



## Aviation Nursing and in-Flight Medical Emergencies: Aeromedical Consideration

Sridharan A\* and Kalpana S

### Abstract

People travel on commercial Aircraft worldwide on medical, social and economic indications. Although civil aviation industry acts as a fulcrum for the booming Medical Tourism, it encounters increasing number of in-flight medical emergencies in the recent years. In-flight medical events are potentially a significant problem due to aircraft at 30000 feet far from advanced medical care, restricted cabin space and resources. Several studies have shown that every day 0.7 to 3% in-flight medical events occur on board worldwide. Data collected by the Directorate General of Civil Aviation show that between August 2012 and August 2013, there was a total of 46 emergency landings, 38 were because of medical emergencies. The aim of this paper is (i) To assess the present system of cabin crew trained to meet the challenges of in-flight medical emergencies (ii) To evaluate the scientific soundness of Aviation Nursing in future. The objective is (1) To institute proper pre and post medical care in the event of any in-flight medical emergency (2) To reduce the incidence of flight diversion and emergency landing. Reviewing various literatures it was found that many authors have highlighted medical management by the trained cabin crew with the help of physician / paramedics on board, but this author raise one genuine doubt that all physicians on board would not be willing to come forward for such emergencies, it should not be an obligatory favour to tackle medical emergencies on board. Further, no published studies have touched upon the need of 'Aviation Nursing' /flight nurse for in flight medical emergencies.

### Keywords

In-flight; Medical emergency; Flight diversion; Aviation nursing; Flight nurse

### Introduction

Passengers take air travel on medical, social and economic conditions. Some 368 million Indians are venturing out of their homes, based on rising income and lower aviation costs. India is able to provide international quality healthcare services at one-sixth or one-eighth of the prices at which such services are available in the West [1]. Though civil aviation industry acts as a fulcrum for the booming medical tourism, it encounters many in-flight medical emergencies. Primary data on in-flight medical events are not available in any commercial Airlines. Though certain airlines do collect information on in-flight emergencies, they neither incorporate

it in a prescribed format and nor subject it to any statistical analysis. The information collected in this paper are only from web search-Medline search, compiled data from the top summaries of Airline emergencies published in on leading news papers and aviation related periodicals apart from face to face interview with flight crew. So far as Indian Commercial Airlines are concerned, as many as 102 emergency landing on account medical emergencies on board in the mid year 2013 to 2015, according to Directorate General of Civil Aviation (DGCA). Cummins et al. examined that worldwide the death on board were middle aged men, with 77% apparently not suffering from any health problem prior to travel [2].

God has created mankind to live on earth. However human beings the creatures of the ground are blessed with remarkable compensatory haemo-dynamic mechanism whenever exposed to strange environment in high altitude up to a limited atmospheric pressure. Flying at height of 30000 feet, small changes in human physiology will end in major catastrophe and incapacitation ranging from vomiting to intractable heart attack. According to Federal Aviation Administration-Civil Aerospace Medical Institute temperature decreases steadily at an average rate of 2°C per every 1000 feet ascend with corresponding decrease in the pressure, besides exposure to radiation, vibration and acceleration forces known as 'g' forces. The published article by Amit Chandra, MD, MSc et al underscores that passengers who travel by Air are more often subjected to physical and psychological stress due to altitude changes and fluctuations in cabin pressure [3]. Cabin crew are placed in a critical situation to tackle medical emergencies on board with much courage and skill coupled with positive attitude without diversion of flight, the author observes.

It was found that in the early days of commercial aviation many airlines have recruited trained nurses as cabin crew and this has been now insisted to be reintroduced by many, notably by Dr. Hirofurni of Japan Airlines [4]. Present first aid training and recurrent training for 40-60 hours is not sufficient enough to tackle medical emergencies as efficiently as Aviation Nurse. At times, some of the on board physician, will not be willing to come forward for such in-flight emergencies for fear of medico-legal implications., and all these issues needs to be addressed in good letter and spirit. In as much as intractable myocardial infarction, uncontrolled asthma, convulsion, severe anaphylactic allergic manifestations and obstetric emergencies on board are concerned, the situation being critical pose great challenge to cabin crew and physician on board, would draw the attention of International Civil Aviation Organization (ICAO) and its contracting states. So far no study have necessarily touched upon the need of Aviation Nurse in such critical situation to effectively tackle, to maintain and to monitor the vitals of the precious human life till the aircraft reaches the next nearest airport. Since no published studies had thrown light on 'Aviation Nurse' / 'Flight Nurse' in India, this paper assess the technical soundness of the present system of cabin crew trained to meet the challenges of in-flight medical emergencies and the scientific evolution of Aviation Nursing in commercial Airlines. With this back ground, this study is attempted.

