STRESS MANAGEMENT IN MILITARY AIRCREW

By

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Guided

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A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

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I hereby give my acceptance to guide the above student through the Dissertation work "Stress Management in Military Aircrew" , which is a mandatory requirement for the award of MBA Degree.

Thanking You

Yours Sincerely

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ACCEPTANCE OF SUBMISSION OF DISSERTATION FOR MBA(AVIATION MANAGEMENT) SAP ID : 500066426

Sir,

1. I am on the posted strength of this unit w.e.f 17 Dec 18. I am undergoing MBA (Aviation Management) from University of Petroleum and Energy Studies, Dehradun since May 2018.

2. I was to submit my dissertation by 31 Jan 20 as per the guidelines issued by UPES. Due to the recent Indian Air Force skirmish with Pakistan, I have been continuously involved in operational duties for the past one year.

3. In view of my combat employment towards service of the nation I am delayed in submission of the hard copy of dissertation by the assigned date. I have however already submitted the softcopy of my dissertation before the due date.

4. It is therefore requested if an exception may be granted toawards acknowledging the acceptance of submission of my dissertation for the requirement of MBA (Aviation Management), UPES, Dehradun

5. For your kind consideration and approval please.

Yours sincerely,

Sanabh

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Vice Chancellor
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1. This is to acknowledge with thanks the help, guidance and support that I have received during the Dissertation.

2. I have no words to express a deep sense of gratitude to the management of **University of Petroleum & Energy Studies, Dehradun** for giving me an opportunity to pursue my Dissertation, and in particular **Wg Cdr Gunadnya Kharche SC, Indian Air Force** for his able guidance and support.

3. I must also thank my wife Ms Vandana Varma Karmakar for her valuable support and help.

4. I also would like to gratefully acknowledge the cooperation of the aircrew taking part. Their participation made the collection of data possible and confirmed the relevance of this research.

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DECLARATION BY THE GUIDE

1. This is to certify that the Wg Cdr Saurabh Karmakar, a student of MBA (Aviation Management), SAP ID 500066426 of UPES has successfully completed this dissertation report on "**STRESS MANAGEMENT IN MILITARY AIRCREW**" under my supervision.

2. Further, I certify that the work is based on the investigation made, data collected and analysed by him and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfillment for the award of degree of MBA/BBA/B.Sc.

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CHAPTER I

INTRODUCTION

1.1 Overview

1.1.1 The term stress originates from physical science where it refers to the force placed upon an object to cause straining, bending, or breaking. In the human context and in psychology, however, stress is often used to describe the body's responses to demands, favorable or unfavorable, placed upon it. Anything that causes stress is called a stressor. As stress increases, so does the level of attention, resulting in improved performance. Stress is an unavoidable aspect in a pilot's natural life. Its level affects an individual's performance as too much stress may diminish the person's ability; while an inadequate stress may cause boredom, less attentiveness and drive. Administrators and supervisors must comprehend the main fundamentals of stress; the sources of stress; how it arises; how to diminish or avert it by using administrative tactics. They also must detect the symptoms of personnel and recognise stress incidence. To improve performance, managers must also learn how to generate healthy stress for employees.

1.1.2 The word "stress" has been cast-off so habitually currently, that it started to mislay its connotation of "hazard" or "peril". Most of the illnesses of the third millennium include stress that is appalling fatigue, frustration, agonising pressure of which we are article of owing to the imprudent pace of our impatient life, due to acerb rivalry, run for money, isolation, deficiency of communiqué, depression. The term stress, comes from primitive English - distress - (trouble, difficulty, and unfriendly condition), which means undefined response of our body to any demand. Although the term itself does not mean only nervous pressure, consequence of the action of detrimental factors (stress can be a positive thing, without adverse consequences), only representing the adoptive mandate of the body, in the day-to-day language stress is linked to burden, that fact that it signifies an eternal companion of life being neglected. The adaptation potentials of the human being are evermore arduous due to modern life, with all it assumes. Under such circumstances, stress became an issue we

forever deal with, both extra-professionally and professionally. Systemic stress, understood like a disease, characterized by an inter-waved gathering of specific and nonspecific replies of the body to the action of stressors, including both the abrasion, and the weariness of the body and the misery felt, it always has a psychic construction. This is the so-called subordinate psychic stress. But there is also a primary psychic stress, where the stressors wound the scope of the psychic, leading to illogical personal experiences, uneasiness, and nervousness. The negative or indifferent stimuli are perceived as having damaging implication and therefore, uneven, non-adaptive conduct changes occur. Psychic stress is brought most often by language. But the structures transformed by psychic stress are both material (the central nervous system, and mental (psychic processes as such).

1.2 Background

1.2.1 The principal purpose of Defence forces is to maintain national security. The three defence services namely Indian Army, Indian Air Force and Indian Navy carry out missions in peacetime or real operations under diverse stressful circumstances. Military personnel are expected to perform their duties under little or no margins of error. Therefore the training and preparation of military personnel become extremely significant and crucial. During peacetime the personnel are trained while being subjected to stress so as to develop their ability to withstand the same under hostile conditions. However in real operations the stress grows exponentially, due to unknown variables and uncertainties arising due to the limited or no knowledge of enemy's action. One of the main responsibilities of the commanders is to appraise the stress conditions and stress level of the combatants placed under him. They also have to take precautions in this subject wherein they need to regulate the stress conditions faced by his militia and provide an environment conducive to carry out the operations as planned. However, it is not only the duty of the Commander to manage the stress levels of his combatants but also the responsibility of the individual to cope with it and perform flawlessly with an aim to achieve the task at hand within the stipulated timeframe.

1.2.2 The military aviator, by the nature of their responsibilities, produce work-related stress. The military environment – more than any other – is strongly individualized in the culture by a sequence of typical fundamentals which may signify job-related stress sources. Understand here the social obligation of the military profession and the construction of the military society (hierarchic, linear, multi-level, inflexible, which involves a hierarchic

authority, a select vertical subordination). Such forming necessitates conformism and, even, a relative amalgamation, the military environment being comparatively padlocked, therefore limiting the influences with the outside, and if seen as freedom preventive it can become trying for the individual. The values endorsed by the military organization are sometimes differentiated by those of the civil environment – for example, the military desires self-sacrifice, while the civil environment is marked by the upsurge of individuality; the military environment claims abidance, subordination, adaptation as grounds of success, the civil inspires self-sufficiency, self-improvement, tolerance as buildings of success in life and profession etc. Under such circumstances, if the pilot does not comprehend such variances, and does not accept them or considers them non-compliant with civil life, he / she feels controlled, unfulfilled, stressed.

1.2.3 Military aviation environment like any other sword arm of the defense forces operates under a high risk environment which is rich in potential stressors such as enemy aircraft, missiles, ground fire during actual combat, along with peace time stressors like high temperature, acceleration, noise, sickness, vibration, hypoxia, exhaust fumes and decompression. At high level of stress, however, performance begins to deteriorate dramatically; and at maximum level of stress, there is zero performance or incapacitation. This is particularly true when pilots, both civil and military, have to perform complex or unfamiliar tasks that have a negative affect on the safety of flight.

1.2.4 In the recent bygone, the Indian Air Force (IAF) had been involved in some restricted, low intensity combat operations. Usage of air power in war is debatably the most psychologically, physically and emotionally challenging enterprise that military aircrew engage in. The strains of such airborne missions might result in stress in the lives of personnel involved in them. Stress in aircrew is of particular concern, particularly if they are operating high performance aircraft in tactical missions such as air defence, ground attack and air support missions.

1.3 Purpose of Study

1.3.1 Stress has many different interpretations. It will be useful to make a distinction between the words 'stress' and the word 'pressure'. A moderate amount of pressure may be good for our work performance however; when this pressure builds or is constant then we are

into the realm of stress, which is not good. Usually however, individuals and authors use the words "I am feeling stressed", when what they really mean is that they are feeling under pressure. In our professional life we must try and make this distinction for ourselves and establish from others what they really mean by the word stress. Pilots as a group of people will generally admit that they suffer from the effects of stress on the odd occasion but almost invariably deny that it has any effect on their ability to do their job properly. Usually, professionalism is cited as the overriding factor which allows them to leave their troubles at home when they go flying and so there is a general perception that 'piloting' is not affected by stress for those that make a living out of it. These same pilots however, are known to describe the job of a transport pilot as one of many hours of boredom punctuated by moments of sheer terror. Both of these perceptions cannot be true so it often appears that we are describing two different beasts. It is an unfortunate fact of life that stress has been cited as a contributor and occasionally as a causal factor in aircraft accidents and incidents. While the depth of its role is still being debated, evidence suggests that we do not manage stress very well and we all probably know of someone who has left the cockpit for stress related reasons - it just got too much for them.

1.3.2 As stress is an unavoidable outcome of work, relations and personal life, people are always subject to stress on and off the job, which may affect efficiency, and job satisfaction. However, well-managed stress can encourage performance as well as well-being of the employees. Leaders must appreciate the main foundations of stress; the grounds for stress; how it arises; how to diminish or avert it by using managerial tactics. They also must detect the symptoms shown by their subordinates in order to identify stress occurrence. To improve performance, leaders must also learn how to generate an atmosphere which induces healthy stress for his employees or subordinates.

1.3.3 "There are three kinds of problems you can have with your car: those that will kill you, those that will leave you stranded and those that will cost you more money if you let them go on too long. Shimmies and shakes which concern the steering and suspension of your car, come under the first category, so we will examine them in some detail. The steering pieces like the tie rod, ball joints, center links, and so forth, literally hold the front wheels to the car. If any one of them breaks you are in serious trouble. You might say that there is nothing you can do about it and if they are going to break then they are going to break. Wrong! If you know what to look for then you can heed early warning signals. A funny thing

happens. People never know when their car is handling badly, because all the things that wear out generally wear out slowly or incrementally, as the mathematicians say. Every day the car gets a little worse- the ball joints get a little looser, the tie rod ends get a little sloppier, your tires get a little squarer and all kinds of things happen to make the car handle worse. Except you don't notice because the changes are so small that you adapt to them."

1.3.4 Complex military aviation missions, like automobiles, are made up of many interdependent parts and the way in which these parts work together depends upon their condition. The parts of an automobile may wear down imperceptibly because changes due to wear and tear (like effects of stress over time), are small and people adapt to them. However when warning signals so unheeded the system may break down unexpectedly, resulting in fatal consequences owing to the peculiar environment of aviation in general and military aviation in particular. Wastell and Newman (1996) have argued that a well-designed military system should realize the twin aims of enhancing human performance and lowering stress. Success in this endeavor, they demonstrate, depends on the degree of support and controllability the system affords the operator.

1.3.5 The dangers of stress lie in the pilot's ignorance of that danger and in its insidious nature. The degradation of a military aviator's performance due to stress can have disastrous consequences. If military aircrew are trained to recognise stress, analyse its causes and manage it effectively using stress management techniques, then one of the most critical and insidious dangers of military aviation will be addressed.

1.4 Research Hypothesis

1.4.1 It is not easy to find a generally acceptable definition of stress. People look stress in their perspectives and backgrounds.This research seeks to analyse the stressors affecting military aircrew, to provide the knowledge to recognize the symptoms of stress and to manage it. The hypothesis formulated for the present study were :

(a) Hypothesis – I : There will be significant stress in the military aircrew due to inherent hazard of the occupation.

(b) Hypothesis – II : The responsibility of being the last bastion of the nation bestows an added pressure of performance on a military aircrew.

