

Educational and Mandatory Fitness Standards in the Firefighting Profession



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ABSTRACT: Firefighting is a physically demanding and hazardous occupation. The hazards of firefighting include exposure to flames and heat, building collapse, and continuous work in a toxic environment, which are the most commonly perceived risks, but the most deadly hazard to on-duty firefighters is that of Sudden Cardiac Death. This qualitative study aimed to explore the educational programs available to the firefighters that can potentially reduce the on-duty sudden cardiac deaths and determine why there are no mandatory fitness standards. The study aimed to offer those responsible for the training of firefighters the specific training and education available and how to motivate firefighters to accept the training and education. The researcher conducted interviews with firefighter respondents who discussed their views regarding firefighter physical demands, mandatory training, and their perceptions on general fitness requirements to meet the research objective. From the evaluation of the findings, it was noted that firefighters have a negative attitude towards training. However, it is evident that physical training is necessary to ensure that the firefighters remain in the best shape to carry out their duties successfully. Besides, fitness will ensure a reduction of the sudden cardiac deaths that have become prevalent among on-duty firefighters. The lack of awareness is a problem that needs to be evaluated through a collaborative approach involving all the stakeholders.

KEYWORDS- Firefighter Education, Healthcare Research, Physical Training, Educational Training, Human Subjects

I. INTRODUCTION

During the detailed documentation process of the NFPA from 1987 through 2019, there were a variety of factors that caused the death rate for on-duty firefighters to fluctuate. The majority of the death rate fluctuations resulted from incidents involving multiple firefighter deaths, including the September 11, 2001, terrorist attacks that resulted in 341 firefighter deaths at the World Trade Centers in New York¹. The number of deaths as a direct result of the 9/11 attacks is continuously rising as a number of the 15,700 emergency responders are dying from the toxins they were exposed to². Though trauma type of duty-related injuries and deaths are what are perceived as the most dangerous to firefighters, the actual leading cause of on-duty firefighter deaths is Sudden Cardiac Death³.

Cardiac-related issues and Sudden Cardiac Death (SCD) have been the causes of death for on-duty firefighters before official accounting began in 1977 by the NFPA. Fire ground deaths related to "heart attacks" are documented in many records of US fire departments and media reports back to the 1800s⁴. With the exception of 2001, SCD has been the leading cause of death of on-duty firefighters, according to the NFPA reports, since 1987⁵. The number of overall on-duty deaths has fallen to its lowest number since official reporting began, and the trend remains the same: firefighters are more likely to die from SCD than any other fire-related event⁶.

The fire service has recognized the risk to firefighters from cardiac-related medical issues and developed several pre-hire and pre-entry tests to apply for the job of a firefighter. In a 2011 survey of executive fire officers, 88% reported the use of Physical Abilities Tests (PATs) for pre-hire screening⁷. Since then, other fire departments have also added PATs to the pre-hire process as one of the primary requirements of the original application process. Even though pre-hire PAT numbers are closing in on being required to work at all fire departments in the U.S., only a quarter of these departments require physical standards as a yearly measurement of health and endurance. Fire service administrators report this lack of mandatory yearly physical fitness assessments from pushback by firefighters themselves⁷.

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Physical and Health Requirements of Firefighters

As physical abilities tests continued to be recognized as a measurement of physical standards, the correlation was also recognized that those able to pass the tests were more physically conditioned and therefore healthier. Through the detailed tracking of firefighter injuries and deaths that started in 1977, there was a clear understanding that overall Sudden Cardiac Death (SCD) was the leading cause of on-duty firefighter deaths⁸. Sudden Cardiac Death is not a rare phenomenon in the U.S. and occurs at an approximate rate of 6 in every 100,000 Americans. Sudden Cardiac Death is immediate compared to other types of cardiac issues, and the sufferer will see a full cessation of cardiac activity within an hour of the first symptoms if symptoms are even recognized. Causes related to SCD can be genetic, structural, or coronary artery disease⁹. According to the American Heart Association (AHA), the lack of physical activity is one of the causes of coronary artery disease that contributes to SCD. An overall cardiorespiratory fitness leads to the reduction of coronary artery disease and other health issues, including cancer and stress⁹.

