Original Article

Retrospective Analysis of Disabilities during Initial Medical Examination of Aircrew Applicants in the Indian Army

Sahu S[*], Sasirajan J[+]

ABSTRACT

All aircrew in the Indian Armed Forces undergo a stringent medical examination during entry either at the Institute of Aerospace Medicine (IAM) or Air Force Central Medical Establishment (AFCME). The medical standards for various categories of aircrew duties have been stipulated in Indian Air Force Publication 4303 and apply to all the three defence services. Aircrew applicants in the Indian Army are in-service candidates with about four years of service while compared to the younger aircrew applicants of Indian Air Force (IAF) and Indian Navy (IN). Periodic analysis can provide insights into the nature of disabilities that lead to medical unfitness during such examination. While studies on aircrew applicants for IAF and IN personnel are available, there has been no study on Indian Army personnel undergoing initial aircrew medicals at IAM. This study was therefore carried out to analyse the disabilities detected during the initial medical examination of Indian Army aircrew applicants at IAM. Records of all candidates undergoing medical examination are maintained at Medical Evaluation Centre (MEC) in IAM. These records of aircrew medical examinations for the period 2003 to 2007 were included for analysis. All service aircrew candidates undergo the entire sequence of medical examination as per IAP 4303 irrespective of disability being detected at any stage of examination. A comparison of disability pattern with other services initial aircrew applicants (IAF and IN) using data from similar few studies was carried out. A total of 212 Indian Army officers underwent the initial aircrew medical examination. The mean age of these applicants was 26.1 years (range 24-30 years). Of these, 72 (33.9%) were declared permanently unfit. The total number of disqualifying disabilities were 91. The two leading causes for unfitness of these applicants were radiological spinal abnormalities (n=35, 38.5%) and ENT conditions (n=23, 25.3%). Of the spinal abnormalities, compression fracture was the leading cause which was comparatively higher when compared to aircrew applicants of other service. This could be attributed to the field posting in the initial years of service of the Indian Army personnel, predisposing to strenuous work and trauma. Further analysis has shown that among the candidates disqualified due to spinal anomalies, the degenerative conditions such as spondylosis, spondylolysis and Schmorl's nodes accounted for about 57.2% which is higher compared to IAF aircrew applicants and almost similar to IN aircrew applicants. Indian Army aircrew applicants being in-service candidates have a varied disability pattern when compared to other aircrew applicants of IAF and IN. Implications of these disabilities vis-à-vis fitness for aircrew duties and a possible review of policies are discussed in this study.

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KEY WORDS: In-service candidates, medical examination, disability pattern

Introduction

All applicants for aircrew duties in the Indian Armed Forces, including Indian Army, undergo a stringent medical examination during entry either at the Institute of Aerospace Medicine (IAM), IAF or Air Force Central Medical Establishment (AFCME). The medical standards for various categories of aircrew duties, as stipulated in IAP 4303 [1], apply to all the three defence services. Periodic analysis can provide insights into the nature of disabilities that lead to medical unfitness during such examination and provide support or otherwise for medical policies. While studies on candidates for IAF and IN are available [2, 3], there has been no study on Indian Army aircrew applicants undergoing initial aircrew medicals at IAM. This study was therefore carried out to analyse the

[*]Graded Specialist & Asst Professor (Aerospace Medicine), IAM, IAF, Bangalore-560017

[+]*MD (Aerospace Medicine)*

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disabilities detected during the initial medical examination of Army aircrew applicants at IAM. Records of all candidates undergoing medical examination are maintained at Medical Evaluation Centre (MEC) at IAM and were available from 2003 to 2007. A total of 212 Army officers underwent the initial aircrew medical examination out of which 72 (33.9%) personnel were declared medically unfit. The mean age of these personnel was 26.1 years (range 24-30 years). The two leading cause for unfitness of these applicants were spinal abnormalities (n=35, 38.5%) and ENT conditions (n=23, 25.3%). Of the spinal abnormalities, compression fractures were the leading cause. Implications of these disabilities vis-à-vis fitness for aircrew duties and a possible review of policies are discussed.

