The Aviation Industry And The Competency Of Cabin Crew In Dealing With Premature Delivery On-Board: A Survey And Literature Review

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Abstract

Background: To assess the awareness and competency of cabin crew in following recommended safety measures when managing unexpected premature delivery during flight, and to assess the availability of medical kits and their contents on-board.

Methods: An online survey using a questionnaire and Internet search of different airlines and aviation authorities operating within Europe and worldwide.

Results: The online questionnaire was sent twice to 15 different airlines, but a poor response rate was obtained (13%). Therefore, the relevant information was sought through direct communication with the European Aviation Safety Agency and the Joint Aviation Authorities of Europe. It was found that there is a lack of adequate training and on-board equipment availability when it comes to resuscitating a neonate. This makes air travel risky for pregnant women.

Discussion: Commercial airlines do not have a published, universally agreed-upon protocol in terms of training cabin crew to resuscitate prematurely born neonates on-board. In addition, on-board emergency medical kits are deficient in equipment essential for neonatal resuscitation and should be optimised.

BACKGROUND

The aviation industry has expanded hugely in recent years. Millions of people use air transport every day, and it is common to find women air travellers who are pregnant [1].

The safety of on-board passengers is at the forefront of present-day aviation industry priorities. According to the United States Bureau of Labor Statistics, 38.3 million people use aeroplanes to commute for business each year and 40% of these travellers are female. Moreover, 80% of the 98,000 flight attendants worldwide are women, 60% of whom are in their reproductive age (16–44 years). Of approximately 80,000 commercial airline pilots around the world, about 5% are females [2]. Studies have shown that, if pregnant, these women are at a higher risk of preterm labour [2]. Iatrogenic and spontaneous premature delivery as a result of complications of pregnancy occurs in 7–12.5% of all pregnancies. It also depends on the country of residence and ethnic origin. Women with a history of previous premature birth, recurrent episodes of threatened premature delivery, multiple pregnancies or cervical trauma are at an even higher risk while airborne. Around 2% of childbirths in Europe are premature, where the babies are born at or less than 32 weeks' gestation [1]. With this demonstrated risk, the only help available on-board is from cabin crew should a preterm birth occur. Logically, then, cabin crew should be aware of this possibility, as well as adequately trained and well equipped to handle such an incident safely. We have not come across any studies evaluating this issue in the published literature.

METHODS

The authors designed an electronic online survey comprising eight questions focused on risk awareness, crew training and equipment provision on-board. The survey package was sent twice to randomly selected airlines operational in Europe. For each airline, the respective customer care email addresses obtained from

the respective website were used. Due to an initial poor response, reminder emails were sent two months later. Still, the total response was only 13%. Thus, detailed online research was carried out for each of the selected airlines and civil aviation authorities, e.g. the Joint Aviation Authorities of Europe (JAAE), International Civil Aviation Organisation (ICAO) and Federal Aviation Administration (FAA), through their respective websites.

RESULTS

Only 13% of the contacted airlines responded to our electronic survey. The data collected focused on two main issues, specifically the available equipment on board commercial aircrafts and the level of cabin crew training in resuscitating a premature neonate.
From the survey, some of the available instruments were of inappropriate sizes, for example, intubation kits. In addition, as illustrated in (Table 1), a few basic necessities were surprisingly missing, such as a dry towel and food-grade plastic bags. The flight attendants received basic resuscitation training for adults and children. Although a recertification process was found to be in place, no further details about the duration and intensity of such training was available. The official websites of the JAAE, ICAO and FAA were searched. Their recommendations for the first aid and emergency medical kits' contents did not include basic equipment for thermoregulation. Moreover, there was no recommendation for specific sizes of these instruments (Table 1). Airlines' policies regarding travel in pregnancy were also examined. Most of them allow women with singleton or twin pregnancy to travel at 36 and 32 weeks' gestation, respectively.

Table 1

Comparison of resuscitation kit standards between the aviation industry and the International Liaison Committee on Resuscitation.

		ICAO	FAA	JAAE	ASR	NRS
A	**THERMOREGULATION KIT**					
	Towels	No	No	No	No	Yes
	External artificial heat source	No	No	No	No	Yes
	Specialised plastic bag	No	No	No	No	Yes
B	**UMBILICAL CORD CLAMP/SCISSORS**	Yes	Yes	Yes	Yes	Yes
C	**AIRWAY**					
	Oxygen	Yes	Yes	Yes	Yes	Yes
	Intubation kit*	Yes	Yes	Yes	Yes	Yes
	Bag/valve/mask*	Yes	Yes	Yes	Yes	Yes
D	**CIRCULATION**					
	Intravenous cannulation*	Yes	Yes	Yes	Yes	Yes
	Fluids	Yes	Yes	Yes	Yes	Yes
	Umbilical venous catheterisation kit	No	No	No	No	Yes
E	**EQUIPMENT**					
	Stethoscope	Yes	Yes	Yes	Yes	Yes
	Non-mercury thermometer	Yes	Yes	Yes	Yes	Yes
	Blood pressure measurement electronic device	Yes	Yes	Yes	Yes	Yes
	Glucometer	Yes	Yes	Yes	Yes	Yes
F	**DRUGS**					
	Epinephrine (1:10,000)	Yes	Yes	Yes	Yes	Yes

ICAO = International Civil Aviation Organization, FAA = Federal Aviation Administration, JAAE = Joint Aviation Authority of Europe, ASR = Airline Survey Responses, NRS = Neonatal Resuscitation Standards. *Available but in an inappropriate size for a premature neonate.