The evidence that SCD is the leading cause of on-duty deaths among firefighters is well documented¹⁰, as is the research that coronary artery disease is one of the three contributing factors in SCD. The two other contributors to SCD, genetics and heart structural damage, are detectable through cardiac screening that is required at the entry-level for firefighters and firefighter trainees¹¹. Therefore, it can be concluded that firefighters may develop coronary artery disease over time. Maintaining physical standards requires the firefighter to stay active, and with standards directed towards cardiorespiratory and strength training, the firefighter will also reduce the risk of coronary artery disease. With all these factors being well documented and known to firefighters, there continues to be resistance to mandatory yearly physical fitness standards in the fire service.

The fire service has a multitude of governing agencies and associations representing government entities, chief executive officers, and the firefighters themselves. The majority of these groups, including the firefighter's union, recommend mandatory fitness regimens and standards, but only approximately 27% of agencies participate in such programs⁷. Originally, costs and the perception of firefighters working out on duty were limiting factors to implementing fitness standards. Fire service administrators worried that public perception would be a barrier to firefighters working out on duty, but that was later proven insignificant when the general public became educated in how maintaining fitness standards are necessary for a para-military organization¹². As fitness levels were increased among firefighters, the frequency of work-related injuries, such as strains and sprains, reduced, saving agencies money¹³. Costly workout equipment was many times purchased with grant money or donations from businesses and the firefighter associations. Additionally, firefighters developed or adapted workout routines that both increased their fitness levels and incorporated routine work tasks¹³. Overall, maintaining a physical standard was both a cost and a lifesaving venture for firefighters. The resistance from implementing these programs originates from the line firefighters and officers who would be required to maintain the standards.

II. RESEARCH PROBLEM

The problem is that there are no standardized physical requirements for firefighters, triggering various medical health risks in the U.S. In the U.S., on-duty firefighter deaths and serious injuries are meticulously tracked and reported¹⁴. For the last decade, the leading causes of on-duty firefighter deaths have been due to sudden cardiac arrest. Though this data is readily available, there is a gap in information as to why there is no mandatory training or education available to prevent the incidents.

The National Fire Protection Association (NFPA) has been studying firefighter deaths in the U.S. since 1977⁵. The data collected includes the cause of death, the activity the firefighter was involved in, and other demographics, including age and sex⁵. There are studies related to the cause of the cardiac incident, including autopsy reports indicating the percentage of firefighters who had pre-existing cardiac disease. The physiological factors that caused the heart to fail are also documented in detail, showing the medical factors that contributed to mortality⁸. Researchers have investigated the effects of firefighters being exposed to high heat that may cause blood clots^{3,6}. Additionally, there is literature reviewing the need for firefighter on-duty fitness programs and the barriers to those programs being put in place. The information that is lacking is to what training programs are available to educate firefighters in preventing cardiac risk factors and why mandatory physical fitness standards have not been put in place in the fire service when there is evidence that SCD is the leading cause of on-duty firefighter deaths.

The main question of this study is: What are the effects of mandatory physical training and education for firefighters? Additional questions for this qualitative research related to the firefighter's perceptions and experiences were:

RQ1. How does physical training impact on-duty cardiac arrest cases among the firefighters?

RQ2. What educational and physical standards are required to improve firefighters' health and

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occupational readiness?

RQ3. What is the perception of firefighters towards mandatory physical fitness training?