CHAPTER II

LITERATURE REVIEW

2.1 Definition of Stress

2.1.1 Stress can be defined as a disturbing physiological or psychological influence which produces a state of severe tension in an individual. This in itself does not give us a complete perspective because there are both positive and negative aspects to stress and definitions should reflect this. Stress is normally associated with perception and a positive correlation involves the physical and mental symptoms associated with excitement and/or the expectation of good things to come shortly. A negative correlation is the perception of a threat or the foreboding of bad things in the near future. It is however, the manner in which these perceptions affect us physically and emotionally that affect us in our jobs. For pilots--who have been identified as having one of the most stressful occupations--on-the-job stress may occur when operational demands exceed the pilot's physical capacity and/or mental capacity. In these situations, researchers have assumed that pilots with "an overload of information" have an increased risk of stress-related performance errors.

2.1.2 Several definitions of stress have been offered over years. Stress is derived from the Latin word "stringere". It was used in the 17th century to describe "hardships or affliction", and up to now its meaning was denoted as "force, pressure, strain or strong effort" (Carwriht and Cooper, 1997).

2.1.3 Fontana (1989) gives a modern definition of stress and looks stress in capacities of the mind and body. He defines stress as "a demand made upon the adaptive capacities of the mind and body". If the capacities exceed the demands, then stress is a "life-saver"; otherwise, it is a "life-destroyer". This definition highlights three significant aspects about stress: first, stress can be either good (eustress) or bad (distress). Second, there may be a wide range of stressors that cause stress. Third, stress is extremely pertinent to the demand and capacities. If the capacities are good enough, people respond well.

2.1.4 Therefore, understanding stress requires looking at first external demands to identify whether these demands can be transformed or narrowed. Then, it is necessary to look at personal reactions (capacities) to these demands whether human being can balance or not. Since the capacities can vary from person to person, it can readily be understood why some people react differently from others, although they face the same stressors. Or even why the same person can react differently from one year or month or day.

2.2 Various Studies on Stress

2.2.1 Randall and Altmair (1994) state that at least three important goals have to be achieved in any organization: to identify sources of stress, to understand the organizational level of stress, and to develop preventive stress management styles in over time. Randall and Altmair state that one of the first scientific attempts to explain stress was made by Hans Selye in 1956. Hans Selye was the first to describe human stress. His early works were on the responds and adaptation of the body against any demand. Selye believed that this response was "non-specific" which means that the person's response to stress follows a universal pattern whatever the external and internal demand of the body. Selye called this phenomenon as the General Adaptation Syndrome, (GAS), (Randall, and Altmair, 1994).

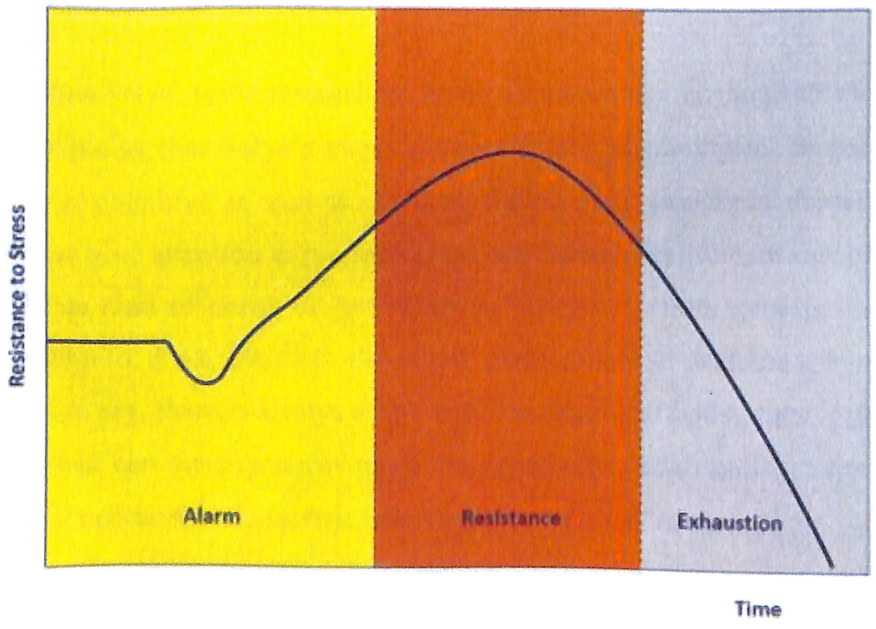


Figure 2.1 General Adaptation Syndrome

2.2.2 The alarm reaction stage refers to the initial symptoms the body experiences when under stress. You may be familiar with the "fight-or-flight" response, which is a physiological response to stress. This natural reaction prepares you to either flee or protect yourself in dangerous situations. In the first stage, alarm (A), the body prepares itself for quick response such as increasing blood pressure. Your heart rate increases, your adrenal gland releases cortisol (a stress hormone), and you receive a boost of adrenaline, which increases energy. If the stressor continuous (Selye just thought an environment stressor), then the second stage, resistance (B) occurs. In this stage the body needs to an organ or system to deal with stressor to return equilibrium. After the initial shock of a stressful event and having a fight-or-flight response, the body begins to repair itself. It releases a lower amount of cortisol, and your heart rate and blood pressure begin to normalize. Although your body enters this recovery phase, it remains on high alert for a while. If you overcome stress and the situation is no longer an issue, your body continues to repair itself until your hormone levels, heart rate, and blood pressure reach a pre-stress state. Therefore the most important stage in GAS theory is the resistance stage. If people cannot balance their life, the exhaustion (C) stage occurs. This stage is the result of prolonged or chronic stress. Struggling with stress for long periods can drain your physical, emotional, and mental resources to the point where your body no longer has strength to fight stress. You may give up or feel your situation is hopeless. Luthans (1987) describes the third stage as "the automatic shutoff valve of death", because in this stage exhaustion, collapse and even death may occur.

2.2.3 After Hans Selye, some researchers found shortcomings in the GAS model of stress. Allen (1983) explains that Selye's stress definition is a physiological response. However stress can also be cognitive as well as physical, for example anxiety or depression. Modern stress researchers give attention to psychological and behavioural dimensions of stress. Allen (1983) labels this kind of stress as "psychogenic" (psyche: mind; genesis: origin), mental origin. According to these theorists the mind perceives first, and the physical response follows. That is to say, there is always a link between mind and body. Allen (1983) describes how the individual can manage stress more constructively. He examines why human stress exists and how it operates, and identifies the causes and effects of stress.

2.2.4 "The military personnel are suffering from occupational stress. A majority (60%) reported suffering from significant work stress. Almost half (42.5%) reported that work stress was a significant contributor to the onset of their mental illness." The relationship between

stress and performance is explained by Yerkes–Dodson (1908) Law. The Yerkes–Dodson law is an empirical relationship between arousal and performance. The law dictates that performance increases with physiological or mental arousal, but only up to a point. When levels of arousal become too high, performance decreases. The process is often illustrated graphically as a bell-shaped curve which increases and then decreases with higher levels of arousal.

2.2.5 Edens (1992) found that there is a significant relationship between psychological stress level and pilot error. Human factors cause 60-70% of air accidents (Uçuş Emniyetinde Hedef, 1995), including sleeplessness, fatigue, alcohol and smoking, panic, using drugs, ignorance, and *stress*. The role of stress in air accidents is approximately 20% (Gata Hava ve Uzay Hekimliği Merkezi, 1995). If commanders deal with stress and human factors, they can reduce the number of accidents, and thereby increase the safety of pilots.

2.2.6 Henn's study (1996), which was related to performance and pilots, found that there are a few significant stressors that decrease the performance ability of aviators such as irregular work hours, fatigue, training structure, labor-management confrontations, and time management.

2.2.7 Many surveys were carried out to identify the relationships between stress and military personnel and performance. Katz (1997) mentioned some findings about stress and aviators in his Aeromedical research. In his report, naval personnel reported significantly decreased job satisfaction in relation to negative stressful life events; another study in his report cited 71 percent of military pilots were admitted to being worried by personal and family problems; and family stress on the pilots affected flying efficiency.

2.2.8 Research in aviation shows that individuals can be trained against stress as "error inducers" (Sexton, Thomas, Helmreich, 2000). Helmreich, (2000) also clarifies the importance of crew resource management (CRM) in training effort against human errors and stress. Helmreich, (2000) highlights that pilots and doctors operate in complex environments where teams interact with technology. In both domains, risk varies from low to high with threats coming from a variety of sources in the environment. Safety is paramount for both professions, but cost issues can influence the commitment of resources for safety efforts. Aircraft accidents are infrequent, highly visible, and often involve massive loss of life,

resulting in exhaustive investigation into causal factors, public reports, and remedial action. Research by the National Aeronautics and Space Administration into aviation accidents has found that 70% involve human error.

2.2.9 Carlisle (2001) focuses on pre-flight stresses. He thought that even the best pilots are subject to a significant level of stress that could diminish their ability to fly safety. He suggests not flying, if pilots perceive much more stress. Richard and Reinhart (1993) also focused on pre-flight stresses. According to them flight stresses may be solved at the end of the day. However, if pilots bring stress from ground to the cockpit, there could be a real problem. Therefore stress can be more dangerous in pilots' life.

2.3 Understanding Stress

2.3.1 Coming to terms with stress requires an understanding of what it is. Essentially we need to know how it affects our bodies and our psyche before we can begin learning how to manage it. Imagine that you are flying a routine mission in your fighter jet and you are in your comfort zone, now that you are more or less through with your profile and are on your way back to base for a landing. Suddenly you hear an audio warning blare in your ears. You quickly glance at your emergency warning panel and see that your engine fire warning light is on. The fire warning indication could be spurious or it could be an indication that your engine was about to reach meltdown. Your mind because of your training would start looking for other indications to decide upon the correct course of action. That notwithstanding to consider what is happening to us physically, we have to look at the processes in the body.

2.3.2 One or more of the senses detect a change which is going to affect you. The brain senses a threat and passes a signal to the hypothalamus which in turn stimulates the pituitary gland. The pituitary gland releases ACTH (adreno-corticotrophic hormone), which stimulates the adrenal glands which then release adrenalin to the body. Adrenalin then prepares the body for "fight or flight". The heart beats faster, blood pressure rises, respiration increases and an increase in blood glucose provides extra energy. On the other hand the emotional reaction to stress in the above mentioned example would be anxiety or fear. This adrenalin flow is an instinctive reaction and is not always associated with unpleasantness. The butterflies that sportsmen and women feel with the onset of competition is the same process. While some

people would describe it as addictive there is no doubt that it is useful in improving performance levels. At the less extreme levels of this adrenalin flow, the term arousal is commonly used with the same meaning. There will always be a level of stress/arousal in the form of normal body functioning and there is no increase in performance once the overload point has been reached rather there is a gradual decrease in performance.

2.4 Personality and Stress

2.4.1 There are innumerable factors that influence an individual's appraisal of a situation or event. Some of them are ethos, traditions, backgrounds, values, customs, experiences, religious, attitudes, and ideologies. However the most significant is the personality of the individual. Personality is a central element to interpret the internal and external demands as a stress or not. Allen (1983) states that personality makes people "more prone" or "more resistant" to stress. There are some personal characteristics mentioned below that affect the stress perception state

2.4.2 *Self-esteem* is an individual's general feeling of worth. Individuals with high self-esteem have positive feelings about themselves. Individuals with low self-esteem view themselves negatively. People with high self-esteem perform better and are more satisfied with their jobs than those with low self-esteem. Having low self-esteem, people have been confronted more stress than others.

