

Morbidity Patterns of Naval Aviators in a Naval Helicopter Base

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Abstract

The medical standards for fitness of naval aircrew are laid down in NO (Spl) 01/08 for entry and NO 17/2004 for Annual Medical Examination and are primarily based on IAP 4303, Manual of Medical Examinations and Medical Boards (4th Ed revised) These standards are more stringent in nature vis a vis a non aviator, keeping in view the high physical and mental demands of military flying. This leads to greater periods of unfitness and medical wastage of aircrew when faced with any medical condition. An analysis of medical evaluation data provides insights into the morbidity pattern among a particular professional group. This paper retrospectively examines the morbidity patterns in helicopter aircrew of a frontline naval helicopter base of the Indian Navy from the year 2000 onwards. A total of 120 different cases of low medical categorization were analyzed. The tabulated data includes diagnostic category, specific diagnosis, age group and flying category. The analysis reveals that the maximum number of disqualifications took place in the 31-35 years age group, while the >50 years group had the least number of cases. Diseases of the musculoskeletal system comprised the bulk of the cases (54%), followed by systemic diseases (16%). 74 cases (61.6%) were awarded various temporary LMCs while 46(38.3%) were awarded permanent categories. The preventive mechanisms of strict annual and periodical medical examinations of aviators ensures low morbidity rates, however with changing lifestyles and increasing operational pressures there is a requirement of additional screening safeguards against spinal disorders, hypertension and lifestyle disorders. The study findings reiterate the requirement of a specific waiver system for all aero medical cases in the Navy and a need for data warehousing of all such cases.

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Introduction

Military flying is a stressful and highly demanding profession that requires highest levels of mental and physical fitness. The aircrew involved is a highly skilled and physically fit group trained at a very high cost. Most naval aviators complete their flying careers without any significant health issues however, the aviators are a part of the general population and cannot be totally shielded from the health risks associated with day to day life, but unlike normal individuals, their medical condition can lead to a prolonged period of unfitness and total or partial isolation from their professional environment. Therefore the emphasis of their health care should be a holistic approach consisting of preventive management, discovering trends and controlling a disease in an early stage so that the disease process can be arrested quickly and a clinical finality be

reached for quick reassessment of the health status for further utility in the flying profession.

The medical standards for fitness of naval aircrew are laid down in NO (Spl) 01/08 for entry and NO 17/2004 for Annual Medical Examination and are primarily based on IAP 4303, Manual of Medical Examinations and Medical Boards (4th Ed revised)[1]. The basic tenets of these standards follow the principle of reducing medical wastage of trained personnel with an eye on safety of the man and the machine. An analysis of medical records provides insight into the morbidity pattern among a particular professional group [2]. The findings can then be applied towards preventive countermeasures aimed at reversing these trends. This paper presents a review of the medically

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disqualifying conditions of 120 naval aircrew (pilots, observers and aircrew divers) over a ten year period in a frontline helicopter base of the Indian Navy.

Methods

The data for this study was obtained from archived medical board records (AFMSF15) of 120 male naval helicopter pilots, navigators and aircrew divers posted to a Naval Air Station in Maharashtra. Records during the period Jan 2000-May 2010 was collated for the analysis. Guidelines laid down in NO (Spl) 01/08 and IAP 4303 was used for nomenclature of Low Medical Category (LMC) for flying duties only, Shore/Ashore category was not considered for analysis. Information available for each aircrew included date of birth, medical diagnosis and medical category. The tabulated data includes diagnostic category, specific diagnosis, age group and flying category. Medical categories in cases, where there was a progression of the LMC into a higher or lower medical category through the tenure of the aircrew, the latest medical category was considered for the analysis. The subjects were divided into age groups depending upon the date of the latest cat/recat board. Non flying and technical personnel were excluded from the study. Inability to follow up cases where the aircrew was transferred out of the unit in a low flying category can be considered a limitation of the study.

Results

A total of 120 different cases of low medical categorization were analyzed. Out of these there were 62 pilots, 40 observers and the rest were Air Crew Divers (ACDs) (Fig 1). The distribution of cases by disease category, diagnosis and age group is provided in Table 1. The analysis reveals that the maximum number of disqualifications took place in the 31-40 years age group, while the >50 years group had the least number of cases. Diseases of

the musculoskeletal system (including spinal conditions) comprised the bulk of the cases (54%), followed by systemic diseases (16%). 74 cases (61.6%) were awarded various temporary LMCs while 46 (38.3%) were awarded permanent categories (Table 2).