### The aim of this study

(i) To assess the present system of cabin crew trained to meet the challenges of in-flight medical emergencies.

\*Corresponding author: A. Sridharan, Department of Epidemiology, The Tamil Nadu Dr. M.G.R. Medical University, Chennai, Tel: +91 9445936151; E-mail: marina\_maam@yahoo.co.in

Received: October 23, 2017 Accepted: February 20, 2018 Published: February 27, 2018

(ii) To evaluate the scientific soundness of Aviation Nursing in commercial Airlines.

(iii) To draw the attention of all airlines and the regulatory agencies to employ a trained 'Aviation Nurse/ 'Flight Nurse' to tackle in-flight medical emergencies.

### Objective

(1) To institute proper pre and post-medical care in the event of in-flight medical emergency

(2) To ensure on board sick and fellow passengers' safety and

(3) To reduce the unwanted flight diversion and emergency landing.

It was observed that no year wise data available on the number of in-flight medical emergencies in World/in India and in each Airline, and it is hard to standardize and compare data across regions. There is no system that meticulously arrays all in-flight medical emergencies as part of their Research and Development (R&D) in the contracting states of ICAO. This author describes that primary data on in-flight medical emergencies that lead to diversion of flights / emergency landing and the mortality and morbidity of air passengers in a given period is not available for researchers.

### Data Collection Method

Survey conducted by face to face interview with cabin crew from various Airlines in Chennai base, the experience encountered by air passengers and by this author by virtue of his aero medical experience as Airline Preflight Medical Officer in various Airlines and also as an Aviation Medical Examiner, by interacting with cockpit and cabin crew for the last ten years. The secondary data collected from reviewing various literature, periodicals, data being sourced from DGCA website and notifications., data from website like PubMed, Wikipedia , DNA etc. and newspaper on flight diversion and emergency landing due to in-flight medical emergencies in India. The cause of the in-flight medical emergencies on the order of occurrence are arrayed accordingly and its merits and demerits are discussed and the conclusion so derived is categorized as 'Aero medical consideration' with recommendation to the policy makers and ICAO for exploring the feasibility of inducting one of the cabin crew as qualified Nurse, 'Aviation Nursing'/'Flight Nurse' at least in the long haul flights.

### Results

Data collected by the Directorate General of Civil Aviation showed that between August 2012 and August 2013, a total of 46 emergency landings and 38 were because of medical emergencies. Despite incidence studies were lacking due to poor data availability, frequent complaints of vomiting, syncope, infants breathing problems, in flight labour pain among pregnant passengers, chest pain, heart attack and respiratory problems among elderly passengers and post surgical complications among passengers recuperating from recent surgery were major causes for flight diversion. A study described that "although aviation is regulated by a variety of national and international laws and standardized documentation of in-flight medical emergencies is inadequate and needs further development" [5].

"If you are caught in a medical emergency on-board, the first thing you should do is to ask if the airline has access to ground medical support. If so, then ask the flight attendant to call them immediately."

An emergency landing of a domestic flight may cost an airline about \$30,000, while that of an international flight, \$70,000 to \$230,000 [6] The scope and outcome of the study is to have a qualified nurse/ Aviation Nurse on board to identify appropriate clinical presentation of the on board passengers who are in life threatening situation while flying at a height of 35000 feet above MSL, by coordinating with the physician on board, and being able to administer the correct dose and the rate of administering such life saving drugs on board. By virtue of this unique concept of 'Aviation Nursing' no doubt, the airline could not only win the confidence of sick passengers to take a safe air travel at the careful hands of such flight nurse [4].