2.4.3 "An individual's generalized belief about internal control (self-control) versus external control (control by the situation or by others)" is called *locus of control* (Nelson and Quick, 1990, p. 74). Internals have been found to have higher job satisfaction, higher motivation, having more efforts lead to performance, and less anxiety than externals. Externals are more prone to get stress in organizations.

2.4.4 *Self-efficacy* is an individual's beliefs and expectancies about his or her ability to accomplish a specific task effectively. Individuals with high self-efficacy believe that they have ability to get things done. Research has indicated that women and minorities tend to have lower than average self-efficacy (Nelson and Quick, 1990). Self-efficacy is the belief we have in our own abilities, specifically our ability to meet the challenges ahead of us and

complete a task successfully. Since self-efficacy is related to the concept of self-control it provides ability to an individual to modulate one's behavior to reach his goals.

2.5 Perception of Stress

2.5.1 Earlier it was mentioned that people can perceive stress differently. Perception differs from individual to individual. The important thing for a manager (or commander) is to identify who perceives and to what extent. A systematic approach for the perception of stress is shown figure 2.2.

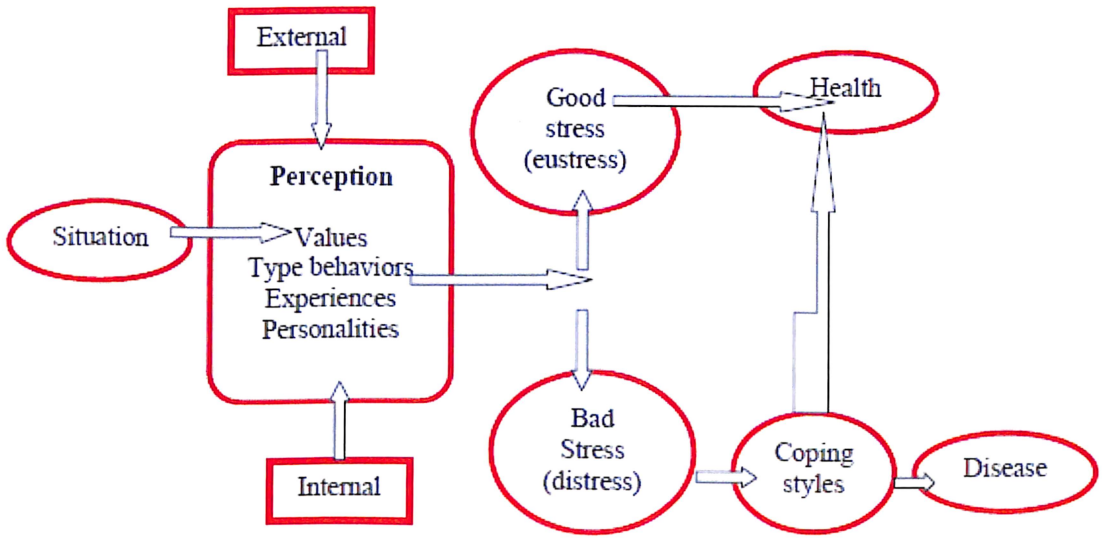


Figure 2.2 Perception of Stress

2.5.2 As shown in figure 2.2 the internal such as the attitude and characteristic; personality of individual; and external sources such as the job itself, manager, family, intensively affect the perception so does the situation. If the capacity of a person exceeds demands, it is perceived as good and healthy, then bad stress may not occur. Otherwise he or she perceives the demand as distress. The coping styles performed mostly by individual itself and some by environment such as manager determine the results whether he or she can overcome the stress or not. If he or she overcomes the stress, disease will not occur. Otherwise stress can cause disease.

2.6 Importance of Optimum Stress Levels

2.6.1 People sometimes define stress incorrectly as too much work, a feeling of anxiety, too much pressure, feeling tired, etc. Most people consider stress as a negative term. However, pressure can be regarded as positive and it can be useful for reaching higher performance. Selye (1976) distinguishes damaging stress from promoting stress with the labels *distress and eustress* respectively. When people talk about stress, they often characterize stress as distress. When stress is defined as ''wear and tear'', the reference is to distress. On the other side, eustress (good stress) is essential for growth and survival of people. It gives a certain amount of energy and drive.

2.6.2 Distress-eustress phenomena can be explained in quantitative terms. Yerkes- Dodson law illustrates this relationship between the quantity of induced stress and resulting performance (Allen, 1983). The Yerkes-Dodson law can be illustrated graphically as an inverted U shape. If we place stress on a horizontal axis and performance on a vertical axis, the interaction of them becomes the area of optimum performance.Quantitatively, stress effects on performance follow the inverted U-shaped relationship (the Y-D law). Although there is considerable evidence in support of such a relationship, the Y-D law is not the whole story and has limited explanatory value for a variety of reasons (e.g., Hancock, 2002).

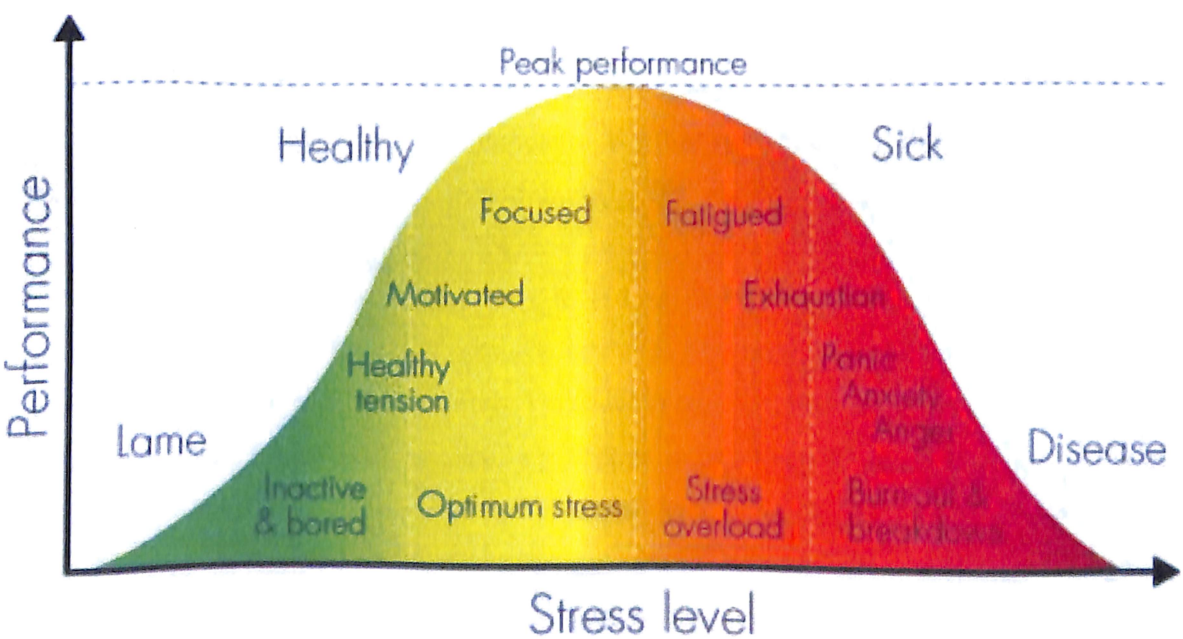


Figure 2.3 Yerkes-Dodson law (Optimum Stress Level)

2.6.3 On the one hand, where stress is low, people may become bored, less motivated, and therefore shows less performance. A little amount of stress must be induced to increase performance. On the other hand, where stress is too high, their performance may diminish. They may feel anxiety and may become unhappy because of suffering from all the symptoms of stress. If employees can keep themselves within the area of optimum performance, then they may be sufficiently aroused to perform well. But, since stress is different from person to person, this graph and this zone of optimum performance may be different for people. Some people may operate most effectively at a specific level of stress, whereas another person may become either bored or unhappy at the same level of stress.

2.6.4 For one thing, not all empirical evidence is consistent with a U-shaped function of performance across levels of arousal (Westman & Eden, 1996). Secondly, as Hockey (1983) and Hancock and Warm (1989) argued, every stressor produces its own unique pattern of effects on cognition and performance, making it unlikely to find an adequate all-encompassing principle or theory.

2.6.5 Further different stressors can interact, often producing non additive effects on performance (e.g., Hygge & Knez, 2001). Evans, Allen, Tafalla, and O'Meara (1996) examined the interactive effects of multiple, sequential stressors on cognitive performance and psycho-physiological indices. Subjects engaged in a relaxing or a highly stressful activity followed immediately by performance of a task under quiet or noisy conditions. Results indicated that the negative effects of noise on both concurrent and aftereffect performance and on BP were exacerbated by prior exposure to either a lab stressor (making a speech) or to a naturalistic stressor (college final examination).

2.6.6 Thirdly, the Y-D law relates only to arousal or system activation and not to other processes such as interference and resource demands that might also be influenced by stress. Finally, and perhaps most importantly, Y-D law relates exclusively to simple quantitative measures of goodness of performance, e.g., speed or accuracy of response. It is clear that stress creates qualitative changes in the organism and its performance, above and beyond those captured by the Y-D law. For example, at some point, stress increments begin to degrade performance. Initial degradation is graceful, that is, small and gradual reductions in performance as stress increases. In extreme circumstances, the degradation in performance can be catastrophic, with a stress increment causing a complete system failure (Norman &

Bobrow, 1975, 1976). Different stressors and different levels of stress act upon cognitive functions through different intervening states. There is need in a complete account to develop a descriptive or explanatory system that reflects these qualitatively different states. They suggest that the concept of Stress State will help to elucidate various ways in which stressful circumstances influence human performance.

2.7 Stressors

2.7.1 The environment or physical conditions obviously play an important role in building up our stress levels. For example, oxygen levels in the cockpit, crowding or conversely feeling totally alone, the danger levels of what you are actually engaged in doing and perhaps the safety equipment available could be construed as purely physical factors. There are some other physiological factors however that also play an important role. Examples would include the person next to you getting sick, how much sleep you had last night and what your fitness level is, amongst others. An enemy pilot firing a missile at you would definitely upset you. There could be emotional stressors like marital discord, illness of a close relative, financial burden, academic performance of your children or an unpaid phone bill, depending on individual thresholds. It is all too often that these unpredictable stressors turn a normally manageable situation into an uncontrollable one. One can make a distinction between acute and chronic stress. Chronic stress is the result of longer term demands. These are mostly, though not necessarily, emotional in nature. Luthans (1987) divides stress sources into two main parts. These causes come from both outside and inside the organization and from the groups who are influenced by them. (However, in a sense, individual stressors should be taken up from this category and should be considered another sources of stress.). As a result, it can be categorized the causes of stress into three main parts: extra organizational stressors, organizational stressors, and individual stressors.

