

FIRE FIGHTER HEALTH AND WELLNESS

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Abstract

The profession of fire fighter has been in existence since the Roman times where slaves were tasked to perform the basic function of putting the wet stuff on the red stuff. Sadly, during that time, many fire fighters died due to unknown causes however, had they died today, the cause of their death could be traced through extensive research initiatives in place. Unfortunately, it was not until the twentieth century where advancements in technology along with data research and analysis endeavors concluded the human heart is not designed to take on the stressors associated with everyday firefighting and that the idea of implementing a health and safety program was deemed necessary for fire fighter survival.

Focusing on military fire fighters for a moment, the U.S. Air Force (USAF) having been designated as the lead agency responsible for implementing a fitness program to all Department of Defense (DoD) Fire Emergency Services (FES) has yet to implement a standardized fitness program. As a result, the initiative towards designing a structured fire fighter health and wellness program was launched in 2011.

Prior to the launch of the 2011 initiative, in 1998, a review and analysis was prepared for the U.S. Air Force School of Aerospace Medicine in which several fire fighter fitness programs that were being utilized at that time were evaluated. The four programs evaluated involved the Interim Air Force/Department of Defense Fire Protection Programs Fire Fighter Physical Fitness Program, the Canadian Forces/Department of National Defense's new Fire Fighter Physical Fitness Maintenance Program, the then emerging International Association of Fire Fighters/International Association of Fire Chiefs Fire Service Joint Labor Management

Wellness/Fitness initiative (IAFF/FC initiative), and finally the National Fire Protection Association's NFPA 1583 (Palmer, Carroll, & Mirza, 1998).

Following what the USAF is actively pursuing, the intent of this project is to determine if a structured health and wellness program will be effective in reducing the risks associated with coronary heart disease among fire fighters. Furthermore, this project will identify measurements that demonstrate the effectiveness of a structured health and wellness program in order for an organization to justify funding the program beyond the research phase.

There are literally thousands of questions which could be asked regarding fire fighter physical fitness programs and their effectiveness. To limit the length of this project and the fact there is not enough time to capture every question, capitalizing on a few questions that will shed some light on the significance of this research initiative will be a priority.

The most significant question to ask is "Is there an association between a structured health and wellness program and a reduction in stress related injuries and or fatalities?"

David Nichols of the West Manchester Township Fire & Emergency Services stated several similar questions in his 2004 research paper on Health & Wellness Programs for Volunteer Firefighters – a Local Approach. One question asked was how can a health & wellness program assist in the management of known risk factors? (Nichols, 2004)

Literature Review

Year after year, fire fighters succumb to cardiac emergencies despite the various physical fitness training and education programs offered and implemented annually. In a 2007 article found on WebMD, fire fighter deaths caused by heart disease averaged at 45 percent over the past 30 years (DeNoon, 2007). Stefanos Kales, a Harvard researcher stated “What our study is showing is the majority of on-duty heart deaths in firefighters are work related and are precipitated by physical and toxic factors.”

Statistically, the majority of fire fighter fatalities are a result of stress such as cardiac related emergencies. In a 2007 report published by the National Fire Protection Association, 38 fire fighters died as a result of sudden cardiac failure (Fahy, LeBlanc, & Molis, 2008). The report goes on to state of those fire fighters who died from cardiac emergencies; post mortem findings determined 10 had heart disease. It was not known if those individuals knew they had heart disease or not which leads into the question of how effective is a healthy eating regime in terms of preventing or reducing heart disease risks?

Unfortunately, most fire fighters and honestly most Americans do not understand the importance of maintaining a healthy lifestyle which includes physical fitness and proper eating habits. A study titled PHLAME (Promoting Healthy Lifestyles: Alternative Models' Effects), found that with a structured health and wellness program, fire fighters after one year improved their proper eating habits and increased their healthy physical activity behaviors leading them in the direction towards reducing heart disease risks (Elliot, Goldberg, Kuehl, Moe, Breger, & Pickering, 2007). Unfortunately, all fire fighters are not the same in terms of eating habits and body composition.

In a 2009 report on obesity and emergency responders, the authors determined obesity was an epidemic among fire fighters in which some type of intervention should be performed (Tsismenakis, Christophi, Burress, Kinney, Kim, & Kales, 2009). The study performed consisted of 370 Fire Emergency Services (FES) candidates located throughout Massachusetts. Of those candidates, astoundingly, over 75 percent were found to be considered overweight or obese.