### Discussion

Even though some Airlines do collect information on in-flight emergencies, neither do they incorporate it in a prescribed format nor subject it to any statistical analysis. The information so collected in this paper are only web search-Medline search., compiled data from the top summaries of Airline emergencies published in on leading news papers and periodicals apart from face to face interview with flight crew and from the aviation experience of the author who is working as pre-flight medical officer in commercial airline. It goes without saying that variation in the incidence of in-flight medical emergencies and the resultant increase in flight diversion/ emergency landing year after year warrants further studies in future. The vision of National Civil Aviation Policy 2016 (NCAP 2016 ): To create an eco-system to make flying affordable for the masses and to enable 30 crore domestic ticketing by 2022 and 50 crore by 2027. Despite lack of adequate data on in-flight medical emergencies, so far as Indian Commercial Airlines are concerned, there has been as many as 102 emergency landing on account of medical emergencies on board in the mid year 2013 to 2015, according to data available with aviation regulatory agency, Directorate General of Civil Aviation (DGCA). Similarly on April 17, about 190 passengers on board a Spicejet aircraft on way to Kolkata from Mumbai had to make an overweight landing at Nagpur as one of the passengers had suffered a heart problem. Air India flight from London bound for Mumbai diverted to Baku Airport in Azerbaijan to give medical assistance to a passenger become sick on board [7].

According to article in Times of India news dated 4<sup>th</sup> Nov 2013 by Manju V, 13 out of 38 medical emergency landings involved flight diversion [8]. The trend brings financial consequences as well. According to the officials of commercial airlines, it would be a cumbersome task to reschedule the entire flight plan and passengers booking after a single diversion. News published on Monday, November 10, 2014 that Flight AI 331 flying from Bangkok to Mumbai made an emergency landing at Kolkata's NSCB International Airport on November 5, 2014. On August 09, 2016, Mumbai-Bangalore Air India flight made an emergency landing back to origin because a passenger suffered a cardiac arrest on board., on July 21, an IndiGo flight from Mumbai to Chennai returned to the city after an infant suddenly took ill but died on arrival. Mid - air medical emergencies in Air India's two flights and had them diverted to two airports- Norway and Finland. The Rajkot-Delhi flight of Air India made emergency landing at Sanganer airport due to a woman passenger, had suffered a cardiac arrest," Sanganer airport director R S Balhara said [9].

According to news article in Financial express, A flight from New Delhi to Chicago was diverted to Norway, due to a medical emergency (Source: PTI). Flight AI 174 was diverted to the Helsinki airport in Finland due to medical emergency, A New York-bound

Air India (AI) flight was diverted to Iceland after a passenger fell seriously ill. Air India AI 803 New Delhi- Bangalore was diverted to Nagpur due to medical emergency. New Delhi, Feb 17, Air India flight AI 130 London- Mumbai landed at Ankara Airport. Mumbai-bound Air India aircraft from London diverted the flight to Baku airport [10]. Air India plane from London diverted as passenger taken ill. A US-bound non-stop Air India flight from New Delhi was diverted to Iceland's Keflavik International Airport on Tuesday due to a medical emergency [11]. On 19.5.2017, a mid air delivery-30-weeks pregnant Cicymol Jose was on board a Jet Airways flight bound for Kochi from Dammam, Saudi Arabia on 19.5.2017., went into premature labor and delivered a boy baby by a paramedic on board when the aeroplane was flying over Pakistan and was immediately diverted to Mumbai to handle the medical emergency [12].

Further, the recent trend of Air Ambulance also stake its claim in the growth of medical tourism, and health department, Government of Tamilnadu has entered into an agreement for launching Air Ambulance Service, the author observes. At times such as intractable myocardial infarction, uncontrolled asthma, convulsion, severe anaphylactic allergic manifestations and of course recent incidents of obstetric deliveries on board pose great challenge to cabin crew and physician on board to treat in cramped cabin space with limited life saving equipments and medicine. Since there is no data available, the collective experience of various airlines and experience of passengers and treating doctors it has shown that major inflight medical events are minor and major medical emergencies are only few but yet required flight diversion. A survey of 20 international airlines over a period of 7 years was 0.33 per billion revenue passenger kilometers. And diversion was estimated from 2 to 8% [13].

Tension Pneumothorax: In the chest can be fatal if not corrected immediately. In a much – publicized incident, Professor Angus Wallace and Dr. Tom Wong saved a 39-year old woman who suffered from this condition on board an aircraft flying from Hong Kong to London. The Doctors improvised on things readily available on hand to save the woman, they used brandy to clean the skin, a coat hanger to puncture and relieve the tension in the chest and inserted a catheter to keep the lungs expanded [14]. A previous study has found that the risk factors for medical and allergic events during air travel were increase of passenger's age, flight stress and anxiety, changes in the cabin environment, decreased seat space, Alcohol/drug intake and longer flights [15].