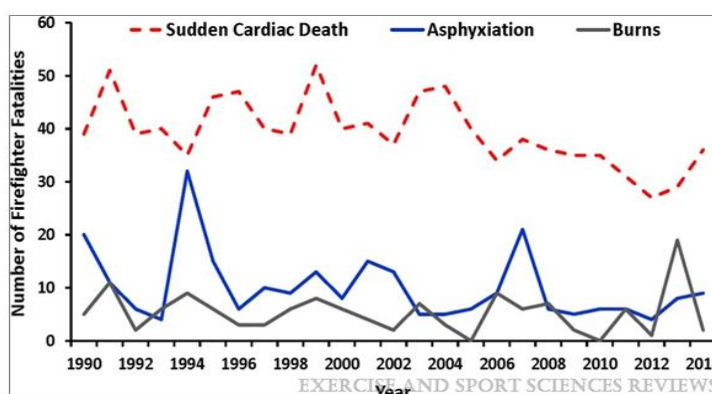
III. LITERATURE REVIEW

On Duty Cardiac Arrest Among the Firefighters

There are three main specific firefighting duties: alarm response, fire suppression, and training⁸. All these duties are associated with high risks of death as a result of cardiac-related events. The greatest risk of cardiac death often occurs during or within a short period after fire suppression, a period when the odds are 10-130 times higher than during fire station activities⁸. Moreover, strenuous physical exertion, especially among people unaccustomed to such duties, has been identified as a trigger of SCD in the general public¹⁵. It has been established through research that firefighting is a strenuous activity, with evidence showing that the firefighting activity requires spending a considerable amount of energy of between six and thirteen metabolic equivalents (METs)¹⁵. Other studies have also established that firefighting places considerable strain on the cardiovascular system, including increased coagulatory state, reduced plasma volume, impaired endothelial function, reduced diastolic function^{8,16}, and optimal or near-optimal heart rate¹⁶. These physiological changes have been found to cause plaque interference, thrombotic occlusion, and myocardial ischemia, which contribute to a cardiac event, particularly among people with underlying disease. As a result, various studies have suggested that the strenuous nature of firefighting work could singularly, or together with other common firefighting physiologic stressors like fire-ground contaminants' exposure, elevated sympathetic nervous system, dehydration, and heat stress, precipitate cardiac deaths among vulnerable firefighters^{8,9}.

Impact of Training on On-Duty Cardiac-related Cases

Sudden cardiac events have been identified as the leading cause of on-duty-related deaths since the NFPA started tracking on-duty firefighting fatalities more than four decades ago. SCD has consistently represented the largest percentage of on-duty-related annual deaths among firefighters, averaging 43% over the last three decades, as illustrated in figure 1⁸.



The above percentage is conspicuously high compared to the death of other public safety workers such as police officers and emergency medical service workers, whose deaths account for 7% and 11%, respectively. However, the number of cardiac fatalities has been trending downwards, as evidenced in figure 1. Such an encouraging trend could be attributed to on-duty training efforts undertaken by bodies such as the National Volunteer Fire Council (NVFC), the International Association of Fire Chiefs (IAFC), and the International Association of Firefighters (IAFC). These organizations have been undertaking rigorous campaigns to promote firefighters' fitness and wellness and increase their medical evaluations. Most of these wellness and fitness promotion campaigns often focus on psychological support, physical training, and nutrition education¹⁷. Wolkow et al.¹⁷ also noted combining these interventions could be the most effective approach to improve the cardiovascular health of firefighting personnel.

Critical Issues and Health Concerns Among Firefighters

Generally, firefighters tend to be expected to respond to any form of emergency in their community. It is evident that firefighting is an inherently dangerous occupation considering that the job tasks involve suppressing the fire and providing the emergency medical services, the rescue operations on the fire site, and the response to the emergencies of the hazardous material that takes place in that area. Considering the unique and challenging role of the firefighters, readiness and the ability to respond to the moment's notice are key considerations for emergency preparedness. In this regard, much research has been conducted to evaluate the relationship between firefighting and health implications. Specifically, researchers have focused on the relationship between firefighting and cancer, cardiac health, injury, and physiological health, among others. There are

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numerous occupation-related risks for firefighters that make them at an increased risk for different diseases and injuries. Kales et al.¹⁸ noted that there are several chronic stressors, which include the long periods of sedentary activities, exposure to smoke, and the challenges to shift work and other acute stressors such as irregular physical exertion, smoke exposure, extreme physical exertion, excessive heat and dehydration, and the alarm responses that are likely to lead to an increased risk. Therefore, with the increased understanding of the firefighters' unique job tasks and exposures, there has been increased attention on the impact of the firefighting duties on the health of the firefighters. Organizations like the USFA and National Volunteer Fire Council (NVFC) have partnered to investigate the emerging concerns and provide solutions to firefighters' health issues. Different critical issues have been identified following their research.