DISCUSSION

The aviation industry has expanded hugely in recent years. According to the International Air Transport Association, 2.8 billion passengers used air travel in 2011. This number is expected to rise to 3.6 billion by 2016 [3]. Such a huge number of passengers (nearly 7.7 million per day) puts a gigantic responsibility on the professionals involved in maintaining the safety and wellbeing of those passengers. This is particularly vital in cases of vulnerable passengers with imminent risk to their health or life. We searched for an earnest,

predefined strategic effort of care and responsibility for pregnant passengers. Our survey examined the neonatal resuscitation standards of the aviation industry in managing unlikely but possible premature delivery on-board. The poor response from the aviation industry and the lack of information on their websites highlighted that insufficient arrangements have been made due to a lack of foresight.

When the first author had to take a flight with his pregnant wife late in her pregnancy, his knowledge of the risks caused him to enquire about the preparedness of crewmembers in dealing with emergencies. Their enigmatic response provoked considerations of maternal and neonatal safety that led us to investigate current aviation practice. Our investigation highlights the importance of patient safety, especially when pregnant women are allowed to travel during the second and third trimester. Dealing with an unexpected threat to the life of an adult, let alone that of a child, is a stressful experience. As medical practitioners, we are familiar with the intensity of the experience of reviving a child, despite years of intense training in state-of-the-art facilities with other healthcare professionals who can provide assistance. For a non-medical individual, this could be a daunting task even if he or she has received basic training. This holds very true for on-board crewmembers. Moreover, resuscitation training and the provision of well-equipped emergency medical kits on-board seem to be logical solutions for the potential occurrence of premature birth.

The intensity and standards of training are out of the remit of our study due to logistical limitations. Thus, we compared the aviation industry's published standards of neonatal resuscitation with the algorithm set by the International Liaison Committee on Resuscitation (ILCOR) [4]. Neonatal resuscitation training should allow cabin crew deliver to life support to premature neonates efficiently, and there must be a clear understanding of basic principles of the resuscitation process. Moreover, thermoregulation and adequate ventilation are key factors in caring for a premature neonate. In case of an unexpected on-board premature delivery, the priority is to preserve thermo-neutral state of the newborn through thermoregulation and keeping heat loss to a minimum. A rapid postnatal fall in body temperature is attributable to a combination of the physical characteristics of the newborn, e.g. large surface area in relation to body weight and thin layer of insulating fat, or to external factors, e.g. the extent of total heat loss (conduction, convection, radiation and evaporation), ambient air temperature, pressure, relative humidity and the temperature of surrounding surfaces [5, 6].

Resuscitation starts with drying and wrapping the baby. If the newborn is preterm and born at 28 weeks of gestation or less, there is no need for drying. Instead, the entire body except for the head (a hat can be used to cover it) should be wrapped in a special food-grade plastic bag near a heat source [7]. With the cessation of placental support, maintaining patency of airways and delivering respiratory support is the next important step. The aim of this is to aid spontaneous breathing by providing a continuous positive airway pressure through a facemask or nasal prongs. This seems simple, and perhaps in reality it is; however, a skilful pair of hands is required to carry this out. Moreover, although chest compressions, adrenaline and volume expansion are rarely used in neonatal resuscitation [8], they must still be mastered.

Emergency medical kits were available on all commercial airlines surveyed; however, they are clearly lacking in some of the basic equipment necessary to deliver successful neonatal life support. For example, they contain inappropriate sizes of crucial lifesaving equipment, e.g. intubation and ventilation kits. Regardless of the proposed training, this will certainly render the cabin crew incapable of initiating and maintaining stabilisation of the premature neonate. Thus, the aviation industry must develop a universal neonatal life support training policy, overhaul the current practice and upgrade emergency medical kits to contain all the required items with the correct sizes for resuscitating a prematurely born neonate on-board. In other words, all necessary equipment for thermoregulation, adequate ventilation and stabilisation of the newborn should be made available for cabin crew. This should be supported by suitable training and a recertification process, which will ensure a sufficient level of knowledge and competency amongst the cabin crew when it comes to using this equipment in a critical situation like premature birth.

CONCLUSION

Cabin crew training should be at an appropriate level to manage an unexpected delivery of a premature neonate on-board an aircraft. According to the guidance

set by ILCOR, this must be aided by the provision of necessary resuscitation equipment to carry out this task. Our study serves as a preamble to instigating hazard perception in the medical fraternity for those who are very likely to take their first breath on-board.

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