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Assessment of Knowledge Regarding Airplane Ear Preventive Measures among Air Travelers of Najran University's Staff

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ABSTRACT

Passengers before air travel should be frequently advised on the possible preventive measures to reduce any sort of ear discomfort. A cross-sectional survey-based approach was adopted to assess the prevalence of OBT, source of information on preventive measures for OBT, and respondents' level of knowledge of preventive measures for aeroplane ear discomfort. 206 respondents i.e., air travellers of Najran University's staff were sampled using a purposive sampling technique. Results highlighted that the prevalent symptoms of ear discomfort during air travel, which are most commonly observed such as ear pain, popping noises, reduced hearing, dizziness, and ringing noises in the ear. Also, findings explored that OBT is the severe health issue caused during air travel however mild concerns include pain or loss of hearing, vertigo and ear discharge. Most respondents were aware of 'Chewing gum or sweets' and 'Yawning or swallowing' as prevention measures, and 'Blowing against a pinched nose (Valsalva maneuver)' as preventive measures for ear discomfort during air travel. 'Internet' (11.2%), 'Posters/Leaflets in aeroplanes' (7.8%), 'Posters/Leaflets in airports' (6.8%), and 'Social Media' are the most common sources of information for preventive measures to reduce prevalence of OBT. Adopting passive methods like yawning, moving the jaw, swallowing, etc. are quick techniques to deal with ear discomfort.

INTRODUCTION

A number of individuals fly both private and commercial flights on a regular basis, as the airlines are reportedly serving more than 100,000 passengers every day. These individuals are exposed to otic barotrauma (OBT) and seek help from an otolaryngologist. A practising otolaryngologist possesses knowledge of barometric changes essential for identifying ear infections (Mitchell-Innes *et al.*, 2014; Wu & Kozin, 2024). OBT is a traumatic injury of the tympanic membrane and the middle ear resulting from an existing high-pressure differential between the external environment and the middle ear. This pressure is commonly experienced when slight changes in pressure are faced during air travel due to different elevations. The mild symptom is slight aural discomfort due to the increased adoption of air travel, with number of passengers increasing from 310 million to 3.7 billion every year for the last 50 years, with 1 million flying each moment (Naouri *et al.*, 2016).

Eustachian tube dysfunction is estimated to be around 30% in children and 10% in adults. It is experienced when cabin air pressure is at cruising altitude at sea level being lower than air pressure. This cabin air pressure at typical cruising altitudes (11 000–12 200 m) is equal to atmospheric air pressure (1800–2400 m) (Naouri *et al.*, 2016; WHO, 2007). OBT is also referred to as the pathological change which results from poor eustachian tube function due to factors like increased likelihood of middle-ear barotrauma and degree of mastoid pneumatisation (Mitchell-Innes *et al.*, 2014). Other symptoms include pain or loss of hearing (Naouri *et al.*, 2016), vertigo and discharge in severe cases (Michael *et al.*,

2021), long-term morbidity such as tympanic membrane perforation in rare cases (Ryan *et al.*, 2018), sensorineural and conductive hearing loss 5 and perilymph fistula (Bhattacharya *et al.*, 2019).

Nevertheless, it is fortunate that a number of aeroplane ear preventive measures exist, such as swallowing and yawning for performing the Valsalva maneuver. However, it is evident with limited benefits in reducing ear discomfort linked with OBT in adults due to a lower level of awareness among the public. Past studies have highlighted the symptoms, causes and preventions of OBT, but limited research is available on public awareness for OBT causes and prevention in Saudi Arabia. Therefore, the current research was conducted to analyse the public perceptions of the knowledge of OBT, identifying symptoms' frequency and awareness levels for prevention measures among academic staff who are frequent air travellers of Najran University, Saudi Arabia. A cross-sectional survey-based approach was adopted to cater for the following objectives:

1. To assess the respondents' level of knowledge of preventive measures for aeroplane ear discomfort.
2. To investigate respondents' source of information on preventive measures for OBT.
3. To estimate the prevalence of OBT among the public in Saudi Arabia.