Barriers to Fire Services Physical Training

Barriers to physical training can take place at the individual or even the departmental level. Studies have been conducted to analyze the perception of the training initiatives. It is noted that firefighters could avoid the working out processes while on the shift for the fear that it can interfere with the response to an emergency call. For example, it was noted that training on duty is avoided in some instances to not arrive at a scene fatigued. Although this is a major concern for the firefighters, a study examined the effects of exercise on occupational performance¹⁹. In order to represent a worst-case scenario, the participants engaged in the simulated fire ground tasks. They included hose drag, climbing of stairs, ladder raise, carrying equipment, and forcible entry. This was carried out for ten minutes after a fatiguing circuit training exercise protocol. According to the study findings, although the exhaustive training exercise protocol hindered the fire ground performance, the physically trained firefighters outperformed the others who were not trained and the non-fatigued colleagues even when they were fatigued.

Despite the findings, recommendations and guidelines have demonstrated the need to avoid exhaustive exercises such as the near-max efforts and the rating of the perceived exertion while on duty or to exercise during the low call volume times to ensure that they have a peak performance. Another barrier that the firefighters in the U.S. may have been fighting is the unawareness of their current health status. According to a study, about 68% of the sampled 768 professional firefighters underestimated their BMI classifications²⁰. Additionally, the firefighters' self-perceived fitness levels did not align with the actual fitness that was measured by the aerobic capacity. This lack of personal awareness among the firefighters implies that the perceived need to improve individuals' general wellbeing and health may be diminished. This illustrates that the state can provide mandatory and non-punitive health screenings and appropriate consultations. This can help the firefighters identify the weaknesses and even begin to improve upon the poorer components of health.

Benefits of Physical Training

Studies have demonstrated that the fire departments can also benefit from the health promotion programs since it applies to the improved job performances. Occupational tasks can require a high amount of aerobic fitness as well as muscular strength, which is greater than or equal to 68 kg for an extended period of time. It should be noted that considering the strain that is caused by the environment, such as anxiety, heat, and dehydration, the tasks are performed in the protective gear that weighs at least 23 kg. This means that if a firefighter is not physically able to execute the tasks in harsh conditions, the safety of the public, the engine, and the self tend to be placed at risk. Considering the physical nature of the job, it is evident that more fit individuals tend to be more likely to execute the physical job tasks better. In order to support this further, previous studies have shown that there is an association between fitness and job performance. For example, a study showed that firefighters who had higher abdominal strength, upper body endurance, as well as anaerobic power had a better and enhanced performance on time to completion of the fire ground tests²¹. In addition, the performance of the firefighters decreased with an increase in the body mass index, body fat, and waist circumference. These findings demonstrate the need for physical training to facilitate peak physical job performance.

IV. METHODOLOGY

This study used qualitative research methodology. It is an appropriate method that can be used to understand how people tend to experience the world. This method was chosen to help understand the perceptions and opinions of the firefighters in the U.S. regarding physical training. The aim of the study is to investigate and understand the perceptions of the firefighters in the U.S. and the reasons that they are not willing to take physical training activities, which can protect them from illnesses like cardiac arrest.

A. Participants

The population that was described as the target population of the firefighters in the U.S. is significantly a large one, implying that the researcher may not be able to interview each and every member of the population. A simple random sampling

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technique was used to identify the sample for the study. After the analysis, interviews were conducted in the selected population of 15 respondents which were selected as the representative sample for the population. Since this study focused on interviewing a homogenous group of participants, the sample population of 15 was deemed as adequate to gather the needed information and make conclusions regarding the understanding of their perceptions.

B. Data Collection

Permission was obtained from the fire departments that allowed employees to be interviewed. Potential participants were then contacted, and interviews scheduled. The data for this study was collected using interviews. Although one-on-one interviews provide a better engagement with the respondents, other choices like phone interviews were chosen considering the avoidance of physical contact due to the COVID-19 regulations and guidelines of social distancing. The information collected was recorded for the responses that were used in the analysis.

