Purpose:
Cardiac disease is the number one cause of death in the United States (Centers for Disease Control and Prevention, 2016; Go et al., 2013), therefore, many workplace wellness programs incorporate targeted education regarding behaviors that may increase the risk for major cardiac health problems. Cardiovascular disease risk factors can lead to heart attack, stroke, heart failure, circulation problems, and many other complications (National Heart Lung and Blood Institute, 2017). A variety of workplace wellness program models exist for employees. These programs may incorporate biometric screenings, health coaching, educational interventions, and various wellness activities designed to reduce risk factors, improve health outcomes, improve quality of life, and control medical costs (Mattke, et al., 2013). For example, risk factors for cardiovascular disease including hypertension, hyperlipidemia, diabetes, obesity, smoking, physical inactivity, age, genetics, and unhealthy diet may be addressed within workplace wellness programs (American Heart Association, 2018). Furthermore, coexisting cardiovascular risk factors may exponentially increase the risk of developing cardiovascular disease and complications. Cluster analysis can assist in discovering the classifications and relationships within and among homogeneous groups (Dunn et al., 2017) to further investigate cardiovascular disease risk factors. The purpose of this study was to examine and describe the prevalence of single and combined, or multiple, cardiovascular risk factors within a workplace wellness dataset by way of cluster analysis.

Methods:
IRB approval was obtained to conduct secondary data analysis on de-identified wellness program biometric screening data collected from employees who underwent a health screening. A total of 8,809 records were collected from an eight year period spanning 2011 through 2018. The following variables were included in the data analysis: BMI, waist circumference, LDL, total cholesterol, HDL, triglycerides, blood glucose, age, ethnicity, and gender.
Results:
Based on the evidence collected, five major cardiovascular risk factors were defined: hypertension, diabetes, hyperlipidemia, overweight, and abdominal obesity. Using these factors, we clustered individuals according to acceptable thresholds. Further, data was classified into four levels of cluster membership: none, single, multiple clusters, and full sample. Descriptive statistics indicated that ages of participants ranged from 17.5 - 67.5. Females comprised the majority of the sample (70%), as did members of the white ethic group (78%). As subsets were defined by greater risk factors (no risk factors to single to multiple), the results indicate that males and older subjects have larger prevalence for risk factors. Disparity was noted in the prevalence of ethnic groups as risk factors increase: subjects classified as American Indian and Black increased as a percentage of the sample while those classified as Asian and White decreased. The analysis also indicated: 1) greater levels of cardiovascular exercise improved the prevalence of risk factors across the sample, and 2) tobacco use may influence CVD risk differentials among the subjects.

The cluster analysis visually illuminated the distribution of types of subjects pertaining to having or not having specific risk factors. Of the 8,809 subjects, 2,169 (24.9%) had no CVD risk factor, 1664 (18.9%) had a single risk factor, and 4,976 (51.5%) had two or more risk factors. This analysis revealed that the majority of sample members are described as having more than one CVD risk factor. Furthermore, among the 6,640 subjects having one or more risk factors, 75.4% had multiple. Additionally, it was evident that the majority (65%, n=5733) of participants were at risk by being overweight (as defined by a Body Mass Index greater than 25) and 33% (n=2641) males and 42% (n=6165) females were at risk with abdominal obesity (as defined as waist circumference greater than 40 in males and greater than 35 in females).

Conclusion:
Cluster analysis proved useful in grouping participant data based on their risk factors. A baseline analysis of data was conducted and understanding of cardiovascular risk clustering in this specific population was gained. Further investigation is needed to clarify the relationships among these identified risk factors and to expand the findings of this study. However, this analysis provided insight into employee health and risk factors, allowing those that plan educational activities and interventions to specifically target and address prevalent risk factors and combinations thereof among the participants in the workplace wellness program. The development of customized specific risk reduction strategies, interventions, and programs may result, hopefully mitigating poor health consequences often associated with cardiovascular risk factors.

Title:
Discovering Cardiovascular Risk Factors Within Workplace Wellness Biometric Data: A Cluster Analysis

Abstract Describes:
Abstract Summary:

The purpose of this study was to examine and describe the prevalence of single and combined, or multiple, cardiovascular risk factors within a workplace wellness dataset by way of cluster analysis. The analysis provided insight allowing those that plan educational interventions to specifically target and address prevalent risk factors.

Content Outline:

Introduction:

Cardiac disease is the number one cause of death in the United States (Centers for Disease Control and Prevention, 2016), therefore, many workplace wellness programs incorporate targeted education regarding behaviors that may increase the risk for major cardiac health
problems. The purpose of this study was to examine and describe the prevalence of single and combined, or multiple, cardiovascular risk factors within a workplace wellness dataset by way of cluster analysis.

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Five major cardiovascular risk factors were defined: hypertension, diabetes, hyperlipidemia, overweight, and abdominal obesity. Using these factors, we clustered individuals according to acceptable thresholds. Further, data was classified into four levels of cluster membership: none, single, multiple clusters, and full sample.

The cluster analysis visually illuminated the distribution of types of subjects pertaining to having or not having specific risk factors. Of the 8,809 subjects, 2,169 (24.9%) had no CVD risk factor, 1,664 (18.9%) had a single risk factor, and 4,976 (51.5%) had two or more risk factors. This analysis revealed that the majority of sample members are described as having more than one CVD risk factor. Furthermore, among the 6,640 subjects having one or more risk factors, 75.4% had multiple.

Conclusion:

Cluster analysis proved useful in grouping participant data based on their risk factors. A baseline analysis of data was conducted and understanding of cardiovascular risk clustering in this specific population was gained. This analysis provided insight into employee health and risk factors, allowing those that plan educational activities and interventions to specifically target and address prevalent risk factors and combinations thereof among the participants in the workplace wellness program.