LITERATURE REVIEW

In a survey-based study, distributing an online questionnaire among commercial aircrew of three airlines in Finland, the researchers examined the most common symptoms of middle ear (ME) barotraumas,

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which may affect flight safety. Among 1789 respondents, 1516 reported experiencing ME barotraumas during flight, among which 5% had to undergo a surgical procedure due to an increasing number of upper respiratory tract infections. A common factor reported is poor performance subjected to Toynbee and Valsalva maneuvers (Lindfors *et al.*, 2021).

It is reported that OBT is one of the most reported medical complications of aviation caused by middle ear's traumatic inflammation. The cross-sectional research was conducted to examine the quick response of travellers at the departure or arrival airport departments to identify their knowledge of the positive signs or symptoms of OBT. The suggestive preventive measures include chewing gum, the Valsalva maneuver, frequent swallowing and yawning to relieve ear tension (Almufarrej *et al.*, 2023).

The vaccine-preventable emergencies and tropical infectious diseases are the mainstay of pre-travel consultations. However, accidents and injuries, which are known as non-communicable diseases, also occur during travel, and therefore public should be aware of these as well. Results showed that 1 in 100,000 travellers die due to trauma (40%) and other diseases (60%), among which <3% are also associated with infectious diseases. These infections can be prevented with awareness of effective measures (Potin *et al.*, 2023).

A serious threat to flight safety is health incapacitation therefore a study was carried out examining the upper respiratory infection (URI) and ear-nose-throat (ENT) barotrauma among commercial pilots. Results were collected within one year from 463 pilots. These results reported that URI symptoms increased to 50.1% and ENT barotraumas to 55.5%. Consequently, pilots taking decongestant medicine increased to 59.5% (Boel & Klokker, 2017).

Another study highlighted that a common infection observed among air travellers is barotitis media (BM), which is the key cause of severe discomfort and sometimes permanent balance and hearing deficits. A questionnaire-based survey was provided to 97 respondents identifying their travel history, advice-seeking behaviours before travelling and BM knowledge for effective air travel experience. Results showed that persistent ear pain and duration of the last flight are significantly associated with knowledge of participants of BM (Michael *et al.*, 2021).

In a systematic review, it is discussed that among flight attendants and physical health risk factors, the most prevalent physical risk factors include abnormal air pressure and ionising radiation. The most prevalent outcomes due to abnormal air pressure include barotrauma and cerebral blood flow. The change is characterised by low oxygen concentrations accompanied by an increase in altitude and a decrease in atmospheric pressure (Russo *et al.*, 2023).

METHODOLOGY

Study Design

This study is a cross-sectional online survey-based research conducted between March 2023 to May 2023 among academic staff of Najran University to explore their knowledge on awareness and symptoms of OBT during air travel. A quantitative research design was adopted in the current study since knowledge patterns among targeted respondents were observed from numerical data. Quantitative research is essential for seeking data from a broader population, providing findings with higher generalisability and objective answers (Taherdoost, 2022). Therefore, to draw a statistical pattern on the awareness of respondents regarding OBT and the symptoms identified most commonly during air travel, a quantitative research design was used.

Sample Size and Population

The targeted population of the research included air travellers to observe their OBT awareness and symptoms. For this purpose, the academic staff of Najran University who have travelled at least once by air were considered eligible for the research. Purposive sampling is a sampling technique used to target the respondents who are selected "on purpose" to provide specific outcomes in the research (Mweshi & Sakyi, 2020). Therefore, a total of 206 respondents who agreed to participate in the research were sampled using a purposive sampling technique to assess the knowledge regarding aeroplane ear preventive measures among air travellers of Najran University's staff.