V. DATA ANALYSIS AND RESULTS

A. Analysis

Both semi-structured and open-ended questions that enabled the researcher to gather closed-ended information for this specific type of research as well as the opinions of the respondents were utilized. Each respondent has unique experiences and can share the unique responses that can inform the findings and the conclusions made from these findings. The use of a combination for these types of responses is important as it allows for flexibility in data collection. For example, it was important for this study to demonstrate whether the firefighter was subjected to any form of training when they were recruited and how it was in case they were subjected to it. In addition, it was vital to give the respondents an opportunity to express their opinions about the type of physical training programs that would be suggested and their potential benefits, if any.

B. Results

RQ1: How does physical training impact on-duty cardiac arrest cases among the firefighters?

The first research question sought to evaluate the impact of physical training in the on-duty cardiac arrest cases among firefighters. This research question was important in the evaluation of the physical training that has been suggested as the solution to cardiac arrest cases, with the aim of establishing the necessary knowledge from the participants regarding the role of physical training on heart-related problems, and specifically the on-duty cardiac arrest cases among the firefighters. Through the evaluation of this research question with various questions, it would be possible to understand the nature of the participants and their call to add into knowledge regarding how their behavior affects their health and physical fitness to carry out the job properly. In this regard, the participants were asked whether they had knowledge of sudden cardiac death and their knowledge on the same regarding being a major cause of deaths among the firefighters. Participants were also asked them whether they have ever been diagnosed with any cardiac-related cases and whether they understood the relationship between cardiac illnesses and physical fitness. From the evaluation, one main theme of lack of information/ uncertainty was identified. This theme was identified as many of the respondents indicated that they did not have enough information about cardiac arrest and physical exercises. Although some of the respondents have heard about cardiac arrest cases among the firefighters, majority of them do not have knowledge of the problem and how it relates to physical fitness.

The current literature suggests that physical fitness has an important role in improving the general health of the firefighter and ensuring that there are reduced cases of cardiac illnesses. However, it is evident that majority of the firefighters do not have enough knowledge about this issue. It should be noted that the different firefighters have not been meeting the recommended levels of fitness across the U.S., considering the cardiovascular and metabolic demands of the job. In the same regard, many fire departments in the U.S. have noted adopted any standardized means of ensuring physical exercises and training that should keep the employees fit and avoid cardiac illnesses. The study showed that although the recruits have been required to undertake extensive training sessions and programs, most of the departments fail to uphold the needed training levels and fitness standards among the incumbent firefighters. In this regard, the major theme of uncertainty and lack of knowledge that was established from the findings of the interviews is supported by the available literature that shows that most of the firefighters, including the managers or directors of the fire departments, are not properly equipped with enough knowledge about physical fitness and prevalence of sudden cardiac deaths among firefighters.

This conclusion is also supported by the andragogical model or the adult learning theory that was used as a basis of this study. This is a model that entails the application of various learning theories, such as the contiguity and sensory-stimulation theory. The contiguity theory asserts that firefighters ought to understand specific actions to take when operating in immediately dangerous-to-life-and-health (IDLH) settings that result from fire outbreaks. Another theory that discusses the situation is sensory stimulation theory that states that people are likely to invest in their senses to process a change. However,

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the sensory stimulation theory argues that individual firefighters may not appreciate or understand the significance of fire safety training due to the lack of proximal experience in fire conditions in which senses detect and cause bodily reactions to combustion products such as heavy smoke, reduced-oxygen atmosphere, and high temperatures. From the evaluation of these theories, it is evident that the conclusions of the study are in line with the andragogical model that suggests the ignorance or lack of knowledge of individuals based on their exposure or lack of it. One of the bases of this conclusion is that most respondents agreed that they had not been exposed to any educational training or resources that demonstrate the significance of physical training. The lack of education among the firefighters makes them unknowledgeable as they feel mandatory training is a form of punishment.

RQ2: What educational and physical standards are required to improve firefighters' health and occupational readiness?