Several surprising findings came from that 2009 report of which one in particular; obesity, was considered a factor towards vehicle accidents. While their obesity was not a direct contributor to the accident itself, obese individuals, not specifically fire fighters, diagnosed with sleep apnea were found to become drowsier while driving than those who are within normal levels of weight. As a result, some of the obese individuals involved in motor vehicle accidents were found to have fallen asleep at the wheel prior to the time of the motor vehicle crash. Emphasis should be placed on accepting the fact this medical anomaly could impact fire fighters who are tasked to drive and or operate fire apparatus.

The authors of the report suggest during the medical examination portion of a fire fighter recruit interview, and current fire fighter's annual physical, BMI is considered as a means of determining if they pose a health risk and even a liability to not only themselves, but the department in general.

Similarities

Of all the other resources reviewed, the consensus seemed to concentrate on cardiorespiratory fitness and proper dieting for fire fighters as being the two necessary means to reduce the risk of heart disease. One published article specifically indicated

there may be some correlation between fire fighters and metabolic syndrome in terms of cardiac related fatalities (Donovan, Nelson, Peel, Lipsey, Voyles, & Israel, 2009). In this specific article, the authors indicate of the 214 career male fire fighters evaluated, 56 percent were overweight with an additional 19 percent being categorized as obese. These findings disturbingly mirror what other reports have found; that increased weight among fire fighters is becoming the norm.

The authors concluded 15 percent of the 214 male fire fighters evaluated possessed metabolic syndrome. Furthermore, 25 percent of the fire fighters were considered to be below an identified level to perform safely in their duties. While not specifically stated, a hypothesis outlining a structured health and wellness program would reduce cardiac emergency risks to fire fighters seems appropriate.

Conclusion

While one study found ultrafine particulates encountered during firefighting operations contributed to increased heart disease (Baxter, et al., 2012), another journal article confirmed health and wellness was a leading cause of fire fighter fatalities, specifically indicating a trend over the course of six-years. What the authors determined was of the 644 recorded fire fighter fatality incidents; nearly one half of those could have been prevented in some fashion, i.e. participating in a structured health and wellness program (Moore-Merrell, Zhou, McDonald, Fisher, & Moore, 2008).

In this particular report, the authors divided certain contributing factors into four clusters. Fire fighter health and wellness was included in cluster four along with staffing and operating guidelines. Ironically, the two other contributing factors are somewhat

controllable in terms of reducing risks. The study showed the three factors that were grouped into cluster four contributed to 44.72 percent of fire fighter fatalities alone.

Of the literature reviewed, it is fair to state fire fighter injuries and fatalities can be realistically reduced through the implementation of a structured health and wellness program emphasizing on cardiorespiratory exercise. Furthermore taking the necessary steps to prevent fire fighters from coming in direct contact of materials that could increase heart disease is a must. Incorporating an effective health and wellness program that includes fire fighter safety should be a priority in the fire service.

Hypothesis

We've known for years the job of being a fire fighter has inherent risks associated with the tasks performed. It was not until 1977 that NFPA began to track fire fighter fatalities by creating a database to track the trends of fire fighters killed in the line of duty to include succumbing to cardiac emergencies (NFPA, 2008). In creating the fatality database and with the emphasis on health and wellness, the question of what will a structured health and wellness program do to prevent or reduce stress related injuries and fatalities was posed. The hypothesis presented for this project is "More fire fighters will suffer stress related injuries and or fatalities if a structured health and wellness program is not followed."

Research Design

Based on the information provided in the college textbook titled Practical Research, both quantitative and qualitative research methods are best suited to fire fighter health and safety programs (Leedy & Ormrod, 2010). These methods are to be

selected based on the fact the research question is confirmatory and predictive. The research question asks if the lack of a structured health and wellness program exists, would the lack increase the fire fighters risk to stress related injuries and or fatalities. The question can be answered by evaluating the progress of each participant involved in the project.

To further justify the selection of the quantitative research method, because of the short time to generate this proposal and the fact deductive reasoning and statistics plays a pivotal part in the evaluation; this research project will be mostly based on statistical and not so much physical indicators. Because participants will perform a base line performance test, that information will be used throughout the research to compare if they are making progress towards the hypothesis statement of proving a structured health and wellness program will affect the risks associated with stress related injuries and/or fatalities.

Data Gathering Procedures

The population for this research will be fire fighters age 18 to 50 years old, both male and female who are assigned to various duty positions such as a fire fighter, Assistant Fire Chief, Fire Inspector, etc. and are currently assigned to various departments in the DoD system. However, considering there are over 3,000 active fire fighters in the DoD system, evaluating all of them would be a monumental task. In order to narrow the audience, it is recommended to select two fire departments consisting of approximately 100 participants.

