Original Article

Retrospective Analysis of Initial Medical Examination of Women Candidates in the Indian Air Force: 2011 - 2013

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Abstract

The physical fitness standards of candidates for entry into Indian Air Force are very stringent. The medical standards for aircrew candidates have been specified in detail and are updated regularly. For entry into the Indian Air Force (IAF) as commissioned officers the medical standards are predominantly the same for women candidates as that for males. Institute of Aerospace Medicine (IAM) and Air Force Central Medical Establishment (AFCME) are the two centres who conduct the initial medical examination for such candidates. It has been seen by previous studies that there is a large rejection rate observed during the medicals at initial entry both for male and female candidates. Literature search did not reveal any published study in the IAF which compares medically disqualifying conditions for flying duties between male and female candidates. This study was therefore carried out to analyze the pattern of medical conditions resulting in disqualification among women candidates conducted at IAM and comparison with the male aircrew applicants. Medical examinations records carried out at the Institute of Aerospace Medicine are maintained at Medical Evaluation Centre. These records of women candidates from January 2011 to May 2013 were accessed for analysis in this study. A total of 231 candidates (182 for ground duty and 49 for aircrew duty) underwent their initial medical examination at IAM during this period. An overall rejection rate of 71% for aircrew and 47% for ground duty candidates was observed. Differences were observed, both in the percentage of rejections and disabilities between aircrew and ground crew. Refractive errors were the major cause of rejection in both the aircrew and ground duty applications. In the ground crew candidates it was followed by obesity, whereas, in the aircrew applicants the other common causes of rejection were anthropometric and spinal abnormalities. Anthropometric disqualifications were the third most common cause of rejections among the female aircrew (17%). Comparison with similar data of male aircrew applicants revealed a significant difference in the conditions causing permanent rejection between them.

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The Indian Air Force (IAF) opened her doors for women officers in early nineties by enrolling women in both aircrew and ground crew duties. Women aircrew are employed at present in helicopter and transport streams. Ground duty officers are commissioned in both technical and non-technical branches [3]. Initial medical examination for selected women candidates is carried out at the Institute of Aerospace Medicine (IAM) and Air Force Central Medical Establishment (AFCME).

Periodic analysis of data on medical examination can provide information regarding the nature of the disabilities causing rejection. It also provides inputs on the adequacy of the medical policies governing such medical examination.

Literature search revealed only a few studies on the causes of rejections of initial applicants in male and female candidates among aircrew applicants. Analysis of initial medical examination of aircrew applicants in Indian Air Force has shown that a significant number of male (36.2%) and female (55%) candidates were rejected for flying duty [2,3]. There is no published

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study till date which compares the cause of rejections due to medical grounds of male and female aircrew applicants. It is hypothesized that the pattern of cause of rejection in aircrew applicants is likely to be different between male and female candidates because of the significant difference in their stature and built. In view of this, the present study was conducted to analyze the data on the initial medical examination of women candidates in the IAF and comparing them with their male counterparts.

Material and Methods

The medical records of all initial medical examination of women candidates, from Jan 2011 to May 2013, were accessed for this study, from the Medical Evaluation Centre [MEC] at IAM. These records are available only for duration of two to three years. Records older than this are destroyed as per the directives of Air HQ. A comparative analysis was done with similar data from initial medical examination of male aircrew applicants in the Indian Air Force to understand the differences between the male and female aircrew applicants.

Results

A total of 231 women candidates (Ground duty N = 182, Aircrew N= 49) underwent their initial medical examination at this Institute during the period of study. The mean age was 21.6 ± 0.8 years (range 19 to 23 years). Of the 182 candidates for ground duties, 86 (47%) were found unfit whereas out of the 49 candidates for aircrew duties, 35 (71%) were rejected on medical grounds. Every candidate undergoes the full medical examination irrespective of any disability being detected at any stage ofthe examination. Some candidates had more than one disability. A total of 98 disabilities among ground duty candidates and 53 among aircrew candidates were found.

Majority of the unfitness of ground duty candidates were on account of ophthalmic (32%) and general physical conditions (32%). The details of the disabilities causing rejection and their proportional distribution are shown in Table 1 and Fig 1. Refractive errors (n=29) and obesity (n=19) were the two major causes of rejection.