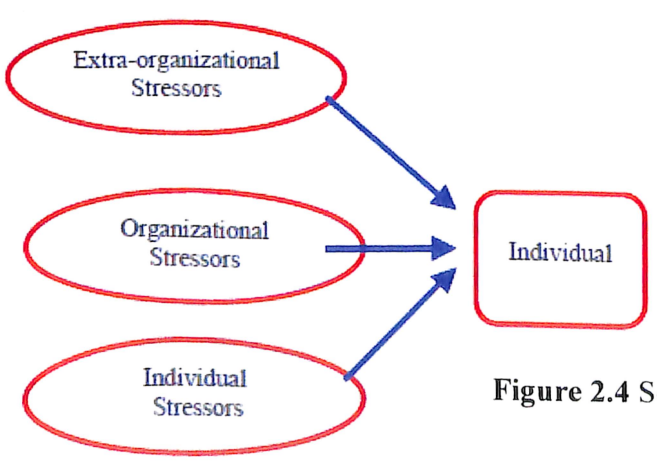


Figure 2.4 Sources of Stress

2.7.2 Stress for a military aviator can be broadly classified as the stress of peace time aviation and that of war. Military aviation at best of times/in peace would constitute a stressful occupation to say the least. Stanley and Knapp (1971) addressed the effects of the environment factors caused by the aerial platform or by the mission (night operations, threat of anti-aircraft weapons, mission in reduced visibility, in high or low speeds, inadequate platform are a few examples for environmental factors) upon the performance of the tasks for air crew. Some generic examples of stressors were given in the preceding paragraphs, however previous studies on the subject has revealed a host of stressors. A list of the various stressors which emerged, are given below:-

(a) **Performance Anxiety.** Military aviation does require the pilot to perform at or above a certain level, failing which either the pilot does not continue to fly or perishes. Both are equally bad as far as a military aviator is concerned. The stress of flying check sorties or handling emergency situations in air would definitely be a Damocles sword for the military aviator, forever hanging over his/her neck.

(b) **Time Management.** Given the fact that a military aviator needs to develop his/her personality in a well-balanced manner, the time available to him/her to share between professional training and personality development is rather less. Poor efficiency levels in the work place also lead to pressure mounting on the aviators who not only have to fly but also have to process paperwork. This manifests itself over a period of time as stress.

(c) **Family time.** Air forces are becoming technology intensive, needing extra efforts to train and assimilate. In addition the strategic demands of the emerging world today require a military aviator to be deployed perennially, whether within the country or without. To make things worse there is the additional burden of shortage of pilots which has to be borne by the existing military aviators. So when then, does the military aviator spend time with his wife and children? Over a period of time this manifests itself as stress.

(d) **Financial Factors.** Economic globalization has led to improvement of the standard of living, by and large across India. However the pay scales of military aviators have not kept pace with the economic boom in the civilian street. It is but natural for a human being to aspire to attain material comforts being beamed right into

our bedrooms, on television. When there emerges a mismatch between a human being's means and his/her material aspiration, the end product is stress.

2.7.3 Combat flying has its own intricacies, requirements and stress. During World War II the average life expectancy of a fighter pilot was rather low and this manifested itself in some strange behaviour which has become legendary. The crushed hat fighter pilots were trying to cope with the stress of not knowing if they would be alive the next day or not. Some found refuge in alcohol and others in morbid humour. Some could not find any refuge and broke down. The survey amongst Indian military aviators revealed the following stressors related to combat flying:-

(a) **Fear of Death/Bodily Harm.** Training teaches military aircrew to perform professionally under stress, like what he/she would feel under combat conditions. However it does not mean that stress ceases to exist. On the contrary it, the fact that military aviators will never talk about this stress (lest it may be misconstrued as a sign of weakness), makes it worse for them.

(b) **Fear of Separation.** The greatest fear of any combatant is that he/she will never see their loved ones again, either due to death or becoming a POW. These mortal trappings exist for everyone. Military aviators in combat have to face these real fears too and unlike a foot soldier, have to maintain a degree of alertness/ concentration which are unparalleled. Thus stress in its most insidious form just keeps piling up.

2.8 Cognition and Stress

2.8.1 Cognitive psychologists study things that people do in their heads and how they subsequently perform based on those mental operations. It is clear that military aviators operate in exactly the same manner by carrying out mental assessments and then executing tasks. Therefore cognitive psychology has valid subjects in military aviators. Cognitive psychology is largely an academic discipline and a basic science, concerned primarily with

(a) Identifying analytically the fundamental components of mental life, such as attention and its allocation, memory systems, problem solving, decision making and the like.

(b) Constructing experimental paradigms to isolate and examine these components in the laboratory.

(c) Developing theoretical structures that help to make sense of the data collected in these paradigms. But the field is not exclusively academic. General principles have been uncovered over roughly the last forty years of laboratory research on cognition and some of those principles show promise of fruitful application to natural situations, especially in education and training.

2.8.2 One important issue to which contemporary cognitive research might usefully be addressed is behavior of military aviators under stress and in emergencies or other abnormal situations. Military aviation emergency situations are almost always dynamic, because early actions by an aviator determine the environment in which his or her subsequent decisions must be made. Further, features of the task environment may change independently of the pilot's actions. Military aviation emergencies are time-dependent, because decisions must be made at the correct moment in relation to environmental demands. These emergencies tend to be complex, in the sense that most variables are not related to each other in one-to-one manner. Finally, emergencies are stressful, because they can create intense psychological pressures on the military aviators. Military aviation emergencies typically are not single isolated events. They are more like episodes extending in time. Thus, these emergency situations often require not one decision about how to react, but a long series of decisions, and these decisions are, in turn, at least partly dependent on one another. For a task that is changing continuously, the same action can be definitive at one moment and useless at another. Military aviators often perform badly in emergencies, sometimes neglecting to respond correctly in even the most obvious ways. One bad decision can worsen the situation and augment the importance of later decisions. A poor decision or an inadequate response can compound the stress effects that are a consequence of the emergency itself. Being able to respond rapidly and correctly is clearly a distinct advantage to anyone caught in an emergency. Research in cognitive psychology has made a contribution to an understanding of acute and chronic stress effects on performance by identifying some of the factors that

contribute to pilot error under emergency or other abnormal circumstances and by suggesting how military aviators might be trained to respond more effectively in these circumstances.

2.8.3 In general, theories of stress account for its effects on cognition and on human performance in terms of multiple psychological and biological processes. These processes include, but are not limited to: arousal or activation (stress intensity is directly and linearly related to arousal level), attention allocation (stress controls directly or indirectly the distribution of attention across points of environmental and internal input and can overload attention capacity), and plans or strategies for the deployment of attention and other resources. Theories differ in their assumptions about these processes. Some attribute little or no role to consciousness or awareness, asserting that stress effects are direct, automatic, biological, or intuitive. Others assign the major performance control functions to plans, appraisals, analyses, and other cognitive phenomena that are invoked in stressful situations.

2.9 Recognizing Stress

2.9.1 A 1985 study or more than 700 U.S. Naval aviators who were involved in major aircraft mishaps found that the 381 aviators who were "causally involved" were more likely to have had problems with interpersonal relationships--one of the symptoms often displayed by someone who is not coping well with stress--than were the 356 aviators who "had no culpability in their mishaps." A report on the study said that the data showed that aviators in the causally involved group also "are more likely to be poor leaders, to be less mature and stable, to lack an adequate sense of their own limitations, and to lack professionalism and the ability to assess troublesome situations. In addition, they are more likely to have financial problems, to have trouble with interpersonal relationships, to have trouble with superiors and peers, and to drink to excess or to have recently changed their alcohol intake. They are more likely to have recently become engaged to be married, be making a major career decision and to have undergone a recent personality change. It also appears that there are certain personality factors that render some aviators more susceptible to the adverse effects of stress, as evidenced by their higher human-error-mishap potential. Such factors as a lack of maturity, no sense of their own limitations and an inability to assess potentially troublesome situations are more prevalent among those who are subsequently assigned fault in an aircraft mishap.

2.9.2 Researchers have studied the effects on pilot performance of both job-related stress and stress at home. A study based on a questionnaire administered to 19 U.S. Coast Guard helicopter pilots in 2000 found that, as stress at home increased, stress on the job also increased. "Pilots under stress at home felt tired and worried ... at work," said the U.S. Federal Aviation Administration (FAA) report on the study. "Pilots indicated that as the home stress experienced at work increased, self-perceptions of flying performance decreased, especially the sense of 'not feeling ahead of the game.'" Authors of the FAA report said that their findings were that the pilots surveyed identified their primary coping strategies as a stable spousal relationship, a stable home life and the ability to talk with an understanding partner. "The first warning signs of home-based psychological distress may be more evident in the daily work activities rather than in cockpit error," the report said. Identifying individuals' stresses give the opportunity to the organization for evaluating their situations and give a chance to managers (commanders) to take preventive measures in advance. There are two major stress symptoms: individual symptoms and organizational symptoms.

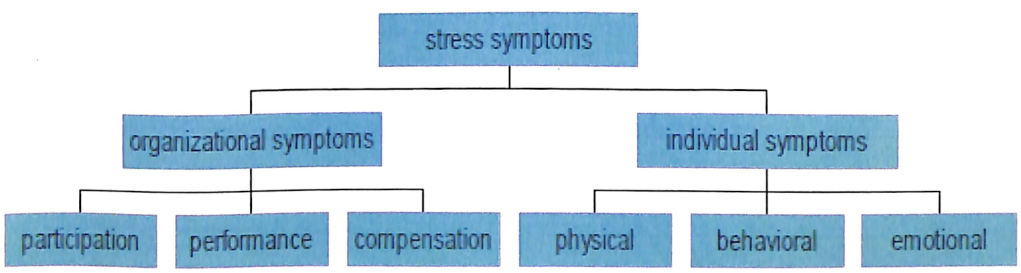


Figure 2.5 Stress Symptoms

2.9.3 To be able to recognise stress in military aviators it is important to be aware of the symptoms of stress Symptoms of stress are numerous and differ from one person to another. Common individual symptoms include the following: -

(a) Physical symptoms.

(i) Tense muscles, especially in the neck and shoulders

(ii) Headache or backache

(iii) Stomach ache, nausea, vomiting, diarrhoea or constipation

(iv) Tiredness or difficulty in sleeping

(vi) Unusually rapid heartbeat

(vii) Shakiness or excessive sweating

(viii) Weight loss or weight gain

(ix) Clenched jaw or clenched teeth

(x) Nail-biting

(xi) Sighing or changes in breathing patterns

(xii) Decreased interest in sex

(b) Emotional symptoms.

(i) Frustration, irritability or anger

(ii) Depression or anxiety

(iii) Nervousness

(iv) Boredom or apathy

(c) Behavioural symptoms.

(i) Abuse of alcohol, drugs or other substances

(ii) Marital problems

(iii) Binge eating

(iv) Self-destructive behaviour

(d) Cognitive symptoms.

(i) Forgetfulness, preoccupation and difficulty in concentrating

(ii) Indecisiveness

(iii) Mistakes at work and loss of productivity

(iv) Excessive worry

(v) Decrease in creativity

(vi) Loss of sense of humour

(e) Organizational culture involves ethos, traditions, values, beliefs and ideologies that guide individual behavior in organizations. Organizational culture can increase

the commitment of employees. However as Gökşen (2001) mentioned in his study, employees' values and organizations' values must fit for this commitment to realize itself. Otherwise workers may feel high level of stress depending upon the extent of this mismatch. A survey was made among NATO countries to identify "aviator's personality profile" (Gata Hava ve Uzay Hekimliği Merkezi, 1995). The results show that Turkish pilots have different profile than European pilots. It can be concluded that there is no universally personal profile in aviation (it can also be mentioned for other professionals), because personality profile may differ from culture to culture.