Material and Methods

Records of all medical examinations carried out at IAM are maintained at the MEC. These records for Army candidates who underwent their initial aircrew medical examination were accessed and retrieved for analysis. Records from January 2003 to December 2007 were included for analysis. All the candidates undergo a full sequence of medical examination as per IAP 4303 irrespective of the disability being detected at any stage of the examination. In candidates with multiple disabilities, only those conditions that were the cause for permanent unfitness were included in the study.

Results

A total of 212 male Indian Army candidates underwent their medical evaluation for aircrew duties in this period. A total of 72 (33.9%) candidates were rejected permanently on medical grounds. Of these, 62 (86.1%) had a single disability while 10 (13.9%) had multiple disabilities, the total number of disqualifying disabilities being 91. 11 (5.2%) candidates were found medically fit but were declared unfit for ejection seat aircraft.

The mean age of the applicants was 26.1 years (range 24-30 years). The detailed analysis of disabilities categorised system-wise is given in Table 1. Spinal disabilities accounted for most of the rejections (38.5%), followed by otorhinolaryngological disabilities (25.3%), which were mainly audiometric hearing loss.

Of the spinal anomalies leading to unfitness for aircrew duties (Table 2), compression fracture (37.1%) and spondylosis (34.3%) accounted for more than one third each followed by Schmorl's node in another one sixth (17.2%). Lumbarisation/ sacralisation and spondylolysis of the spine were some of the other common spinal conditions not compatible with flying duties. Some applicants had more than one spinal anomaly on radiology accounting to the total spinal anomalies of 35.

Table 1: Leading causes for medical unfitness (n=91)

Disability	Number	% of Disabilities
Radiological Spinal Anomalies	35	38.5
ENT	23	25.3
Medical Conditions	10	10.9
Eye	9	9.9
Anthropometric Incompatibility	8	8.8
Surgical Conditions	4	4.4
Orthopaedic Conditions	2	2.2
Total	91	100.0

Table 2: Spinal abnormalities leading to unfitness (n=35)

Disability	Number	% of Disabilities
Compression Fracture	13	37.1
Spondylosis	12	34.3
Schmorls Node	6	17.2
Lumbarisation/ Sacralisation	2	5.7
Spondylolysis	2	5.7
Total	35	100.0

Table 3: ENT causes for rejection (n=23)

Disability	Number	% of Disabilities
Compression Fracture	13	37.1
Audiometric hearing loss	19	82.6
DNS	2	8.7
CSOM	1	4.35
Nasal synechiae	1	4.35
Total	23	100.0

ENT disabilities as a cause for medical unfitness are shown in Table 3 with audiometric hearing loss being the commonest (n=19) followed by DNS, CSOM and nasal synechiae. As already enumerated, ENT disabilities were the second leading cause of unfitness.

Steatohepatitis (n=5) was the major cause of unfitness among medical conditions followed by dyslipidemia as shown in Table 4.

Table 4: Medical causes for rejection (n=10)

Disability	Number	% of Disabilities
Steatohepatitis	5	50
Dyslipidemia	2	20
Pulmonary Kochs	1	10
Impaired Fasting Glucose	1	10
Obesity	1	10
Total	10	100

Of the ophthalmologic conditions, glaucoma was present in four candidates as shown in Table 5.

Substandard leg length (n=6) accounted for almost three fourths of the unfitness on grounds of anthropometric incompatibility (Table 6).

Table-5: Ophthalmological causes for rejection (n=9)

Disability	Number	% of Disabilities
Glaucoma	4	44.4
Myopic astigmatism	2	22.2
Unsafe color perception	1	11.1
Defective ocular muscle balance	1	11.1
Ptosis	1	11.1
Total	9	100.0

Table 6: Anthropometry incompatibilities (n=8)

Disability	Number	% of Disabilities
Substandard leg length	6	75
Substandard stature	1	12.5
Substandard sitting height	1	12.5
Total	8	100.0

Discussion

The present study is the first of its kind on aircrew applicants from the Indian Army and provides interesting insights into medical disabilities leading to rejection for aircrew duties. Important issues are discussed in the subsequent paragraphs.