Table 1: Disabilities among candidates for ground duty

Disability	No.	(%)
EYE	31	(32%)
Substandard vision	29	
Squint	2	
GENERAL PHYSICAL PARAMETER	31	(32%)
Obesity	19	
Underweight	2	
Substandard Stature	10	
MEDICINE	15	(15%)
Anaemia	3	
ECG Abnormality	6	
Valvular heart disease	2	
Miscellaneous	4	
GYNAECOLOGY	5	(5%)
Ovarian cyst	5	
SURGICAL	7	(7%)
Breast lump	2	
Cholelithiasis/polyp	2	
Miscellaneous	3	
UROLOGICAL	1	(1%)
Renal calculus	1	
MISCELLANEOUS	8	(8%)
Fracture vertebra	2	
Incomplete sacralization/		
Lumbarization	3	
Cobb's angle > 15°	1	
Anterior open bite	2	
UNFIT	86	
DISABILITIES	98	

Table 2: Disabilities among candidates for aircrew duty

Disability	No.	(%)
ANTHROPOMETRY	9	(17%)
Substandard height &leg length	9	
EYE	12	(23%)
Substandard vision	12	
GENERAL PHYSICAL PARAMETER	8	(15%)
Overweight	7	
Underweight	1	
MEDICINE	4	(7%)
Anaemia	1	
ECG Abnormality	1	
Miscellaneous	2	
ENT	1	(2%)
Hearing loss	1	
GYNAECOLOGY	3	(5%)
Ovarian cyst	3	
SURGICAL	2	(5%)
Cholelithiasis	1	
Miscellaneous	1	
UROLOGICAL	3	(6%)
Renal calculus	1	
Renal parenchymal Disease	2	
SPINAL DISABILITIES	9	(17%)
Incomplete sacralisation/ Lumbarization	5	
Spina bifida	2	
Loss of lordosis	2	
MISCELLANEOUS	2	(3%)
Cervical rib	1	
Hyperhydrosis	1	

Among the aircrew candidates also, substandard vision was the leading cause of rejection (n=12, 23%) followed by anthropometric and spinal Disabilities, 17% each of the total disabilities. The disabilities detected in aircrew Candidates are given in Table 2 and the system wise percentage of disabilities is given in Fig 2. As is evident from Table 2, lot of the candidates were unfit because of substandard anthropometric parameters (n=9, 17%).

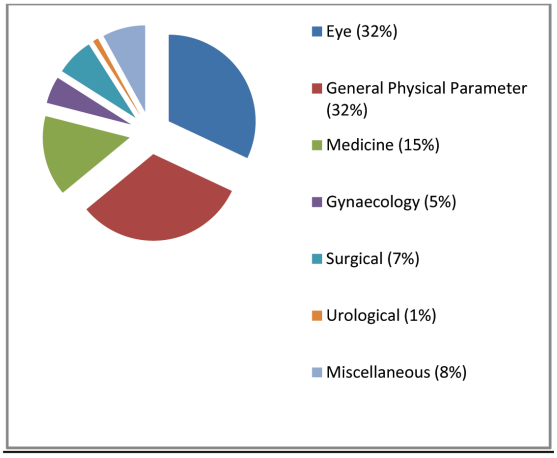

Fig 1: System wise distribution of disabilities: Ground duty candidates

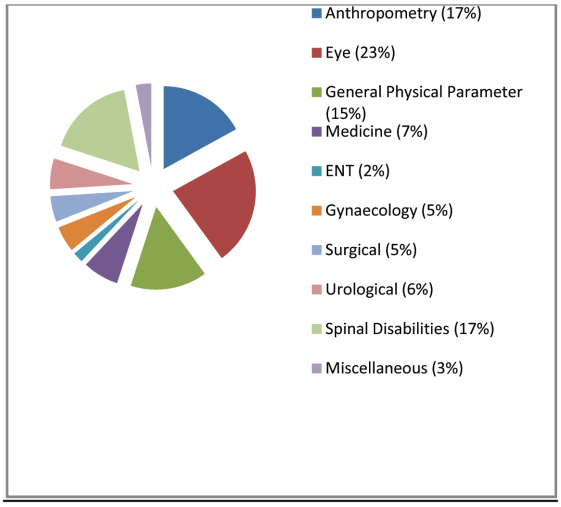

Fig 2: System wise distribution of disabilities: Aircrew candidates

Discussion

During the two and a half years covered under this study, half (52%) of the women candidates were rejected on account of various medical disabilities. This is a significant percentage as almost all the candidates reporting for medical examination were asymptomatic. This corroborates well with the stringent medical evaluation system of IAF. Similar findings have been reported by Khazaleh et

al who found a rejection rate (31.3%) among candidates on medical grounds in the Royal Jordanian Air Force (RJAF) [4].

The initial medical examination is intended to preclude from acceptance those individuals who are either unfit or likely to break down under the stress and strain of military service. It also ensures that each candidate fulfils the medical qualifying standards for her flying or ground career. The standards for fitness are the same for all branches except for aircrew whose visual acuity and anthropometric requirements are higher. Aircrew candidates are also required to undergo a full spine radiograph, which is not required for ground duty candidates [1].

Anthropometric standards reflect the stipulated anthropometric requirements for military aircraft of the IAF. For selection of aircrew duties, minimum stature of 162.5 cm, sitting height of 81.5 cm and leg length of 99 cm is mandatory [1]. Substandard anthropometric measurements were the second most common cause of rejection of aircrew candidates, accounting for 17% of the total disabilities. The minimum height required for aircrew duties is mentioned in the advertisements, which solicit their presentation for the examinations. It is surprising that in spite of this announcement, there were some candidates with substandard height.