(f) Medical problems. Researchers estimate that more than 40 percent of adults experience adverse health effects associated with stress and that more than 75 percent of visits to physicians' offices are for stress-related problems. These problems can be relatively minor, such as clenched teeth or tiredness, but they also can be life-threatening. For example, stress is associated with heart disease and diseases involving the immune system, as well as accidents and suicides. Stress also can exacerbate a number of medical conditions, including gastrointestinal disorders and asthma; some medical specialists believe that stress can be a factor in the development of cancer. The Harvard Medical School report said that the widespread implications of stress include direct effects, "such as ... long-term suppression of the immune system, causing stickier-than-normal platelets, slowing wound-healing, or constricting major blood vessels, and indirect effects on behaviour. More specifically, stress predisposes the body to heart disease and other ailments in several ways:

(i) The stress-related release of adrenaline and other hormones into the blood increases the amount of cholesterol manufactured by the body. (For example, one study found that the blood cholesterol levels of medical students increased by about 25 percent during their final exam period.) Elevated blood cholesterol levels contribute to atherosclerosis, the narrowing of blood vessels, which can lead to chest pain, heart attack or stroke.

(ii) Stress-related increase in blood pressure can contribute to hypertension (high blood pressure), which by placing extra pressure on the blood vessels, can result in injury to the vessels and can force more cholesterol into the artery walls, increasing the risk of atherosclerosis.

(iii) Chronic stress reduces the effectiveness of the body's immune system. The immune system typically responds to an infection by releasing substances to fight the infection; after the infection subsides, the adrenal glands release the hormone cortisol to stop the body's infection-fighting response. During periods of stress, cortisol is among the hormones that remain elevated; at the elevated level, cortisol can suppress the immune system, preventing a response to infection. However, in some cases, stress causes the immune system to overreact. The result is an increased risk of autoimmune diseases, such as lupus, in which the immune system attacks healthy cells. Stress also can exacerbate the symptoms of existing autoimmune diseases.

(iv) Some medical specialists believe that chronic stress, because of its effects on the immune system, may influence the development of cancer by restricting the body's ability to stop the spread of cancer cells. Their theory is that cancerous changes in the body's cells occur often and for many reasons but that the immune system destroys these altered cells; when the immune system cannot do its job, the cancer cells spread.

(v) Stress is one of several factors that can contribute to gastrointestinal ailments. For example, stress can cause an increase in the secretion of gastric acid, which can lead to heartburn. Studies have found that a combination of stress and other psychological factors and physical factors can cause gastrointestinal pain and abnormal contractions of the intestines that often are symptoms of irritable bowel syndrome. Another study found that people who considered their lives stressful were about twice as likely to have ulcers as people who did not believe that they were experiencing stress. Earlier findings identified a bacterium as the primary cause of ulcers, but some medical specialists now believe that stress could delay healing of ulcers.

(vi) Stress is one of dozens of factors that can trigger an asthma attack. The stress response causes small airways in the lungs to contract (tighten), interfering with the flow of air into and out of the lungs. Some specialists also believe that a person's exposure to intense stress when very young can contribute to the development of asthma.

2.10 Coping Stress

2.10.1 Major life events and the frustrations of daily living result in an accumulation of stress that has been associated with numerous health problems, as well as with pilot error. With a healthy lifestyle, an understanding of what causes stress and selection of appropriate coping mechanisms, people can learn to alleviate their stress. People cope with stress in many ways. Specialists say that the first step in coping is to identify stressors and the symptoms that occur after exposure to these stressors. As per various studies undertaken by various scholars as well as teachings recommendations involve development or maintenance of a healthy lifestyle, with adequate rest and exercise, a healthy diet, limited consumption of alcoholic drinks and avoidance of tobacco products. More specific recommendations include the following:

(a) Remove the stressor, or change your way of thinking about the stressor. As a military aviator it may not be possible to eliminate the stressor per se, especially if the stressor is a vengeful boss in an authoritarian system or an enemy pilot trying to shoot you down. In fact it would be better to shoot down the enemy pilot and ignore the boss to alleviate stress. In other words it would be infinitely better to change your way of thinking about stressors you cannot shoot down.

(b) Seek training in common stress-reduction techniques such as meditation, yoga, tai chi; and biofeedback-assisted relaxation. Some mental health professionals also offer bio feedback assisted relaxation training as part of stress management training. Bio feedback machines measure and display some of the physical changes that occur when we use certain stress management skills. Some people also find relief in prayer. This is surely worth trying as meditation and yoga are known to alleviate stress to a large extent. In the Far East, Zen meditation seems to be a well-developed method for attaining mental peace. The word Zen is derived from the Chinese word 'Chan', which in turn is derived from the Sanskrit word 'Dhyana'. In the Middle East Sufism was used to control mental tension. In Europe the method of bio-feedback relaxation, which combines the autosuggestion method of Shultz and the relaxation techniques of Jacobson, is very popular. All the above methods employ some facet of Yoga and are therefore incomplete in themselves. To derive the full benefits of Yoga one must follow the full eightfold Yogic discipline described by Patanjali about 2000 years ago.

They are Yama (Restraints), Niyama (Observances), Asana (Physical postures), pranayama (Breathing control), Pratyahara (Withdrawal of sense organs), Dharana (Contemplation), Dhyana (Meditation) and Samadhi (Attainment of super consciousness).

(c) Relaxation is an important part of stress management. The ability to relax quickly in any situation will serve two purposes. First, as soon as you begin using it, it will help you decrease daily wear and tear on your body. Next it will give you the self-control to decide how you want to handle stressful situations so as to decrease anxiety, anger, fight-or-flight responses and enjoy the experience.

(d) Talk to someone else about the situation. The most effective solution is to find and address the source of your stress or anxiety. Unfortunately, this is not always possible. A first step is to take an inventory of what you think might be making you "stress out".

(e) Exercise or play sports. The military environment of the military aviator would always ensure the opportunity to indulge in sports and exercise. A healthy body houses a healthy mind.

(f) Go outdoors. Being in touch with nature by either going for long walks in parks, camping or by picnicking can greatly reduce stress levels. Surely being a military aviator does not preclude such activities.

(g) Listen to music, read a book, write in a journal or write a list, engage in a hobby or other enjoyable activity. While for a military aviator there could be nothing more pleasurable than flying, there is always the requirement to take a break doing something which one would enjoy.

(h) Imagery training. One can also learn to block out upsetting and intruding ideas by using a technique known as imagery training. The goals of imagery training are to reduce and control mental anxiety. By pleasing visual images, we can control upsetting thoughts and enjoy a deep state of mental relaxation. Learning to control

your thoughts takes knowing what you need to think about, practicing those thoughts and then using them when you want to relax.

(j) Promote efficiency. In today's military environment of multi-tasking and multi-skilling it is very important to be efficient and not to fritter away precious time by procrastinating. Plan your work schedule efficiently so as to remove stress induced by slipping deadlines.

2.11 Summary

2.11.1 The ultimate goal of any air force is to produce combat power at will that enables it to defend its assets and areas of interests/operations and if necessary attack targets with devastating potential: a potential, ready to be used in hostilities. In order to create this potential, air forces enlarge their combat readiness and capability as much as they can. This combat readiness consists of material readiness, personnel readiness and training level. Two potential challenges for combatants preparing for action are potential placement in a hostile environment and anticipation of the unknown. Since war is likely to be a new experience for most of the present day IAF combatants (the last full-fledged war being in 1971), there may be high levels of anxiety during such preparations. When combatants prepare for hostilities, most individuals adapt well. They may experience a wide range of emotional reactions, including: anxiety, excitement, fear of the unknown, denial, shock, irritability, sadness or pride. They may also feel guilty/ worried about the probability of bereaving those who depend on them. Some combatants are likely to be worried about being caught as POWs. Increased tension in the family members is also very common as hostilities approach.

2.11.2 It is therefore inevitable that a uniformed personnel will be subjected to an alien environment during actual ops and therefore his preparation must start before so as to make him capable of performing as per the desired level. Management of combat stress involves three components; prevention, identification and management goals. Primary prevention consists of controlling stressors known to increase dysfunctional stress behaviours such as first experience of combat, insufficient, realistic training, sleep/food deprivation, inadequate information or no sense of purpose and home front worries. Secondary prevention involves training individuals to identify warning signs/symptoms of combat stress, preventing spread of dysfunctional behaviour by segregation/treatment and reintegrating recovered individuals

back into their units. Tertiary prevention involves training individuals in critical event and end of tour debriefings and monitoring for post-traumatic stress disorder (PTSD) symptoms. Listed below is a table showing various stress behaviours that a commander or an individual is likely to encounter during operations. Military personnel need to firstly be aware and secondly be prepared to deal with them.

Table 2.1 Stress Behaviours in operations and combat situations

Adaptive Stress Reactions	**Combat and Operational Stress Reactions**	**Misconduct Stress Behaviours and Criminal Acts**
• Unit Cohesion • Loyalty to Buddies/ Peers • Loyalty to Leaders • Identification with unit • Sense of Eliteness • Improved sense of Self • Enhanced Relationships • Sense of mission • Alertness, Vigilance • Exceptional strength and Endurance • Increased Tolerance to Hardship, pain and injury • Sense of Purpose • Heroic Acts • Courage • Self Sacrifice	• Hyper Alertness • Fear, Anxiety • Irritability, Anger, Rage • Grief, Self-doubt, Guilt • Physical Stress complaints • Inattention, Carelessness • Loss of Confidence • Loss of hope and Faith • Depression, Insomnia • Impaired duty performance • Erratic actions, Outbursts • Freezing immobility • Terror, Panic • Total Exhaustion • Apathy	• Alcohol and Drug Abuse • Recklessness, Indiscipline • Excessive Sick Report • Negligent Disease, Injury • Shirking, Malingering • Combat Refusal • Self Inflicted Wounds • Going absent without Leave, Desertion

2.11.3 Studies also indicate psychological risk and protective factors for PTSD. Compared to veterans with PTSD, those without the disorder had lower neuroticism and psychoticism scores, were more internal in their locus of control orientation, and were more likely to have

shown ability to provide structure to the Vietnam experience. The finding that veterans with high combat experience but without PTSD evidenced less neuroticism than low combat veterans without PTSD provides evidence that those who did not develop the disorder despite high exposure to combat stress are individuals with exceptional emotional strength and resilience. Post-operations phase would also witness concerns for unit members and their families over changes in family life such as, confirmed war casualties, missing personnel in action, potential conflict with family members or others about inheritance, life insurance settlements and other financial matters, rehabilitation of severely injured combatants and most importantly, the issue of resettlement of war widows and their families. At higher levels, a concerted effort must be made with the help of the national media, to absorb as many martyrs' dependents into public sector and private sector enterprises, for their rehabilitation. The media has an important, positive role to play in this issue. Commanders can also help by: being empathic to the personnel concerned, educating families that there will be changes, being attentive to reactions and subsequent behaviour that members may experience such as guilt, anger, substance abuse, and depression; normalizing the fact that re-adaptation may take time. Long term positive and negative stress reactions are shown in Table 2.2. There must be no hesitation to employ the services of competent mental health professionals, where the requirement manifests.

