



Received: 12-01-2023
Accepted: 22-02-2023

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

A Retrospective Clinical Audit of Audiological Care at Bahrain Defence Hospital, Kingdom of Bahrain

¹ Amin S, ² Al Madhoob M, ³ Ali A, ⁴ Al Hoda M, ⁵ Al Omari H

^{1, 2, 3, 4, 5} RCSI Bahrain, PO Box 15503, Building No. 2441, Road 2835, Busaiteen 228, Bahrain

Corresponding Author: **Amin S**

Abstract

Background

The National Health Service (NHS) provides free care for the citizens of Bahrain. It does not have an ear nose and throat (ENT) provision, with many people using secondary care centres. The Bahrain Defence Forces (BDF) Hospital is one of the largest hospitals in Bahrain that serves a range of patients with diverse patient medical needs. This study looked to determine the quality of the audiology provision at the BDF hospital in Bahrain as well as information on audiological issues.

Method

Data on different types of hearing loss, age and secondary conditions were recorded. The study design was in the format of a retrospective clinical audit of the medical records of a random number of patients visiting audiology in the ENT Centre at the BDF Hospital throughout July 2018. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS). Descriptive analyses were performed. Significance was defined as a P value of less than 0.05. Data for audit were compared to a

similar audit completed in an ENT clinic in Scotland, UK.

Results

Of the two hundred and forty-seven patients surveyed, a hundred and fifty-nine (56%) were male. A total of thirty-seven patients with an average age of thirty-eight were recorded as exhibiting conductive hearing loss (CHL). Seventeen patients with an average age of fifty-six were recorded with mixed hearing loss (MHL).

Conclusion

The high sensorineural deafness prevalence in this study coincides with other studies linked to a high rate of consanguineous marriage in the region. The high rate of hearing loss with vestibular disease is linked to the sharing of similar structures such as hair cells and ion channel changes. Hence both would have similar aetiologies.

This study shows that the provision of known evidence-based interventions to improve hearing loss outcomes has been fully acknowledged in this ENT clinic in Bahrain. Quality criteria such as cochlea implants provision is on an equal footing to that of NHS centre in Scotland.

Keywords: Audit, Hearing Loss, Bahrain, Secondary Conditions

1. Introduction

Bahrain's population is 1,501,635, of whom 712,362 are Bahraini nationals. The rest are made up of expatriates. The National Health Service (NHS) provides free care for the citizens of Bahrain. It does not have an ear nose and throat (ENT) provision, with many people having to use secondary care centres. The Bahrain Defence Forces (BDF) Hospital is one of the largest hospitals in Bahrain that serves a range of patients with diverse patient medical needs. This study looked to determine the quality of the audiology provision in a secondary care setting in Bahrain. BDF hospital provides healthcare services for the military, their families, the public sector, referral patients, specialised government personal and royal subjects. Care for patients with ENT is provided at a building with specialised doctors and nurses. In this study we will concentrating on hearing loss, types, ages and any specialised conditions among the patients. Hearing loss can be divided into three basic types: conductive (CHL) which affects the middle ear, sensorineural (SHNL) which affects the inner ear, and mixed hearing loss (MHL) which affects both (Breton *et al.*, 2001)^[1]. Secondary conditions include allergic rhinitis (allergens irritate the nose and cause cold like symptoms), vestibular diseases (Balance disorders that cause dizziness) and Tinnitus (hearing sounds from within the body). Approximately 960 patients attended ENT at the Hospital per week. Appointment intervals for patients with audiological needs differ depending on the individual, from weekly to six monthly, with a mid-interval of 4 months. To date, there have been no published clinical audits of hospital-based ENT care in Bahrain. This study aims to assess the quality of audiological care in a Bahraini secondary care environment.

2. Methods

2.1 Study design

The study design is retrospective clinical audit. The medical records of a random sample of all patients attending the ENT Centre at the BDF Hospital within a 4-week period in July 2018 were collected.

2.2 Methodology

Permission to carry out the clinical audit and ethical approval was provided by BDF Hospital. A sample size of 250 patients was determined to give a 95% probability of being within 5% of the statistically significant range, of determining the prevalence of the main outcome measures in ENT including type and prevalence of hearing loss. As there was no ENT register, a random generated sample of 250 was collected from the hospital database.

2.3 Data collection

Data were collected from the electronic and manual hospital records of the patients in the sample. Data collection took place in July 2018.

A selection of patient records was collected and analysed by two researchers for reliability.

2.4 Data analysis

Data were inputted into an Excel spread sheet from the medical records by the researcher. Parameters included demographic details; risk factors (underlying condition) and levels of control; medications, and the screening for and the presence of complications. Demographics, laboratory investigations and medications were available from the electronic records; other data were collected from the manual records. Complications were recorded if diagnosed in the medical records. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS). Descriptive analyses were performed. Significance was defined as a P value of less than 0.05. Data for audit were compared to a similar audit completed in an ENT clinic in Scotland, UK.