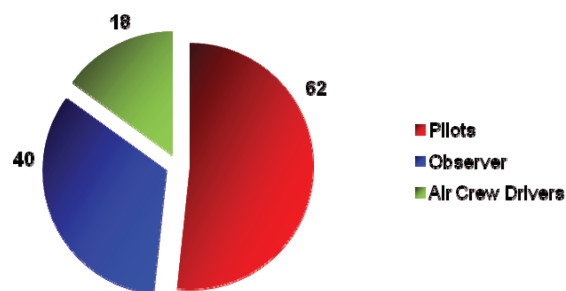


Fig 1: Distribution of Low Medical Air Crew

In the musculoskeletal system, traumas and injuries were the cause for 66% of the cases while spinal conditions made up the other 34%. Within the subgroup of traumatic injuries the most common diagnosis was soft tissue injuries and the age group of 31-40 years was found to be most vulnerable. In the subgroup of spinal injuries PIVD and Low back ache were the major causes of medical categorizations. In this subgroup also the majority of cases were found in the age group 31-40 years. In musculoskeletal system disease category there were a total of 43 (66%) temporary categorizations and 22(34%) permanent categorizations (Table 2). In the temporary categories, 14 (32.55%) were awarded a non flying category, 16 (37.2%) a restricted flying category and 13 (30.2%) aircrew were allowed to fly in a full flying LMC with minor restrictions (Fig. 2). In the permanent categories, 3 (27.2%) were given a non flying category in the spinal condition sub group only, while there were 4 (36.36%) and 6 (54.54%) cases of restricted flying category in the trauma subgroup and spinal conditions subgroup respectively (Fig 3). However most cases of soft tissue injuries were upgraded to a full flying category

and there were no permanent category awarded for fractures and dislocations.

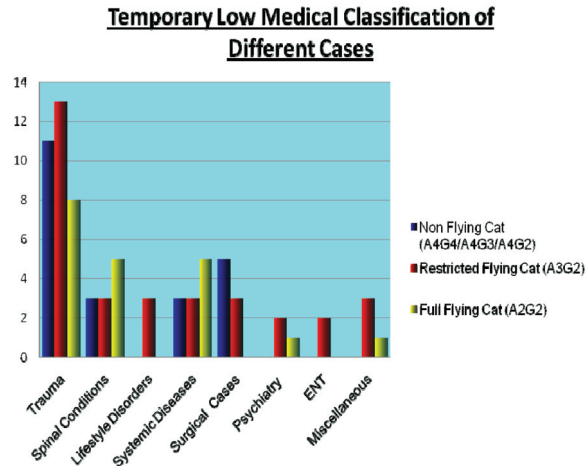


Fig 2: Distribution of Temporary Low medical Classification

In the systemic disease category (Table 1) primary hypertension was the reason for down gradation of 10 (52%) out of the 19 cases, mainly in the 41-50 years age group (n=7). ECG abnormalities comprised the next major diagnosis comprising of 4 cases, although the abnormalities weren't clustered in a particular age group. Lifestyle disorders formed 6.66% of the total number of cases wherein the majority were downgraded for various degrees of obesity with metabolic/biochemical abnormalities (n=6) (Table 1).

This diagnosis formed a major cluster with all 08 cases (100%) belonging 31-40 years age group. Other diagnoses that comprised of the systemic disease criteria are shown in Table 1. 11(57.8%) of the cases were awarded temporary categories with majority being able to retain their flying status (68%) (Fig 2).

The trends for other diagnosis and clinical conditions are also reflected in Table 1 and respective medical classification has been depicted in Table 2 and Fig 2&3 respectively.

Permanent Low Medical Classification of Different Cases

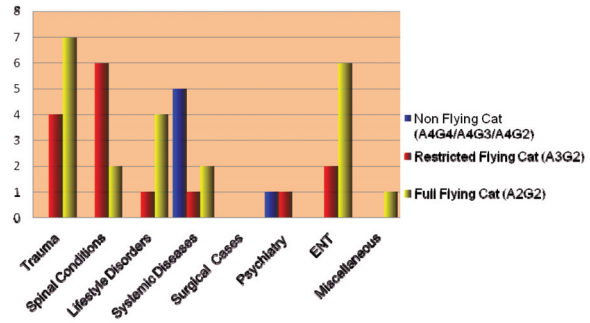


Fig 3: Distribution of Permanent Low medical Classification

Discussion

The impact on flying operations because of medical wastage of manpower is immense. Non availability of trained personnel impacts both readiness and operational effectiveness [3]. The Indian Navy devotes great financial and medical assets to identification and evaluation of Naval aircrew who have been grounded from flying duties for medical conditions thought to be dangerous to the flying mission or personal safety. Aerospace Medical Specialists also play a key role in evaluation and treating pilots and other aviators with an aim of making an aeromedical determination regarding return to flying.

