participants perform a manual dexterity test and record the length of time it takes for each participant to complete the task. Additionally, record the average number of texts that were sent or responded to by the participants in a certain time frame (1-2 days). Record the participants’ age as well.

Then perform statistical computations to evaluate the following:

Is there a correlation between the number of texts and their manual dexterity test result?

What is the relationship of age to manual dexterity test results?

Resources for ways to measure manual dexterity: <http://hubpages.com/business/5-Ways-to-Assess-Dexterity-and-Coordination>. There may even be a computer program or an app that can measure manual dexterity??

8. In a 2014 study titled, “Visuomotor Control in Continuous Response Time Tasks Across Different Age Groups”, the investigators found “Visuomotor performance increased with age to younger adulthood but was worse in the older adult group (retrieved June 1, 2016 at <http://pms.sagepub.com/content/119/1/169.full.pdf+html>). As healthcare providers, assessing visual-motor response time may be important as we assess for age-related changes, early signs of certain illnesses and assess for potential safety risks as visual-motor response times decrease. Additionally, as health care providers we should intervene to help individuals avoid health decline, so the more information we know about visual-motor response time changes, perhaps we then suggest exercises to increase these reflexes. What is particularly interesting with this study is that response times increased with age and then decreased as the older adults. This raises an interesting question, which is; at what age does the decrease in visual-motor response time begin to occur? Also, is there a significant difference between those younger than 20 and older than 20?

Therefore, a suggested student study would be to measure each participant’s visual reaction time and record each participant’s age. It would be ideal to have a variety of ages.

Then evaluate the statistical data with their age to answer the question: what is the relationship of age and visual-reaction time? At what age, does it become statistically significant?

Potential Resource for visual reflex reaction time: <http://www.humanbenchmark.com/games>

9. “Depression is a potentially life-threatening mood disorder that affects 1 in 6 persons in the United States, or approximately 17.6 million Americans each year. Depressed patients are more likely to develop type 2 diabetes and cardiovascular disease” (retrieved June 2, 2016 from <http://emedicine.medscape.com/article/805459-overview>). Depression in college age students is also very prevalent at approximately 44%. Often these students do not seek assistance for their depression. According to the American Psychological Association, “More than 30 percent of students who seek services for mental health issues report that they have seriously considered attempting suicide at some point in their lives, up from about 24 percent in 2010, says Pennsylvania State University psychologist Ben Locke, PhD, who directs the Center for Collegiate Mental Health (CCMH), an organization that gathers college mental health data from more than 263 college and university counseling or mental health centers” (retrieved June 2, 2016 from <http://www.apa.org/monitor/2014/09/cover-pressure.aspx>).

A suggestion for student research would be to administer The-Short-Depression-Happiness-Scale (SDHS) to first, second, third and fourth year college students. Then, analyze the data to evaluate the differences in SDHS scores in relation to the year in college. Additionally, instead of the year in college, the variables could be depression score and the participant’s major.

If a serious depression is found, It would be most responsible ethically for the investigators to refer students with elevated SDHS scores to the Carroll College Wellness Center for counseling and even distribute a pamphlet on depression and/or how to seek assistance.

Resource for SDHS: http://www.pubfacts.com/detail/15588455/Rapid-assessment-of-well-being-The-Short-Depression-Happiness-Scale-SDHS