It is the intent of this project to collect data through both quantitative and qualitative research methods. Using quantitative methods, the necessary research data can be collected through several means or instruments. The simplest means is to conduct face-to-face interviews with those selected to participate in the research project. The majority of the quantitative methods would be consistent with the grounded theory study in which the participant's actions or lack thereof would be evaluated as how they correlate to heart disease.

As for the qualitative research method, the intent is to again use face-to-face interviews as well as distribute perception surveys to each participant. These self-designed surveys will ask each individual what their current physical fitness participation consists of and what they feel is a priority in terms of health and wellness. Furthermore, the survey will be designed to obtain each individual's perception of what they believe their current and long term goals are.

As for tracking participant's progress, this project should adopt a fitness assessment protocol worksheet the Albemarle County Fire Rescue department has generated. This worksheet is designed to compare the participant's base line data to the data from each quarter. At the end of the research project, the data will be analyzed to determine if each participant increased or decreased their physical fitness abilities while reducing their risk of coronary heart disease (Albermarle County Fire Rescue Department, 2012).

The research project is fairly simple in terms of implementation and maintenance however, it is a bit in-depth in terms of analyzing the data. Obviously creating a positive

change in physical fitness and lowering heart disease risks cannot be made or observed over a few weeks or a few months. As a result, the research project needs to be stretched over the course of 12-months in order to effectively collect and analyze the data being returned.

One example of why the research must be stretched over 12-months is the use of a device called the Bod Pod. This particular device utilizes air displacement to determine the amount of body fat an individual possesses. Historically BMI is calculated using calipers or height/weight calculations. The Bod Pod, using air displacement is considered more accurate than methods involving calipers or hydrostatic means (Fields, McCrory, & Goran, 2002). In order for the data to be analyzed effectively, an initial, a mid, and a final test must be completed. The optimal goal is to see a reduction in the BMI.

Statistical Analysis

The role of a fire fighter is something an individual inherently chooses to accept for various personal reasons. No matter the choice, a fire fighter must be capable of performing his or her duties to the best of their ability which may involve working in austere conditions under unimaginable stress. It is these stressors; known and unknown, which will dictate what capacity a fire fighter will perform.

Unfortunately, most fire fighters and honestly most Americans do not understand the importance of maintaining a healthy lifestyle which includes physical fitness and proper eating habits. In a 2007 article published by the New England Journal of

Medicine, 32 percent of all fire fighter deaths in that year were a result of coronary heart disease (Kales, Soteriades, Christophi, & Christiani, 2007).

Before any progress can be made to reduce cardiac related fire fighter fatalities, one must ask “Does physical fitness play an integral part in reducing fire fighter fatalities?” It’s certain the initial reply would be yes however, solid data is necessary to confirm said assumption. Capitalizing on what the authors believed to have used; both simple correlation and regression statistical procedures, determining the association of coronary heart disease and fire fighter fatalities is a priority.

Fortunately the journal article provided sufficient data to assist in answering the above question. One independent variable consisted mainly upon the diagnosis of heart disease among fire fighters, meaning did they visit their doctor for a physical or annual check-up? Furthermore, each fire fighter’s level of participation in some type of regular physical fitness activity was considered an independent variable.

As for dependent variables, response times and nature of emergency were each considered as such. The article’s authors made an initial assumption and one that most individuals would duplicate in stating any fire fighter fatalities that occurred, occurred during actual firefighting operations. The authors went so far to assume “if 10% of a fire fighters time is spent in responding to alarms, 10% of deaths from coronary heart disease should occur during alarm response.”

As we know, fire fighter fatalities can occur at any time both on and off duty however, most coronary heart disease related fatalities are contributed to some type of

stress the individual encounters prior to their death. Unless we educate our fire fighters on the importance of physical fitness and regular medical evaluations, unfortunately the number of fire fighter fatalities associated with coronary heart disease will remain steady if not increase.

With regards to this project, several procedures will be utilized to collect and analyze the necessary data. The first and easiest procedure is through simple observation. By watching how each participant acts with regards to physical fitness and their daily eating habits, some type of reference as to their level of risk can be inferred.

In order to capture the entire groups data, personal interviews must be conducted with each participant in order to grasp how they alone are perceiving the initiative as well as determining what level of wellness they are at prior to beginning the new initiative. Asking questions in a group environment may be feasible however some participants may not reveal their true feelings in a public atmosphere.

Regarding the type of qualitative method to be used when collecting data, it is recommended to use the ethnography method. This particular method will target a certain group of individuals in the fire service that are at most risk of coronary heart disease. By researching this group of individuals, a more precise outcome of this project can be achieved.

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