Data Collection and Analysis

In this research, data was collected through a primary source such that close-ended surveys were conducted to get the first-hand opinion of respondents on knowledge of aeroplane ear preventive measures. Google form-based questionnaires containing 10 questions with multiple choices to investigate research objectives were distributed among the sampled respondents with messages containing informed consent to participate or not and details about research aims and data security. SPSS 26.0 was used for data analysis, applying frequency analysis to the gathered data and highlighting the most frequent symptoms and preventions during air travel among the public in Saudi Arabia.

RESULTS

Demographics

The respondents were asked a few questions relevant to their gender and age demographics and their job designation in their organisation to limit any biases in results.

Table 1 depicts the gender demographics of the respondents. It shows that the majority of respondents, i.e., 54.9%, were male, whereas 45.1% were female out of the 206 academic staff who participated in the study.

Table 1: Gender Demographics

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	93	45.1	45.1	45.1
Male	113	54.9	54.9	100.0
Total	206	100.0	100.0	

Table 2 below shows the age demographics of the respondents. It can be viewed in the table that the majority of the respondents, i.e., 30.1% (62), each belonged to the age group of 36-40 years and greater than 40 years. Besides, 19.9% (41) lied in the age group 31-35, 17.0% (35) were aged between 26 and 30 years; however, only 2.9% (6) respondents were aged between 20 and 25 years.

The research respondents were also asked about their job roles at the Najran University. As shown in Table 3, 26.2% (54) respondents were assistant professors, 10.7% (22) respondents were associate professors, and 11.2% (23) respondents were in Masters at the time of data collection. However, 51.5% (106) of respondents marked 'other' when asked about their job role.

Table 2: Age Demographics

	Frequency	Percent	Valid Percent	Cumulative Percent
>40	62	30.1	30.1	30.1
20-25	6	2.9	2.9	33.0
26-30	35	17.0	17.0	50.0
31-35	41	19.9	19.9	69.9
36-40	62	30.1	30.1	100.0
Total	206	100.0	100.0	

Table 3: Respondents' Job Roles

	Frequency	Percent	Valid Percent	Cumulative Percent
Assistant professor	54	26.2	26.2	26.2
Associate professor	22	10.7	10.7	36.9
Master	23	11.2	11.2	48.1
Other	106	51.5	51.5	99.5
Professor	1	.5	.5	100.0
Total	206	100.0	100.0	

Objective 1: To Assess the Respondents' Level of Knowledge of Preventive Measures for Aeroplane Ear Discomfort

A few questions were asked relevant to research objective 1, investigating the respondents' level of knowledge on preventive measures for aeroplane ear discomfort.

How Often Do You Fly?

It was essential to ask respondents about how often they

fly to make sure results reflect their true flight experiences in terms of symptoms observed and prevention taken for OBT.

Table 4 shows that the majority of the respondents, i.e., 51.9% (107), mentioned that they at least fly once a year, 23.8% (49) mentioned they travel up to 3 times per year, 14.6% (30) up to 6 times per year, and 8.3% (17) stated they travel up to 12 times per year. However, only 3 respondents claimed they have never air travelled yet.

Table 4: Respondents' Frequency of Air Travel

	Frequency	Percent	Valid Percent	Cumulative Percent
I have never flown yet	3	1.5	1.5	1.5
Up to 12 times per year	17	8.3	8.3	9.7
Up to 3 times per year	49	23.8	23.8	33.5
Up to 6 times an year	30	14.6	14.6	48.1
At least once a year	107	51.9	51.9	100.0
Total	206	100.0	100.0	

Which Prevention Measure are You Aware of, Mark All that Apply?

The research respondents were asked to mark all that apply in terms of the prevention measures they have known or used during air travel for OBT. As shown in Table 5, it was observed that 23.8% (49) respondents marked 'none of the above', reflecting that they have not heard of any prevention before. However, 23.8% (49) respondents mentioned that they are aware of 'Chewing gum or sweets', reflecting that it is the most common measure the general public is aware of for treating OBT during air travel. Furthermore, 15.5% (32) were aware of both 'Chewing gum or sweets' and

'Yawning or swallowing' as prevention measures, 12.1% (25) respondents have heard of 'Chewing gum or sweets', 'Yawning or swallowing', and 'Blowing against a pinched nose (Valsalva maneuver)' depicting these 3 as the most common known preventions.