The National Transportation Safety Board (NTSB) emphasize that what the difference between surviving and not surviving a potentially life threatening situation is having; 1) Skill to rely on the situation, 2) Equipment to survive the situation, 3) Training in the use of the situation, 4) A positive attitude towards that situation, 5) To avoid or control that panic situation. Present first aid training and recurrent training for 40 – 60 hours mandatory requirement is not sufficient enough to tackle medical emergencies, the author observes. Further, the author raises one genuine doubt that, at times, some of physician on board will not be willing to come forward for such emergencies and all these issue needs to be addressed in good letter and faith. This paper reviews the published articles, news paper reports secondary data collected from website, and news paper publications. Further, the author, by virtue of his clinical experience of working currently as Pre-Flight Medical officer (PFMO) in various Airlines in India is having adequate experience of addressing such in-flight emergencies fully endorses the findings of Dr. Hirofurni of Japan Airlines [4]. "Is

there a doctor on board the plane?" In three of the cases, it was a true emergency. Airline systems are woefully underprepared to deal with these situations. Here's what needs to change" quipped Celine Gounder [6,16].

## Conclusion

Since human being are the creatures of earth, as a air passenger, trivial systemic abnormality inside the cabin, will at times end in near catastrophe, but its magnitude is not as easily understood and weighed by the airline personal, no matter how much cabin crew training being imparted by the concerned Airlines as understood by this author who is a critical care specialist, endorses the findings of previous studies in toto. Furthermore, this author raise his own concern that in the event of anaphylactic shock, and post delivery profuse bleeding (postpartum hemorrhage ), how far the present cabin crew training system would manage the above mentioned emergency is a debatable subject matter. This paper is attempted in that direction and authored to explain the importance of Aviation Nursing in Commercial Airlines.

## References

1. Interview of Stephen Philip Warner & Vanita Peter D'souza. The Dollar Business with Dr. Mahesh Sharma, Minister of State for Culture & Tourism and MoS for Ministry of Civil Aviation.
2. Cummins RO, Schubach JA (1989) Frequency and types of medical emergencies among commercial air travelers. JAMA 261: 12959.
3. Chandra A, Conry S (2013) In-flight medical emergencies. West J Emerg Med 14: 499.
4. Robert Cocks, Michele Liew (2007) Commercial aviation in-flight emergencies and the physician. Emerg Med Australas 19: 1-8.
5. Sand M, Bechara FG, Sand D, Mann B (2009) Surgical and medical emergencies on board European aircraft: a retrospective study of 10189 cases. Crit Care 13: R3.
6. Gounder C (2013) Medical Emergencies at 40,000 Feet.
7. Press Trust of India (2016) Mumbai-Bound Air India Plane From London Diverted As Passenger Taken Ill.
8. Manju V (2013) Times of India News.
9. PTI (2017) Air India flight makes emergency landing after passenger suffers heart attack.
10. Asia News International (2017) Air India makes emergency landing at Ankara Airport, 200 passengers stranded Air India flight to US lands in Iceland due to medical emergency.
11. PTI (2016) Air India flight to US lands in Iceland due to medical emergency.
12. Panicker RS (2017) Baby Born On Flight To Get Free Lifetime Air Travel, Says Jet Airways.
13. Aerospace Medical Association Air Transport Medicine Committee (2016) Medical Emergencies: Managing In-flight Medical Events.
14. Flatt AE (2009) A flight emergency. Proceedings (Baylor University Medical Center) 22: 24.
15. Sánchez-Borges M, Cardona V, Worm M, Lockey RF, Sheikh A, et al. (2017) In-flight allergic emergencies. World Allergy Organ J 10: 15.
16. Peterson DC, Martin-Gill C, Guyette FX, Tobias AZ, McCarthy CE, et al. (2013) Outcomes of medical emergencies on commercial airline flights. N Engl J Med 368: 2075-83.

## Author Affiliations

Department of Epidemiology, The Tamil Nadu Dr.M.G.R. Medical University, Chennai, India

[Top](#)