The whole endeavor is to sustain an important strategic asset for reasonable amount of time and return him back to the cockpit without compromising safety. However in certain cases the aeromedical decision making process takes time due to the clinical condition of the individual and results in permanent grounding of the aircrew. Individuals selected in the aviation arm of the Indian Navy are subjected to initial aviation medicals at IAM, IAF Bangalore as per guidelines laid down in IAP 4303[1]. The screening medical tests are quite stringent and generally weed out conditions not compatible with safe flying. A study conducted on pattern of medical

Cases (n =120)	Age Group (Years)				TOTAL
	21-30	31-40	41-45	>50	
Musculoskeletal System					
Fractures (Upper extremities)	4	5			9
Fractures (Lower extremities)	2	5			7
Soft tissue injuries	3	13	1		17
Dislocations (Upper extremities)	3	2			5
Dislocations (Lower extremities)	1	4			5
Total	13	29	1		43 (35.83%)
Spinal Conditions					
PIVD		5	3	1	9
Low Back Ache (LBA)	1	6	1		8
Cervical Spondylosis	1	3	1		5
Total	2	14	5	1	22(18.33%)
Life Style Disorders					
Obesity with Dyslipidaemia		6			6
Alcohol Dependence Syndrome		1			1
Non Alcoholic Fatty Liver Disease		1			1
Total		8			8(6.66%)
Systemic Diseases					
Primary Hypertension (Primary HTN)		3	7		10
Syncope		1	1		2
ECG Abnormality		3	1		4
Thalassaemia Minor		1	1		2
Hypertrophic Cardio Myopathy			1		1
Total		8	11		19 (15.83%)

conditions resulting in disqualification among National Defence Academy (NDA) candidates revealed a 36.2% disqualification rate [4]. Although the study was based on IAF statistics it can be easily applied to the Naval scenario, therefore the general pilot population is fit and healthy. This fact is also reflected in this study, it was found out that the average rate of LMC was 10%. However, it is to be noted that this figure also included aircrew in med category A2G2, which for a Naval aircrew flying from ship borne helicopters can be compared

with full fitness. The study shows that the majority of disqualifications were due to musculoskeletal problems. The high percentage of fractures and dislocations especially in the 21-30 age group is caused by higher risk taking attitude of younger pilots, preferences and social pressures of an urban lifestyle. In the older age groups however spinal conditions esp. lower back aches and PIVD predominates which is attributed to poor ergonomics of the Chetak helicopters [5]. This was an expected finding as the high prevalence (77.8%) of LBA in

Indian Naval pilots is well established [6]. Primary HTN forms the major reason of low medical classification of the aircrew in the systemic diseases category. Hoiberg [7] in his study on cardiovascular diseases among US Navy pilots found out 44 (n=150) cases of essential hypertension amongst over a 12 year period. In this study the figures are much less for primary hypertension alone, however when the figures are clubbed with lifestyle diseases (major contributory factor towards CVS disorders) the findings are comparable. McCrary and Van Syoc in their study on permanent flying disqualifications of USAF pilots and navigators found the most common diagnoses in flight disqualification as CAD, HTN, Degenerative Spinal disease and DM. Lifestyle disorders in this study was grouped as a separate diagnostic category, 6.66% of the cases fell in this category, it should be noted that obesity and alcohol dependence is highly underreported (8). Sharma in his study on angiographic profile of civil and military aircrew found 52% of patients with poor lifestyle choices and multi factorial risk factors (9). An obese and/or alcohol dependent aircrew with poor levels of physical fitness is a bane to the aviation system of high safety culture. Psychiatric disorders were also a diagnostic category in this study comprising of 4.16% of the total cases. It did not constitute larger numbers but the range of diagnosis was varied and interesting (Table 1). Aviators are a unique occupational group in terms of their selection, training, lifestyle, frequent competency and medical checks, as well as the nature and changing demands placed on them that can affect their mental health in the long term [10].

The study also analyzed the different unfitness restrictions awarded to the aircrew in the different disease categories. The majorities (61.6%) were placed at various levels of temporary unfitness that included non flying, restricted and full flying categories (Table 2 & Fig 2).

However there wasn't a significant loss of aircrew hours as most of the cases were in either a restricted or a full flying category. The permanent category comprised 38.3% of the cases and again the trend showed a tendency to prevent total medical wastage. During analysis of the cases it was found in certain cases there was a definite case for shortening or prolonging the period of LMC but due to a lack of specific waiver system esp. in cases of injuries and lifestyle disorders the final decision was subjective and open to interpretation.

Conclusion

The preventive mechanisms of strict annual and periodical medical examinations of aviators ensures low morbidity rates, however with changing lifestyles and increasing operational pressures there is a requirement of additional screening safeguards against spinal disorders, hypertension and lifestyle disorders. The Indian Navy follows aviation medical standards based on criteria's set by the Indian Air Force and final tertiary referral centers for aviation cases (for all major conditions) rests with the IAF institutions. The present system is quite good as can be seen from the above mentioned morbidity patterns, however unlike the USAF or the US Navy a specific waiver system encompassing all possible manifestations of clinical conditions does not exist in our system, making qualitative analysis difficult for the aeromedical decision makers. There is also scope for data warehousing of all aviation LMC cases in one center of the Navy so that the database can be used for analyzing trends in epidemiological profile of all aviators and help in revising policies and introducing newer preventive measures.

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