The second research question was designed to investigate and understand whether the participants had knowledge about educational and physical standards that would be important to improve their health and prevent them from various cardiovascular illnesses and specifically sudden cardiac deaths. Physical fitness is important for firefighters. However, the research study established that there are few departments that have implemented any form of standardized physical training. For this research question, the participants were asked to describe various aspects of physical fitness such as the Physical Abilities Test (PAT), their experiences with the same as well as the Candidate Physical Ability Test (CPAT) that are Department Specific or any other. The participants were also asked about their physical fitness levels and the activities that they undertake to ensure high levels of fitness. From the evaluation of the interviews, two main themes were identified from the responses of all the participants who addressed this question effectively. The first theme was disinterested, and the second theme was on daily routine. The first theme reflected that the firefighters are generally not interested or are resistant to the physical fitness training and standards. Although they agree that fitness is generally an issue with most firefighters, they do not want to engage in any form of training. In the same regard, the second theme of lack of daily routine emerged. A majority of the participants noted that they have a personal responsibility in engaging in physical exercises, although they lack a daily routine in doing so.

The current literature suggests that the mandatory training of firefighters can significantly influence their work abilities and improve their physical health. The recent statistics show that firefighters in the U.S. have an increased risk of cardiovascular incidents or even injury¹⁵. However, it is evident that the United States has not been able to adopt standard practices for physical exercises and fitness. In this regard, the use of mandatory fitness tests to ensure that the participants have the required levels that can help them perform their tasks effectively is important¹⁸. It is also important that all the recruits undertake extensive training sessions and programs. However, many departments have failed to uphold the needed training levels and fitness standards among the incumbent firefighters. This has resulted in an increase in unhealthy behaviors such as lack of the required physical fitness, poor sleep habits, as well as unhealthy diets, which makes the firefighters be physically unprepared for duty. The findings show that while majority of the governing bodies in the U.S. Fire Service, such as the NFPA and the IAFF, have encouraged the mandatory annual health screenings and on the duty exercise, only about 27% of the U.S. departments tend to provide the resources successfully. Through proper implementation of the standards, there will be a significant improvement in the overall health and fitness of the firefighters.

The Candidate Physical Ability Test (CPAT) was also noted to be an important standard that can significantly help the improvement of firefighters' physical and cardiovascular health. This is evident from the literature as well as the study findings. The CPAT is a test that is designed in a manner that it can evaluate the entry levels of firefighter candidates on various essential physical capabilities that are required to perform their duties satisfactorily. It is a standardized test that has been recommended in the United States that demonstrates the readiness of the firefighters regarding the physical demands of the job. The analysis of the findings shows that majority of firefighters do not understand the implications of overexertion in the workplace that has led to death and injuries. It can be concluded that one of the main reasons that the firefighters failed to engage in any form of physical exercise is a lack of knowledge. Although many departments have implemented the CPAT as a way of evaluating the entry abilities of firefighters, it rarely follows on the existing employees. Therefore, it is concluded that many entities and employees lack enough knowledge on physical fitness, exercises, the type of exercises, and generally the lack of educational resources and standards has led to ignorance, hence poor cardiovascular health of the firefighters.

RQ3: What is the perception of firefighters towards mandatory physical fitness training?

The aim of the last research question was to investigate and understand the attitude that the firefighters have regarding the suggested mandatory physical fitness training with the aim of improving their general health. This research question was developed with the notion that many firefighters have a negative attitude towards the mandatory physical training that has been suggested in various platforms and departments. The investigation demonstrated that although physical training is a good initiative that seeks to promote the overall wellness of the firefighter, it has become a challenge to implement protocols as the

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initiative is not supported by a majority of the participants. To have a proper understanding of the perception and attitude of the respondents, the researcher asked the respondents about their opinion on the mandatory physical standards, their thoughts on the mandatory physical fitness training, and their opinion on the general training that should be made mandatory. It can be concluded from the findings that most of the firefighters are generally not interested in physical exercises or training. One of the main reasons the firefighters do not want the physical training to be made mandatory is the fear of injuries, including deaths, while others are just resistant to change. The two main themes that were evident from interviews are the resistance to change and the fear of injuries. It can be concluded that people will generally resist change at first, and firefighters are no exception. While some of the respondents may demonstrate a preference for the change process, most of them are not interested in mandatory physical standards since they have not been implemented yet. However, the preference for injuries that have been associated with physical training has been a problem that has led to a negative attitude and perception of firefighters about making physical training mandatory.