Table 2.2 Long Term Stress Reactions

Positive Stress Reaction	Negative Stress Reaction
• Adaptive Stress Reaction • Posttraumatic Growth • Improved Relationships • Renewed hope for Life • Improved Appreciation for Life • Enhanced Sense of personal Strength • Spiritual Development	• Intrusive, Painful memories • Trouble Sleeping • Bad Dream • Guilt about Things done or not done • Social Isolation, Withdrawal, Alienation • Jumpiness, Startle Responses, Anxiety • Alcohol or Drug misuse • Misconduct • Depression • Trust issues in relationships

CHAPTER III

RESEARCH DESIGN, METHODOLOGY AND PLAN

3.1 Research Methodology

3.1.1 The descriptive research method has undoubtedly been the most popular and the most widely used research method in education. Descriptive research studies are designed to explain pertinent and precise information concerning the current status of phenomena and whenever possible, to draw valid general conclusions from the facts discovered. It helps to explain educational phenomena in terms of the condition or relationships that exist, opinions that are going on, effects that are evident or trends that are developing. Therefore descriptive method was of immense value for the purpose of the present investigation. The survey questionnaire has been quantified accordingly as per the self-evaluation test titled "The Glazer Stress Control Lifestyle". The questionnaire was employed to assess the sample of military aircrew based at different bases as well as from varied fleets, service seniority and age group. The investigation was studied as per the guidelines of the questionnaire.

3.2 Data Sources

3.2.1 This research has been primarily based upon The Glazer Stress Control Lifestyle questionnaire however articles and essays on topics related to the subject from the internet, journals, periodicals and books were referred. The present study comprised of a sample of 55 military aircrew of Indian Air Force from different fleets namely fighters, transports and helicopters. The sample of the aircrew chosen comprised of pilots, navigators, flight engineers, flight gunners and flight signalers. The sample of aircrew therefore not only included officers but also airmen employed in flying activities. It was also deliberately planned during the investigation that the age group and service seniority be kept diversified in order to obtain a result which does not gets fixed to a certain ideology/experience. Therefore the age group varied from 24 years to 42 years along with associated service seniority varying from 3 years to 19 years. This data source was collected from three different bases which are not being named due security reasons. Prior to data collection, prospective

participants were given information regarding the nature of the study and risks/benefits. If participants provided informed consent they were then asked to complete the questionnaire.

3.3 Glazer Stress Control Lifestyle

3.3.1 The Glazer stress-control lifestyle questionnaire helps you determine how your personality type affects your ability to deal with stress. There is a particular style of behaving and thinking that seems to make people at higher risk of being stressed. This has been called various things, like "hurry sickness" or "Type A Behaviour". Most of us show some signs of Type A Behaviour. However, too much Type A Behaviour can be bad. The opposite of this has been called "Type B Behaviour". People who engage in this behaviour tend to be more easy-going and relaxed. They are less likely to become agitated or uptight. Also, they are less likely to neglect leisure activities. For Type B's, personal worth and success is based on a much broader range of factors than what they produce, do or achieve. Often, in situations where there is little pressure, Type A's and Type B's will behave and respond in a similar way. Where striking differences tend to show up is in pressure situations. Indeed, Type A's tend to produce more stress hormones and, in general, show a heightened stress response when they are agitated. The more stressed they are, the more Type A behaviours they are likely to display. The research intends to use this questionnaire to study the effect of stress on military aircrew.

3.3.2 The Glazer-Stress Control Lifestyle Questionnaire (GCLQ; Glazer, H., 1978) includes 20 contrasting statements rated on a scale of 1 (strongly agree with left statement) to 7 (strongly agree with right statement). Higher scores are indicative of Type A personality type and higher stress levels while lower scores are indicative of Type B personality type with lower stress levels. Total your score across the 20 questions. The lowest possible score is 20, the highest possible score is 140. After having completed the total score we must look at the following table to identify where we fall along the Type A - Type B continuum. This questionnaire will give you some idea of where you stand with regard to Type A behaviour. The higher your score, the more you may be putting yourself under some risk of stress-related health problems. Remember, however, that even Type B people occasionally slip into Type A behaviour, particularly at times of change or crisis, and that these patterns of behaviour can change over time. This questionnaire will give you some idea of where you stand with regard to Type A behaviour. The higher your score, the more you may be putting yourself under

some risk of stress-related health problems. Remember, however, that even Type B people occasionally slip into Type A behaviour, particularly at times of change or crisis, and that these patterns of behaviour can change over time.

Table 3.1 Glazer Stress Control Lifestyle Scoresheet

Total Score	Type	Remarks
110-140	**A1**	Your behavioural style is Type A. Continuing to behave in this way may make you prone to heart problems. It is worth considering altering aspects of your behaviour towards a less Type A lifestyle. If you are in this category and especially if you are over 40 and smoke, you are likely to have a high risk of developing cardiac illness.
80 – 109	**A2**	You are in the direction of being prone to heart problems, but your risk is not as high as A1. You should, nevertheless, pay careful attention to the advice to Type A's.
60-79	**AB**	You have a mixture of A and B behaviour patterns. This is a healthier pattern than either A1 or A2 but you have the potential for slipping into Type A behaviour. So, you should be aware of the risk attached to changing your behaviour towards a more Type A lifestyle.
30-59	**B2**	Your behaviour is on the less cardiac-prone end of the spectrum. You are likely to be generally relaxed and to cope adequately with stress.
20-29	**B1**	Your behaviour tends to be at the extreme end of non cardiac-prone. It shows few, if any, of the reactions associated with heart problems.

3.4 Survey Questions

3.4.1 The participants were explained and thereafter administered to fill up the questionnaire. All aspects were explained and also mentioned in the questionnaire. The questionnaire is listed below in the table. The subjects were told that this is not an examination rather it is a data collection which will help in conducting the present study.

They were requested to give an honest answer to the questionnaire given to them. It was also made clear that their view would be kept strictly confidential.

3.4.2 Directions for filling up the questionnaire was explained is as follows : Each scale below is composed of a pair of adjectives or phrases separated by a numbered continuum. Each pair has been chosen to represent two kinds of contrasting behavior. Each of us belongs somewhere along the line between the two extremes. For each item on the test, circle the number that will symbolize where you think you belong on the continuum.

Table 3.2 Glazer Stress Control Lifestyle Questionnaire

Sl No			
1.	Doesn't mind leaving things temporarily unfinished	1 2 3 4 5 6 7	Must get things finished once started
2.	Calm and unhurried about appointments	1 2 3 4 5 6 7	Never late for appointments
3.	Not competitive	1 2 3 4 5 6 7	Highly competitive
4.	Listens well, lets others finish speaking	1 2 3 4 5 6 7	Anticipates others conversation (nods, interrupts -finishes sentences for others)
5.	Never in a hurry, even when pressured	1 2 3 4 5 6 7	Always in a hurry
6.	Able to wait calmly	1 2 3 4 5 6 7	Uneasy when waiting
7.	Easy-going	1 2 3 4 5 6 7	Always going full speed ahead
8.	Takes one thing at a time	1 2 3 4 5 6 7	Tries to do more than one thing at a time, thinks about what to do next.
9.	Slow and deliberate in speech	1 2 3 4 5 6 7	Vigorous and forceful in speech (using a lot of gestures)
10.	Concerned with satisfying self not others	1 2 3 4 5 6 7	Want recognition by others for a job well done
11.	Slow doing things	1 2 3 4 5 6 7	Fast doing things (eating, walking, etc.)
12.	Laid-back	1 2 3 4 5 6 7	Hard driving
13.	Expresses feelings openly	1 2 3 4 5 6 7	Holds feelings inside
14.	Has a large number of interests	1 2 3 4 5 6 7	Few interests outside of obligations (school – sport)
15.	Satisfied with school work	1 2 3 4 5 6 7	Ambitious, want to achieve highest marks – scholarships
16.	Never set own deadlines	1 2 3 4 5 6 7	Often set own deadlines

17.	Feels limited responsibility	1 2 3 4 5 6 7	Always feel responsible
18.	Never judges performance in terms of numbers	1 2 3 4 5 6 7	Often judges performance in terms of numbers (grade percentage, money earned)
19.	Casual about school or work	1 2 3 4 5 6 7	Take school or work very seriously (work over weekends or during time off)
20.	Not very precise	1 2 3 4 5 6 7	Very precise (careful about detail)

3.5 Data Analysis Procedure

3.5.1 The following statistical techniques were employed for testing research hypotheses.

(a) Descriptive Statistics such as mean and SD was computed.

(b) Graphical representation of the data was done (Wherever necessary).

3.5.2 The total scores obtained from the Glazer Stress Control Lifestyle Questionnaire were measured and computed to analyse the result. It is known that a military aircrew will be subjected to abnormal conditions not only due to the inherent occupational hazard but also the unknown variables which have been explained in the previous chapter. Owing to this element certain questions of the questionnaire have been studied separately to bring about the fact that a military aircrew needs to be professionally sound leaving no margin of error. To specially understand this aspect ques 1, 3, 12, 16, 17, 19 and 20 have been studied via descriptive statistics towards drawing appropriate results.

CHAPTER IV

FINDINGS AND ANALYSIS

4.1 Descriptive Statistics

4.1.1 Descriptive Statistics was carried out for the total score achieved for each participant. The findings of the same was studied which will be discussed subsequently. The analysis has been presented in a tabular form displaying various aspects.

Table 4.1 Descriptive Analysis of the Total Score

Individual scores	
Mean	87.49091
Standard Error	1.682325
Median	89
Mode	86
Standard Deviation	12.47646
Sample Variance	155.662
Kurtosis	0.422748
Skewness	-0.48908
Range	61
Minimum	52
Maximum	113
Sum	4812
Count	55

4.1.2 Also a descriptive analysis was carried out for the set of questions as discussed earlier which have a compounding factor of creating performance based anxiety for the military aircrew. The set of questions comprised of 7 questions (ques 1,3, 12,16,17,19 and 20) which have been put forth before in the previous chapter. The result of the analysis has been presented in a tabular form below.

Table 4.2 Descriptive Analysis of the Questions Score (set of questions 1,3,12,16,17,19,20)

Set of Ques	
Mean	36.16364
Standard Error	0.706279
Median	36
Mode	36
Standard Deviation	5.237909
Sample Variance	27.43569
Kurtosis	0.498023
Skewness	-0.56467
Range	26
Minimum	20
Maximum	46
Sum	1989
Count	55

4.2 Correlation

4.2.1 The scores obtained for the complete questionnaire and the set of questions (7 ques) were tested for correlation by carrying out an F test with two samples for variances and on rejection of null hypothesis was thereafter tested for T test : Two-Sample Assuming Unequal Variances. The result of the T test rejected the null hypothesis justifying the significance.