However, the results also showed that the least heard prevention measures by the respondents include 'Otrivin' and 'Decongestant, i.e. lorinase' reported along with any other reported prevention as well including 'Chewing gum or sweets', 'Yawning or swallowing', 'Otrivin', 'Decongestant, i.e. lorinase', 'Blowing against a pinched nose (Valsalva maneuver)'.

Table 5: Prevention Measures Respondents Have Heard

	Frequency	Percent	Valid Percent	Cumulative Percent
Blowing against a pinched nose (Valsalva maneuver)	9	4.4	4.4	4.4
Chewing gum or sweets	49	23.8	23.8	28.2
Chewing gum or sweets, Blowing against a pinched nose (Valsalva maneuver)	11	5.3	5.3	33.5
Chewing gum or sweets, Otrivin	2	1.0	1.0	34.5
Chewing gum or sweets, Yawning or swallowing	32	15.5	15.5	50.0
Chewing gum or sweets, Yawning or swallowing, Blowing against a pinched nose (Valsalva maneuver)	25	12.1	12.1	62.1
Chewing gum or sweets, Yawning or swallowing, Decongestant i.e. lorinase, Blowing against a pinched nose (Valsalva maneuver)	1	.5	.5	62.6
Chewing gum or sweets, Yawning or swallowing, Otrivin	2	1.0	1.0	63.6
Chewing gum or sweets, Yawning or swallowing, Otrivin, Blowing against a pinched nose (Valsalva maneuver)	1	.5	.5	64.1
Chewing gum or sweets, Yawning or swallowing, Otrivin, Decongestant i.e. lorinase, Blowing against a pinched nose (Valsalva maneuver)	4	1.9	1.9	66.0
None of the above	49	23.8	23.8	89.8
Otrivin	3	1.5	1.5	91.3
Otrivin, Blowing against a pinched nose (Valsalva maneuver)	1	.5	.5	91.7
Yawning or swallowing	13	6.3	6.3	98.1
Yawning or swallowing, Blowing against a pinched nose (Valsalva maneuver)	4	1.9	1.9	100.0
Total	206	100.0	100.0	

Would You Consider Using these Measures Now?

Table 6 depicts that the majority of the respondents, i.e., 32.0% (66), said 'Maybe' when asked whether they use

these measures or not, 30.1% (60) marked 'Definitely Yes', 24.8% (51) marked 'Probably Yes', 8.3% (17) stated 'Probably No' and only 4.9% (10) marked 'Definitely No'.

Table 6: Measures Considered by Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Definitely No	10	4.9	4.9	4.9
Definitely Yes	62	30.1	30.1	35.0
Maybe	66	32.0	32.0	67.0

Probably No	17	8.3	8.3	75.2
Probably Yes	51	24.8	24.8	100.0
Total	206	100.0	100.0	

Objective 2: To Investigate Respondents' Source of Information on Preventive Measures for OBT

The respondents were asked questions relevant to sources of information for them regarding the preventive measures for OBT.

Which of the Following Sources of Information are You Aware of for Air Travel? Mark All that Apply

Table 7 depicts that the most common sources of information for air travellers include 'Internet' (11.2%), 'Posters/Leaflets in aeroplanes' (7.8%), 'Posters/Leaflets