(a) Spinal disabilities. Spinal disabilities were the leading cause for rejection of Army applicants for aircrew duties. It is pertinent to mention that these aircrew applicants undergo X-Ray of the complete spine. IAP 4303 stipulates the spinal anomalies/ disabilities that are not compatible with IAF duties/ aircrew duties and those that are compatible with aircrew duties. In the present study the rejection rate of 38.5% due to spinal abnormalities is more than that reported among applicants for the IAF (24%) but less than those of IN applicants (49.2%). Further analysis reveals that among the candidates disqualified due to spinal anomalies, compression fractures accounted for 37.1% which is much higher than other studies. Degenerative conditions such as spondylosis, Schmorls node and spondylolysis accounted for about 57.2% which is higher compared to IAF aircrew applicants and almost similar to IN aircrew applicants. The higher incidence of spinal fractures could also be attributed to field posting in the initial years of service of the Indian Army personnel, predisposing to strenuous work and trauma, since all Army aircrew applicants are in-service candidates with about four years of service. It is also pertinent to note that all the Army aircrew applicants were from the fighting arms (artillery, infantry, armoured and mechanised infantry), normally associated with increased physical exertion, postings in inhospitable terrain or working in vehicles associated with harsh vibration characteristics. Degenerative changes can be found in as much as 10 % of the general population between the ages of 20-29 years. The Royal Netherlands Air Force [4] finding of rejection of 20% of the aircrew due to the spinal anomalies is comparatively lesser than the rejection due to the spinal causes in the present study, most probably due to the lower age group of the candidates in their study. This area needs reappraisal, as it is possible that minimal degenerative changes could be compatible with flying duties. Also, the aircrew selection policy of the Indian Army probably needs a relook in terms of "catching them young" so as not to lose out on otherwise good candidates.

(b) ENT. Good hearing is a mandatory requirement for pilots to be operationally capable and ensure flight safety as well. In the present study, the single major cause of rejection was audiometric hearing loss (n=19) which is proportionally much higher than in the other studies. This could be explained by the occupational hazard of long-term constant loud noise/ sudden loud noise events to which the subject population is exposed (gun and artillery fire, high noise levels of armoured vehicles and other equipment).

(c) Medical Conditions. Common disqualifying medical conditions found in the present study (steatohepatitis and dyslipidemia) are a malady of present times and probably also point towards the type of diet consumed & lifestyle rations provided.

(d) Eye. Good visual acuity, ocular muscle balance and stereopsis are mandatory requirements for pilots to have good orientation during flying. In the present study the major causes of rejection were glaucoma, high myopia and astigmatism and are in consonance with similar studies in the IAF and IN.

(e) Anthropometry. Anthropometry is an important determinant of aircrew aircraft compatibility. Four measurements that are used as selection criteria for aircrew duties are standing height, sitting height, thigh length and leg length. These measurements are relevant for adequate clearance from the canopy and Main Instrument Panel, and to have good over-the-nose vision, besides being able to operate all the controls of the aircraft adequately. Standing height has no bearing as far as performance of flying duties is concerned. Since aircrew in the Army will not be involved in ejection (and hence clearance from the Main Instrument

Panel) as the initial training is done in non-ejection seat fighter aircraft (HPTs) followed by helicopters, it is possible that majority of these personnel made unfit could have safely fitted into their cockpits, despite disqualifying anthropometric measurements as per IAP 4303. It is important that these issues are relooked into at appropriate levels for designating different anthropometric standards for army aircrew applicants.

Conclusion

Almost two-fifth of all applicants for aircrew duties in the Indian Army are rejected on medical/ anthropometric grounds. This percentage is much higher than those for IAF and IN applicants. Hearing loss was the most common cause for rejection followed by compression fracture of spine and degenerative spinal conditions. Unlike the IAF where majority of the initial medical examination of aircrew candidates is carried out in the age group of 16-18 years, the Army candidates come for their medicals in the age group of 24-30 years, after serving about four years in harsh field conditions and other adverse environments in the initial years of service. It is likely that the increase in spinal disabilities and hearing loss may be the result of this age difference and exposure to harsh operating conditions. Hearing conservation measures being undertaken in the fighting arms of the Indian Army needs to be examined. The policy of sending only in-service candidates after a specified service period for Army aircrew duties also needs a relook. Single level/ minimal degenerative spinal conditions (eg spondylosis) may be compatible with aircrew duties and needs to be reviewed. The aptness of applying current anthropometry standards for helicopter aircrew needs to be debated.

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