Table 4.3 F-Test 2 Sample for Variance

F-Test Two-Sample for Variances		
	Variable 1	*Variable 2*
Mean	87.49091	36.16364
Variance	155.662	27.43569
Observations	55	55
df	54	54
F	5.673703	
P(F<=f) one-tail	9.42E-10	
F Critical one-tail	1.570884	

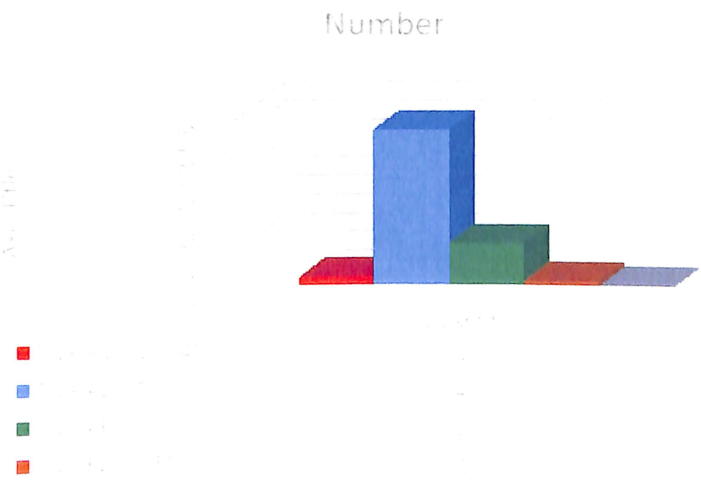
Table 4.4 t-Test:2 Sample Assuming Unequal Variances

t-Test: Two-Sample Assuming Unequal Variances		
	Variable 1	*Variable 2*
Mean	87.49091	36.16364
Variance	155.662	27.43569
Observations	55	55
Hypothesized Mean Difference	0	
df	72	
t Stat	28.13119	
P(T<=t) one-tail	7.08E-41	
t Critical one-tail	1.666294	
P(T<=t) two-tail	1.42E-40	
t Critical two-tail	1.993464	

4.3 Analysis

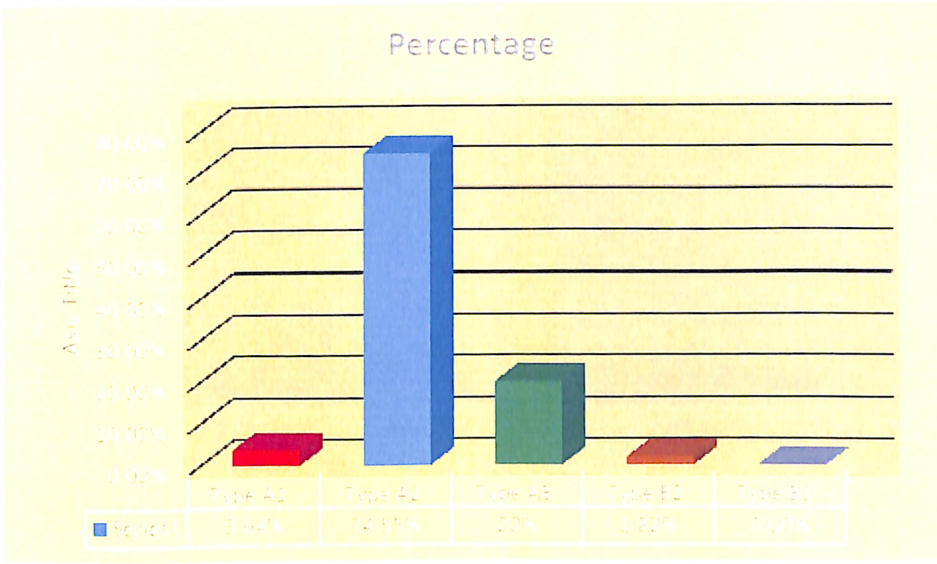
4.3.1 On studying the scores for total scores following data emerged as per Glazer Stress Control Lifestyle Scoresheet. The scores have been reflected as per the interpretation ranging from Type A1 to Type B1.

Graph 4.1 Glazer Stress Control Lifestyle Scoresheet (Number : Analysis)



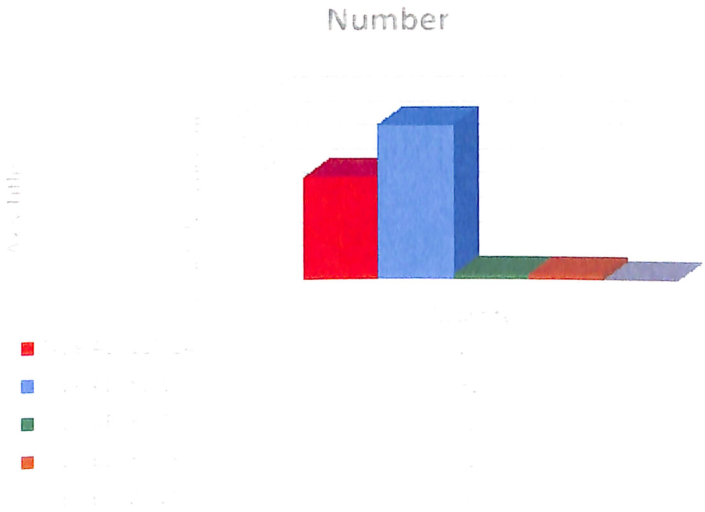
4.3.2 The same scoresheet was thereafter interpolated into percentage to give an indication of the studied population as to which Type are they falling in towards analysing the effects of stress.

Graph 4.2 Glazer Stress Control Lifestyle Scoresheet (Percentage :Analysis)



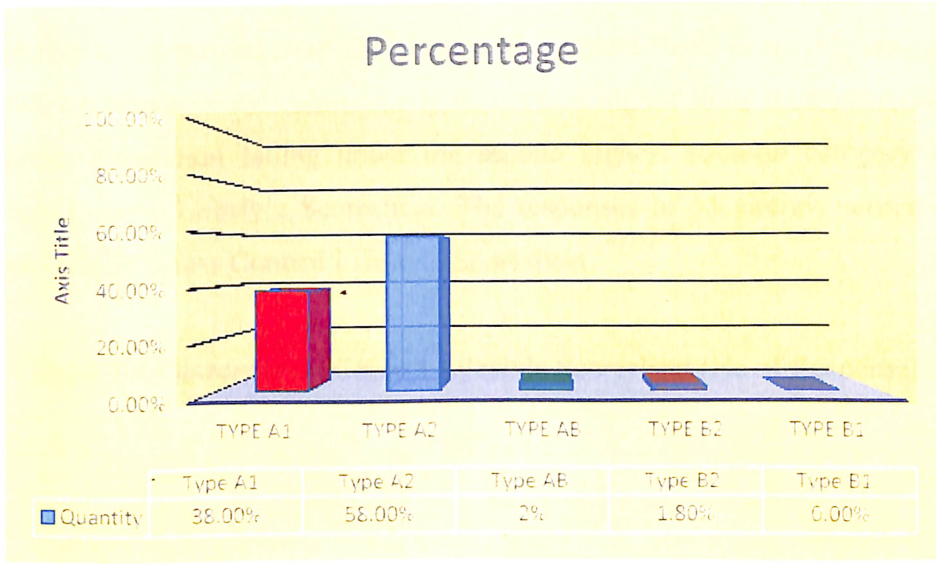
4.3.3 A similar study was carried out for the scores on the set of questions obtained on the set of question following data emerged as per Glazer Stress Control Lifestyle Scoresheet. The scores have been reflected as per the interpretation ranging from Type A1 to Type B1.

Graph 4.3 Glazer Stress Control Lifestyle Scoresheet (Analysis : Set of 7 Ques)



4.3.4 The same scoresheet comprising of the set of 7 questions was thereafter interpolated into percentage to give an indication of the studied population as to which Type are they falling in towards analysing the effects of stress.

Graph 4.4 Glazer Stress Control Lifestyle Scoresheet (% Analysis : Set of 7 Ques)



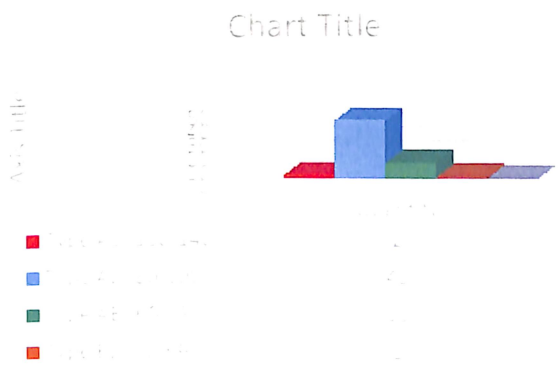
CHAPTER V

INTERPRETATION OF RESULTS

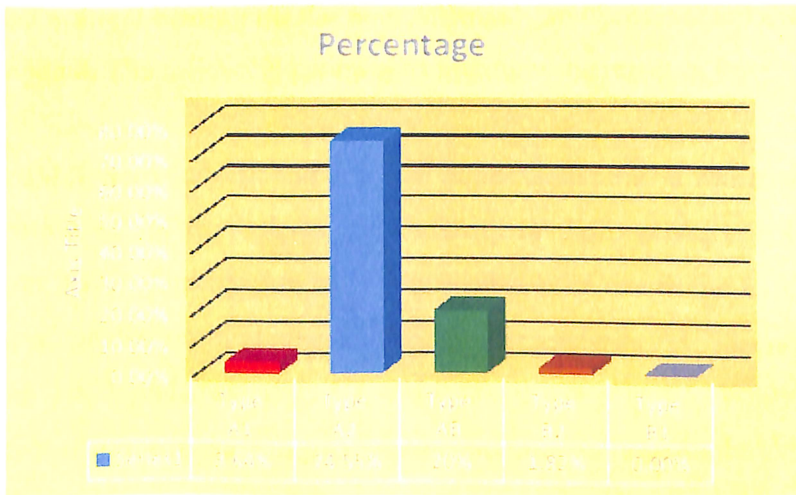
5.1 Interpretation of Results

5.1.1 The response obtained from the aircrew of different fleets or service seniority or age group or cadre resulted in one commonality which was higher stress levels thereby resulting into maximum population falling under the second highest stressful category as per the Glazer Stress Control Lifestyle Scoresheet. The responses of 55 aircrew scored as per the guidelines of Glazer Stress Control Lifestyle Scoresheet.

Graph 5.1 Glazer Stress Control Lifestyle Scoresheet (No of Responses)



Graph 5.2 Glazer Stress Control Lifestyle Scoresheet (Percentage)



5.1.2 On studying the responses under Graph 5.1, it was revealed that out of a studied population of 55 respondents, the majority of the population lay in the A2 Category. The distribution of population in numbers was 2 under category A1, 41 under category A2, 11 under category AB, 1 under category B2 and 0 under category B1. As it is evident the majority lies in A2 category which is the second highest category in the stress measurement scale thereby signifying the higher stress levels of the studied population.

5.1.3 The same result was thereafter converted into percentages so as to clearly bring about the distribution of population under different sub categories of the stress scale as shown in Graph 5.2. The result brings out the fact that about 75% of the population lies in the A2 category signifying higher levels of stress factor. The combined percentage of A1 and A2 category goes beyond 75% mark. However it is also seen that about $1/5^{th}$ of the population is falling under category AB which signifies that a significant percentage of population has managed to control their levels of stress while performing as per the guidelines or demand of the military organization.

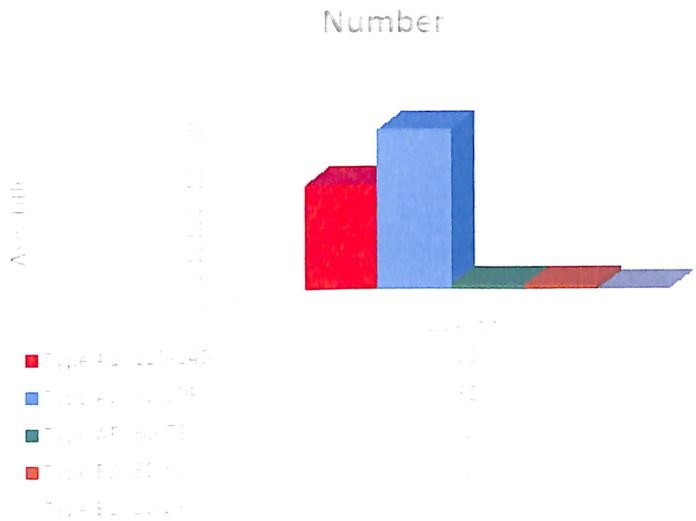
5.1.4 Summarizing the result as per Glazer Stress Control Lifestyle Scoresheet we can clearly say that the military aircrew is under higher levels of stress despite their differences of being in different fleet, branch, age, service seniority and cadre.