A candidate is declared unfit on account of obesity if his/ her weight for height and age ismore than 20% above ideal. Obesity formed 13% and 19% of the total disabilities for aircrew and ground duty women candidates respectively. This rate of prevalence of obesity may reflect the societal trends on obesity.Towards minimising these rejections, it may be worthwhile to have the weight for height and age charts available on the IAF website. All aspiring candidates can access this to know their status. This will then give them sufficient time to reduce their weight and be within the required standards before they appear for the initial medicalexamination [3].

A candidate must possess normal visual acuity, ocular muscle balance, full field of vision and normal colour perception. Visual defects and ophthalmic conditions were the major cause of rejection and hence the importance of a thorough and accurate eye examination cannot be over emphasised. Visual defects formed 32% of the cause for ground duty candidate rejection. Similar proportions of ophthalmologic disabilities causing medical unfitness at entry have been reported in other studies on women candidates [3] and Jordanian Air Force [4].

The human spine is subjected to various stresses during flying. Pre-existing spinal deformity can get aggravated due to these stresses and lead to backache. Therefore, aircrew candidates are subjected to full spinal radiograph to detect spinal disabilities that are not compatible with flying duties. Spinal anomalies formed 10% of total disabilities in this study. Of these, congenital spinal anomalies and degenerative spinal conditions were equal in number. Similar proportions of degenerative and congenital spinal disabilities have been reported in a recent study [3].

From the above table, it is inferred that Ophthalmological conditions constituted the most common conditions for permanent rejection for both the male and female aircrew applicants. This shows the high visual standards laid down for flying duty. Refractive errors were the most common ophthalmic condition [males (76%) females (100%)] accounting for permanent disqualification. Second most common ophthalmological condition in males was defective colour vision (16%) which points to the higher prevalence of colour vision defects seen in male population.

Table – 3 Comparative analysis of the disqualifying conditions between male and female aircrew candidates

Male vs Female aircrew applicants			
S No	**Permanently Unfit Conditions**	**Male Applicant**	**Female Applicant**
1.	Anthropometry	14%	17%
2.	Eye	37%	23%
3.	General Physical Parameter	5%	15%
4.	Medicine	7%	7%
5.	ENT	9%	2%
6.	Gynaecology	NA	5%
7.	Surgical	3%	5%
8.	Urological	Nil	6%
9.	Spinal Disabilities	24%	17%
10.	Miscellaneous	1%	3%

Radiological spinal abnormalities have been seen to be the second most common condition responsible for disqualifications [males (24%), females (17%)]. In ground duty applicants of female candidates, it was seen to be only 6%. This can be explained on the basis of differences in medical screening standards for aircrew and ground duty applicants where the aircrew candidates are subjected to a full spinal radiograph.

Anthropometric disqualifications have been the third most common cause of rejections among both male and female candidates, males (14%) and females (17%). In a similar study by Venkatesh *et. al.* it was found that 26% of female aircrew applicants and 49% of the total disabilities leading to unfitness were anthropometric incompatibilities [3].The minimum stature requirements for the aircrew in the IAF are the same for both male and female candidates. Stature, per se, is more of an administrative requirement. Females in general are shorter than their male counterparts. This could be the reason for the high rejection due to anthropometric disabilities found in this study. It was seen that many of the female candidates unfit on account of substandard height were fit for Naval Observer entry because of relaxation of standing height to 152 cm. Other parameters as per Integrated Headquarters of Ministry of defence (Navy) directives dated 17 July 2009 for the above entry are sitting height – 78 cm, leg length – 91 cm and thigh length – 64 cm.

Conclusion

While ophthalmic disabilities and obesity were the leading causes for unfitness among ground duty applicants; ophthalmic disabilities, substandard anthropometric measurements and spinal disabilities were responsible for the highest rejections among aircrew applicants. The high rates of rejection of female aircrew applicants in comparison to male aircrew candidates are attributable to the similar anthropometric standards applied despite a different constitution of body parameters. Substandard stature was the main cause of rejection for female aircrew applicants on anthropometric grounds. But many of these candidates were fit for Naval Observer entry. There is a need for a study to

formulate anthropometric standards for female aircrew applicants in the Air Force in view of their operational requirements. This will decrease the number of rejections due to substandard anthropometric measurements

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Answer Keys:

1. (b) 2. (d) 3. (b) 4. (b) 5. (b) 6. (a) 7. (b) 8. (c) 9. (d) 10. (b) 11. (c) 12. (a) 13. (a) 14. (b) 15. (b) 16. (a) 17. (b) 18. (d) 19. (c) 20. (b) 21. (b) 22. (b) 23. (c) 24. (b) 25. (d) 26. (c) 27. (a) 28. (b) 29. (b) 30. (a) 31. (a) 32. (a) 33. (a) 34. (a) 35. (a) 36. (a)