Table 7: Source of Information for OBT Prevention Measures

	Frequency	Percent	Valid Percent	Cumulative Percent
Internet	23	11.2	11.2	11.2
Internet, Social media	15	7.3	7.3	18.4
Internet, Social media, and Other	3	1.5	1.5	19.9
Posters/Leaflets at airports	14	6.8	6.8	26.7
Posters/Leaflets at airports, Internet	3	1.5	1.5	28.2
Posters/Leaflets at airports, Internet, Social media	6	2.9	2.9	31.1
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes	2	1.0	1.0	32.0
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Internet	3	1.5	1.5	33.5
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Internet, Social media	1	.5	.5	34.0
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Posters/Leaflets in GP practices/hospital, Internet, Other	1	.5	.5	34.5
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Posters/Leaflets in GP practices/hospitals, Internet, Social media	2	1.0	1.0	35.4
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Posters/Leaflets in GP practices/hospitals, Social media	1	.5	.5	35.9
Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Social media	1	.5	.5	36.4
Posters/Leaflets at airports, Posters/Leaflets in GP practices/hospitals, Social media	1	.5	.5	36.9
Posters/Leaflets at airports, None of the above	1	.5	.5	37.4
Posters/Leaflets at airports, Social media	1	.5	.5	37.9
Posters/Leaflets in aeroplanes	16	7.8	7.8	45.6
Posters/Leaflets in aeroplanes, Internet	3	1.5	1.5	47.1
Posters/Leaflets in aeroplanes, Internet, Other	1	.5	.5	47.6
Posters/Leaflets on aeroplanes, Internet, Social media	2	1.0	1.0	48.5
Posters/Leaflets in aeroplanes, Internet, Social media, Other	1	.5	.5	49.0
Posters/Leaflets in aeroplanes, Social media	2	1.0	1.0	50.0
Posters/Leaflets in GP practices/hospital	4	1.9	1.9	51.9
Posters/Leaflets in GP practices/hospitals, Internet	1	.5	.5	52.4
None of the above	53	25.7	25.7	78.2
Other	32	15.5	15.5	93.7
Other, None of the above	1	.5	.5	94.2
Social media	12	5.8	5.8	100.0
Total	206	100.0	100.0	

in airports' (6.8%), and 'Social Media' (5.8%). However, 1.9% also reported 'Posters/Leaflets in GP practices/hospitals' as their source of information for prevention measures during air travel.

Do You Agree Getting More Information will be Useful?

Table 8 below presents that upon asking respondents whether the providing more information will be useful or

Table 8: Usefulness of Provision of More Information

	Frequency	Percent	Valid Percent	Cumulative Percent
No	6	2.9	2.9	2.9
Not sure	27	13.1	13.1	16.0
Yes	173	84.0	84.0	100.0
Total	206	100.0	100.0	

not for them regarding OBT prevention. Most of them (84.0%) responded 'Yes' to the asked question, 13.1% (27) were not sure about it and only 2.9% (6) responded 'No'.

Objective 3: To Estimate the Prevalence of OBT

The prevalence of OBT was also determined among the target respondents by inquiring about the most common symptoms of OBT suffered during air travel.

Mark All those Apply from the Symptoms Following You have Faced During Air Travel?

Table 9 below presents the responses of students identified when they were asked about the symptoms they have ever observed while flying. It is observed that

17.0% (35) respondents mentioned 'Ear pain' as the most common symptom during air travel, 8.7% (18) mentioned 'Ear pain' as the most repeated symptom, and 7.3% (15) marked 'Popping noises' as a common symptom suffered during air travel. However, 3.4% (7) mentioned suffering from 'Ringing noises in the ear', 2.4% (5) mentioned 'Dizziness', and 0.5% (1) mentioned 'Ear discharge' while on an aeroplane. Nonetheless, 32.5% (67) of respondents mentioned that they did not suffer from any of the listed symptoms.

A few respondents marked more than one symptom to be suffered from during air travel. For example, 3.9% (8) respondents mentioned 'Ear pain, Dizziness' and 'Ear pain, Popping noises' together as the symptoms they suffered while flying.