5.1.5 To have a better understanding of the stress levels and the demands of the military environment certain set of questions (as discussed earlier) were studied separately to specially bring to light the aspect of undeterred dedication and professionalism of the military aircrew. The seven questions decided among the total of the listed 20 questions were decided on the fact that they had a direct bearing on the work demands and professional dedication desired out of each individual. The following paragraphs highlight the result of the study.

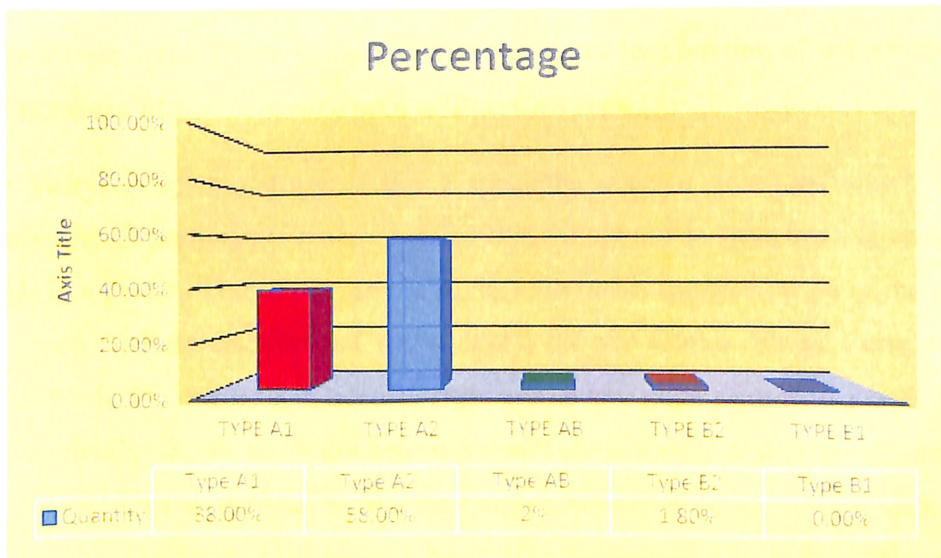
5.1.6 The responses were collated and depicted under Graph 5.3. It was revealed that out of a studied population of 55 respondents, the majority of the population still lay in the A2 Category however it was alarming that there was a substantial rise in the A1 category as well. The distribution of population in numbers was 21 under category A1, 32 under category A2, 1 under category AB, 1 under category B2 and 0 under category B1. While the majority of the studied sample still lies in A2 category there is definite increase in the A1 category and a severe depletion of sample under AB category. A1 and A2 categories are the highest

categories of stress as per the stress measurement scale thereby signifying the higher stress levels of the studied population. The graph clearly shows that the majority of the population now lies in the highest bracket of stress. This shows the fact that, despite being only 1/3rd of the complete questionnaire, the stress created by organizational demands of dedication and unparalleled professionalism forms a key element in increasing the stress levels of the military aircrew.

Graph 5.3 Glazer Stress Control Lifestyle Scoresheet (Number : Set of 7 Ques)



Graph 5.4 Glazer Stress Control Lifestyle Scoresheet (Percentage: Set of 7 Ques)



5.1.7 The results were thereafter interpolated into percentages of population under different categories as per Graph 5.4. It is clearly evident that the majority of the population amounting

to about 60 % still lies in A2 category, however there is a definite increase in the percentage of population falling under A1. If the percentages of categories A1 and A2 are combined, the result shows an astounding quantity of 96%. There lies a huge decrease in AB category as compared to Graph 5.2. As mentioned earlier the demand of a military aircrew to carry out his duty without leaving any margin of error and utmost dedication to service, brings about a compounded volume of increased stress in an individual. The drop in category AB is pronounced due to the reason that the aircrew performs his/her task with utmost professionalism and takes their job seriously to a level where there is no scope of error.

5.2 Comparison of Results with Assumptions (Hypotheses)

5.2.1 ***Hypothesis – I*** **: There will be significant stress in the military aircrew due to inherent hazard of the occupation.**

5.2.2 The responses received from the aircrew indicates that majority of the sample is under higher levels of stress thereby falling in the second highest category of A2 as per Glazer Stress Control Lifestyle Scoresheet. Even percentage wise about 75% of the studied sample is at higher risk level. The sampling included a varied or random set of population which included aircrew from different fleet, branch, cadres, age group and service seniority. The result therefore clearly highlights the stress level on a military aircrew. Hence this goes with the hypothesis that there is significant stress in military aircrew due inherent hazard of the occupation.

5.2.3 ***Hypothesis – II*** **: The responsibility of being the last bastion of the nation bestows an added pressure of performance on a military aircrew.**

5.2.4 On carrying out the study of the 7 specially selected questions which depict the working ethos of an individual, it was revealed that these have a direct bearing on the overall stress levels in a person. Out of the sample of 55 individuals (aircrew) 96% of the population fell in the two highest category of stress levels as per Glazer Stress Control Lifestyle Scoresheet. While the result have been interpolated in the same ratio as the complete set of questions, it clearly shows an overwhelming result of inducing higher stress levels in the military aircrew. This is applicable despite random selection of the sample comprising of different service seniority, age group, fleet, branch and cadre. Hence this goes with hypotheses that, the responsibility of being the last bastion of the nation bestows an added pressure of performance on a military aircrew.

CHAPTER VI

CONCLUSIONS AND SCOPE FOR FUTURE WORK

6.1 Conclusion

6.1.1 Our nervous responses can be traced back to the prehistoric caveman. Imagine a caveman sitting near a small fire in the comfort of his cave. Suddenly in the light of his fire, he sees the shadow of a saber-toothed tiger. His body reacts instantly. To survive the caveman had to respond either by fighting or running. A complex part of our brains and bodies called the autonomous nervous system prepared the caveman for "fight-or-flight". The caveman lived in the jungle or the wilderness and faced many environmental stressors. Often these were immediate, life threatening events involving dangerous animals or human enemies. For the caveman, this fight-or-flight response was very valuable for survival. To conclude we have analysed the definition and meaning of the term stress as something that has a disturbing physiological or psychological influence which produces a state of severe tension in an individual. We tried to understand stress in relation to military aviators by identifying the stressors in peace time like performance anxiety, time management, family time, financial factors and during war like fear of death and separation from loved ones. Having classified stress in terms of peace time stress and stress during combat flying we also analysed the physiological/chemical processes associated with stress.

6.1.2 This leads one to the conclusion that it is the emotional stress which is self consuming and detrimental to health. We inferred that in the twentieth century, especially for the military aviator, our fight-or-flight and emotional stress mechanisms are often both unnecessary and harmful. We also understood the relationship between stress and cognition which explains the adverse effect of stress on the behaviour of military aviators under stress and in emergencies or other abnormal situations. The physical, emotional, behavioural, cognitive and medical symptoms of stress were also delved into to aid in the recognition of stress as this would be the first step in terms of stress management. Various methods of coping with stress with special reference to military aviators, like behavioural change, relaxation, yoga/ meditation, imagery training, communication and efficiency in workplace, were also discussed.

6.1.3 At the end we carried out an analysis based on the response received from a randomly selected individuals of the same fraternity (military aircrew) wherein the selection was random in terms of fleet, branch, age group, service seniority and cadre. This group of 55 participants were subjected to Glazer Stress Control Lifestyle questionnaire comprising of 20 questions. The study was broken down into parts, firstly to study the overall average response of the sample as to which category of stress do they fall in as per the scoresheet given under Glazer Stress Control Lifestyle questionnaire. Secondly owing to the demands of the organization the individuals are demanded to perform their duty with utmost dedication leaving no margin of error, thereby adding higher stress levels. A descriptive analysis was done followed by graphical representation of the results obtained. The study clearly revealed that majority of the population fell under higher categories of stress levels. However it must be understood and also previously covered that military aviation demands certain amount of inherent stress to be existent in an individual. This not only helps in taking appropriate decision but also empowers him to perform appropriately in unknown situations, especially in actual operations. The aircrew needs to be trained under organized stress conditions so as to make him combat effective and be ready to react in adverse and unfamiliar conditions. Having said that there is no denial that there must also exist a remedial measure that needs to be undertaken by the organization as a whole to alleviate the individual to fall in the trap of unwarranted stress. The commander must make adequate and timely efforts to relieve the potential candidates who are likely to go under stress and perform inappropriately or become a threat to the organization itself.

6.1.4 Commanders may hold of seminars to sensitize military aircrew on issues of stress, hiring stress management professionals, posting trained doctors to all flying units, promoting an efficient work culture, adequate leave and pay commensurate with changing times. The lone military aircrew on his part must aim to recognize his own potential and manage the stress levels by employing various methods like Yoga, communicating with his subordinates/ superiors so as to make them apprise of his state and using stress management techniques. This can only happen if he understands and recognizes the effects that become visible as an individual starts spirally down in the trap of stress. He needs to give adequate importance to his health while giving due importance to his duty. It is my sincere hope, being a military aviator myself, that my research will help the present and future generations of military aviators to recognise stress, analyse its causes and manage it effectively using stress

management techniques. In this manner one of the most critical and insidious dangers of military aviation would have been addressed.

6.1.5 Based upon the deliberations carried out so far I would like to make certain recommendations to reduce/manage stress amongst the fraternity of military aviators. But before I do so it would be pertinent to understand that these recommendations will not be a magic pill nor will they be drastically different from those applicable to any normal human being across the board, because after all military aviators, whatever their work environment, are still first and foremost human beings.

(a) Respective military organisations must recognise the very real threat of stress as a silent killer and take the first step of sensitising its military aircrew towards recognising and managing stress by holding regular seminars on this subject.

(b) Having done that the next step for the military organizations would be to institutionalise the stress management programme by hiring professionals to impart stress management training in terms of Yoga, Relaxation techniques and imagery training, at the field level so that all military personnel and indeed all the military aviators can benefit from it.

(c) Doctors (preferably aviation medicine specialists) trained in psychological counseling should be necessarily posted to all the flying units. These doctors should have to mandatorily fly a certain number of sorties per month, in the Squadron, to keep them abreast of the stress being faced by the pilots. These doctors should also carry out a quarterly psychological stress evaluation of the Squadron pilots and forward a report of the average stress levels of the Squadron pilots to the higher authorities. This report could also form the basis of evaluating the management skill level of the Squadron Commander and his Flight Commander.

(d) The Military organization could also promote some of the beneficial work culture of the corporate world, which stresses upon the efficiency and quality/output of work rather than the number of hours of work put in. To successfully accomplish any task, it is necessary not only that you should give it the best there is in you, but that you should obtain for it the best there is in those under your guidance. All round

efficiency and better time management will reduce stress levels. Ensuring the aircrews get enough leave time would be another way of distressing them.

6.2 Scope for Future Work

6.2.1 The above study was a stepping stone towards future studies that could be carried out understand these nuisances which are more often forgotten or not understood. Following suggestions are mentioned below which may be incorporated in future:

(a) The present study was delimited to only 55 randomly selected aviators comprising of varied age group, service seniority, branch, fleet and cadre. It can be replicated by taking larger samples from a similar set of individuals or randomly selected individuals.

(b) The present study was delimited to only a two bases. It can also be conducted for increased number of bases and branches/trades.

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