The literature supports the study findings that firefighters have a negative attitude toward mandatory physical training^{5,7,9,12}. Many firefighters lack self-motivation and ambivalence, which leads to poor perception about the engagements of the fire departments^{14,17,19}. In most cases, self-motivation and ambivalence are highly influenced by social groups such as the firehouse culture. It is such trends that become a deterrent to exercises and positive attitudes towards training among the firefighters. The conclusions suggest that interpersonal relationships could positively influence firefighter fitness^{5,7,9,12}. It is important to highlight that the initiation of group-based exercises can improve exercise adherence, shift cohesion, and the creation of a sense of accountability. Another issue that could be affecting the negative attitude of the firefighters is the nature of the exercises. In some notable cases, the participants engage in simulated fire ground tasks that are not easy to undertake. For example, they included hose drag, climbing of stairs, ladder raise, carrying equipment, and forcible entry, among others. These are mainly carried out for ten minutes after a fatiguing circuit training exercise protocol. The participants who take part in such activities are significantly strained. In this regard, more awareness may improve their perception and help them form a positive attitude towards engaging in mandatory training.

The main factor that is likely to influence this conclusion is that most of the participants who were interviewed in this study have not been engaged in any form of education that highlights the importance of training. There is a significant lack of knowledge among the participants who, thereby, tend to resist taking part in the physical training. Many of the respondents doubt whether the mandatory physical fitness exercises are good and whether they can actually be implemented. Some of the responses indicated that "It's good as long as it is "doable." From such opinions, it can be concluded that such a respondent may not be willing to engage in any form of physical training that is mandatory. In fact, such a response shows that that physical fitness exercises are not good at all. This can be demonstrated by one of the respondents who argues that "I don't think they are good because it really doesn't...well it's not fair to everyone. With more knowledge, such respondents are likely to change their minds and take part in the mandatory training. It is established that working with the firefighters is just not a matter of sending them to work when there are emergencies, but also continually educating them about the activities that they undertake and the importance of any requirement at workplace. Their desire to engage in mandatory training and physical fitness stems from proper education about the entire process.

EVALUATION OF THE FINDINGS

VI. CONCLUSIONS

In summary, firefighting is an important profession that has an important role in society. However, it is one of the most demanding occupations across the globe. The engagement involves exposure to high temperatures, equipment weights, and the requirements for constant readiness outweigh the performance levels of even the well-trained athletes. Due to its nature, there is a need for the firefighters to always be at the optimal level of performance, and at times, they do not take any preparation in case of an emergency, even when they are asleep. Therefore, researchers demonstrated that firefighting engagement is a type of exertion is a musculoskeletal and cardiogenic human stressor²². Therefore, physical conditioning is the primary factor in preparing firefighters to endure the physiological demands required to perform at any time²³. There are a lot of risks that have threatened the lives of firefighters while on the job, including the collapse of buildings, exposure to dangerous toxins, as well as direct exposure to flames, and excessive heat. Therefore, there has been a lot of concern regarding the overall health of the firefighters, and particularly the cardiovascular illnesses and deaths. Studies have recommended that physical training can be of significant help to ensuring that the firefighters have good physical and cardiovascular fitness that reduces the prevalence of sudden cardiac deaths while they are on duty. In relation to this, this study was carried out to investigate the impact of mandatory training in the reduction of sudden cardiac deaths. However, it was noted that many departments had not adopted any mandatory training or physical training standards due to the opposition from the participants.

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Although physical training is important and can improve the overall fitness of the firefighter, including reducing sudden cardiac deaths, there is not enough information among the firefighters and the departments on how to successfully implement the protocols while avoiding injuries. The lack of awareness among the firefighters demonstrates that the perceived need to improve individuals' general wellbeing and health may be diminished. This illustrates that the state can provide mandatory and non-punitive health screenings and appropriate consultations with the stakeholders, especially formulating educative programs for the firefighters to understand its significance. It is evident that the physical training of the firefighters bears benefits for the city as well as the administration and all the parties involved. In this regard, there is a need for a more collaborative approach to ensure the positive development of the programs and implementation. Before the implementation, a wellness committee should be formulated to assess the situation that comprises all the key stakeholders. This will ensure more knowledge and less resistance.

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