Table 9: Most Common Symptoms of OBT Suffered During Air Travel

	Frequency	Percent	Valid Percent	Cumulative Percent
Dizziness	5	2.4	2.4	2.4
Ear discharge	1	.5	.5	2.9
Ear discharge, Dizziness	1	.5	.5	3.4
Ear discharge, Ringing noises in the ear, Dizziness	1	.5	.5	3.9
Ear pain	35	17.0	17.0	20.9
Ear pain, Dizziness	8	3.9	3.9	24.8
Ear pain, Ear discharge	1	.5	.5	25.2
Ear pain, Popping noises	8	3.9	3.9	29.1
Ear pain, Popping noises, Dizziness	1	.5	.5	29.6
Ear pain, Ear discharge, Popping noises	2	1.0	1.0	30.6
Ear pain, Popping noises, Reduced hearing	2	1.0	1.0	31.6
Ear pain, Popping noises, Reduced hearing, Dizziness	2	1.0	1.0	32.5
Ear pain, Popping noises, Reduced hearing, Ringing noises in the ear, Dizziness	2	1.0	1.0	33.5
Ear pain, Popping noises, Ringing noises in the ear	1	.5	.5	34.0
Ear pain, Reduced hearing	8	3.9	3.9	37.9
Ear pain, Reduced hearing, Dizziness	2	1.0	1.0	38.8
Ear pain, Ringing noises in the ear	5	2.4	2.4	41.3
None of the above	67	32.5	32.5	73.8
Popping noises	15	7.3	7.3	81.1
Popping noises, Dizziness	3	1.5	1.5	82.5

Ear discharge, Popping noises, Dizziness	1	.5	.5	83.0
Ear discharge, Popping noises, Reduced hearing	1	.5	.5	83.5
Popping noises, Reduced hearing, Ringing noises in the ear	1	.5	.5	84.0
Popping noises, Ringing noises in the ear	3	1.5	1.5	85.4
Reduced hearing	18	8.7	8.7	94.2
Reduced hearing, Dizziness	2	1.0	1.0	95.1
Reduced hearing, Ringing noises in the ear	3	1.5	1.5	96.6
Ringing noises in the ear	7	3.4	3.4	100.0
Total	206	100.0	100.0	

Have You had Previous Ear Surgery?

Lastly, respondents were also asked to mention if they have had any previous ear surgery due to OBT suffered during air travel. Table 10 shows that the majority of them responded 'No', i.e., 98.5%; however, 1.5%

(3) respondents said 'Yes', depicting that knowledge regarding ear preventive measures is essential since it may limit even the small chance of suffering from OBT such that an individual had any recent ear surgery should delay air travel.

Table 10: Respondents with Previous Ear Surgery

	Frequency	Percent	Valid Percent	Cumulative Percent
No	203	98.5	98.5	98.5
Yes	3	1.5	1.5	100.0
Total	206	100.0	100.0	

DISCUSSION

Preventive Measures of Airplane Ear Discomfort

The current research's key objective is to identify the knowledge of air travellers on the key interventions which could be undertaken while feeling aeroplane discomfort. The results of the current research showed that respondents were aware of a few preventive measures like chewing gum or sweets, yawning or swallowing, blowing against a pinched nose (Valsalva maneuver), otrivin, and decongestant, i.e. lorinase. Notably, in past research, it is addressed that rapid free fall causes ambient pressure change, equalising the middle ear pressure. It can be prevented by the Valsalva maneuver, which is a process helpful in severe cases; however, it requires an oxygen mask. Therefore, adopting passive methods like yawning, moving the jaw, swallowing, etc. are quick techniques to deal with ear discomfort (Naouri *et al.*, 2016; Sannigrahi *et al.*, 2018).

Similarly, Bhattacharya *et al.* (2019) highlighted chewing, swallowing and yawning as helpful measures which should be taken during landing and taking-off since they activate eustachian tubes' muscles bi-laterally. Nonetheless, it is recommended not to sleep during the descent and ascent of flights as it is the period which may create sudden pressure change. Earplugs also assist in equalising the pressure slowly when ear discomfort is felt against the eardrum (Bhattacharya *et al.*, 2019). Valsalva maneuver is one such effective prevention which is beneficial for crucial ear discomfort conditions such as the prevalence of aerotitis media (Sharma *et al.*, 2020). However, another research highlighted that if yawning, jaw movements, and swallowing do not prevent ear discomfort, then the air should be forced into the cavities of the middle ear by

raising nose and mouth pressure to occlude the nostrils (Bagshaw & Illig, 2019).

Sources of Information on Preventive Measures for Ear Discomfort During Air Travel

Health information should be delivered by effective means or sources of measures of preventive measures through websites, leaflets, personal communication and advertisements (Mitchell-Innes *et al.*, 2014). Concurrently, the recent research findings suggested that air travellers should be communicated with basic preventive measures as only a few respondents mentioned the sources of information, including Posters/Leaflets at airports, Posters/Leaflets in aeroplanes, Posters/Leaflets in GP practices/hospitals, Internet, and social media. In this aspect, Mitchell-Innes *et al.* (2014) examined that flight leaflets are the most effective source for OBT since they are provided during the onset of facing any symptoms of ear discomfort during travelling. Some other sources for air travel health advice include the Internet, brochures, books, travel agents, and newspapers (Naouri *et al.*, 2016). Another study pointed out that for the public, education leaflets should be posted on the official website as a significant source for informing about ear discomfort. However, social media is also a useful resource (Ho *et al.*, 2017).

Prevalence of OBT

Ear discomfort during flight or aeroplane air is common whether the travellers are flying in business class or getting leg space; the problem is often faced. The current research highlighted the prevalent symptoms of ear discomfort during air travel, highlighting symptoms

which are most commonly observed such as ear pain, popping noises, reduced hearing, dizziness, and ringing noises in the ear. Similarly, past research highlighted that air travel symptoms include fullness, pain, discomfort, and moderate to mild loss of hearing. However, severe hearing loss, severe pain, vertigo, tinnitus, and hemotympanum are the symptoms affected individuals face in severe cases (Bhattacharya *et al.*, 2019). Nevertheless, another painful ear disorder experienced during air travel due to external pressure's rapid change is called aerotitis media, which leads to pain, vertigo, tinnitus and hearing loss (Sharma *et al.*, 2020). Besides, some of the risk factors for tinnitus and hearing loss other exposure to high noise and low pressure in aircraft include hypertension, acoustic trauma, flying time, smoking and diabetes mellitus causing hearing loss (Muyassaroh *et al.*, 2021). Respondents were also asked if they have had any previous ear surgery and few of them responded 'Yes'. Consequently, Bhattacharya *et al.* (2019) highlighted in their research that individuals suffering from sinusitis, recent ear surgery, common cold, ear infection or nasal congestion should reschedule travel plans or use decongestants an hour or 30 minutes before travel to limit the change of ear discomfort.

CONCLUSION

The pressure changes during air travel is one of the most common challenge which causes barotrauma or OBT. Considerably, equilibration is achieved normally by jaw movements, swallowing, chewing or yawning. Also, prior to the flight the use of an oral decongestant limits the incidence of OBT which is generally recommended to passengers. The research highlighted that it is important to increase the awareness on the prevention measures during air travel to limit ear discomfort among passengers. The common symptoms are often mild but they can get worse like trouble hearing, feeling that ear is blocked, dizziness, severe ear pain and ear discharge. These can cause severe issues and an ear surgery is required therefore taking early measures is important to secure the eardrum. Therefore, education leaflets should be posted on the official website of airlines as a significant source for informing about ear discomfort.

Limitations and Future Implications

The research sample size was limited to the academic staff of Najran University however for generalisability for broader Saudi population, the future research can be enhanced by considering diverse demographics to limit any bias. Additionally, the recent study was limited to survey-based research however in the future it can be improved using open-ended interviews to support survey findings with in-depth perceptions. The current research highlights the most common symptoms observed during air travel and the commonly known preventive measures among public. It will be beneficial for the healthcare sector, aeroplane industry and researchers to increase the general awareness on measures which prevent OBT and other challenges pertinent to ear discomfort during air travel.

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