2.5 Data and material requests

The datasets and resources produced during the current study are not publicly available due to confidentiality of the files.

Methods and datasets can be made available from the author upon reasonable request.

3. Results

Medical records were missing for three of the two hundred and fifty patients, resulting in two hundred and forty-seven full datasets. Of the two hundred and forty-seven patients, a hundred and fifty-nine (56%) were male. Screening for Conductive hearing loss, risk factors and complications are documented in Table 1. A total of thirty-seven patients with an average age of thirty-eight were recorded as exhibiting conductive hearing loss (CHL). Seventeen patients with an average age of fifty-six were recorded with mixed hearing loss (MHL). A total of a hundred and sixteen patients with an average age of fifty-three were recorded as having sensorineural hearing loss (SNHL) (Table 1). On review of the complications, sixteen of the patients with conductive hearing loss had vestibular disease. Nine of the patients with mixed hearing loss had vestibular disease and sixty-two of the patients with sensorineural hearing loss had

vestibular disease (Table 2).

NHS Glasgow & Clyde - Clyde in a recent audit was reported to be limited in leadership for paediatric audiology and this service required urgent review unlike BDF which caters for both adults and children. ‘Recommendations include suitable facilities to perform Insert Bone Conduction Visual Reinforcement Audiometry (VRA), aided sound field and speech testing in appropriate audiological conditions. BDF do not have facilities for electrophysiological tests. Modernised hearing aid fitting protocols need to be followed and there should be a move towards ensuring the prescription, verification, evaluation of hearing aids for reviews. BDF does not accommodate hearing aids unlike NHS Glasgow & Clyde, but they do offer hearing aid assessments and aided audiograms for re-programming. NHS Glasgow & Clyde had some geographical issues in accommodating access to suitable levels of support for all, and the heavy work load of the audio logical staff mean that direct involvement with families, especially early can be sporadic. However, a good working relationship with Senior Audiologist/ Salt overcomes most challenges in practical terms. BDF has audiologists that work well with ENT doctors to emulate patients accurately and consistently (Table 3)’.

Table 1: Process and outcome measures at BDF, ENT department

Processes and outcome measures of ENT patients at the BDF.	Frequency n (%)
Gender	
Males	139 (56)
Females	108 (44)
Patients with vestibular disease	
Males	59 (49)
Females	60 (51)
Patients with allergic rhinitis	
Males	36 (52)
Females	34 (48)
Patients with tinnitus	
Males	39 (67)
Females	20 (33)
Patients with surgical history	
Males	42(64)
Females	24(36)
Patients with hearing loss	
CHL	38 (15)
MHL	17 (7)
SNHL	116 (47) (P< 0.05)
Age with hearing loss	
37	38(22)
53	116(68) (P< 0.05)
56	17(1)

Table 2: Frequency of disease type and hearing loss type

Type of hearing loss with disease	Frequency (percentage)
CHL	
CHL and Tinnitus	7(21)
CHL and Allergic Rhinitis	11(32)
CHL and Vestibular disease	16(47)
MHL	
MHL and Tinnitus	8(33)
MHL and Allergic Rhinitis	7(29)
MHL and Vestibular disease	9 (38)
SHNL	
SHNL and Tinnitus	30(24.5)
SHNL and Allergic Rhinitis	30(24.5)

SHNL and Vestibular disease	62(51)
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Table 3: Comparison of process and outcomes measures in the ENT clinic of the Bahrain Defence Forces Hospital (Bahrain), Isa Town Health Centre (Bahrain) and NHS Glasgow & Clyde, Scotland (UK)

Process/outcome measures	BDF (Bahrain)	Glasgow and Clyde audiology (Scotland)
A comprehensive range of audiological assessments are available locally	Met criteria with some recommendations	Met criteria
Hearing aid assessments and reprogramming assessments are available locally	Met criteria with some recommendations	Met criteria
Cochlea implants available	Met criteria	Met criteria
Equipment is calibrated annually. Daily checks are conducted and documented	Met criteria	Met criteria
Clear referral pathways which are widely Disseminated.	Met criteria	Met criteria

4. Discussion

This study documents that the provision of known evidence-based interventions to reduce hearing loss outcomes has been fully realised in this centre in Bahrain. Quality criteria such as cochlea implants are on an equal setting to that of NHS Glasgow & Clyde in Scotland (www.nhsggc.org.uk) The impact of failing to lower the increasing incidence of vestibular diseases in patients with sensorineural hearing loss is likely to be considerable, with a higher link to other complications, and the resulting personal and economic costs associated with this hearing complication. However, this study has reported that many process measures are assessed for most patients, and this compares advantageously with the situation in Scotland. The high sensorineural deafness prevalence in this study coincides with other studies on deafness indicating that the major factor is genetics (Das, 1996)^[2] (Gysin *et al*, 2000)^[4] (Jamal *et al*, 2000)^[5]. This has been linked to a high rate of consanguineous marriage in the region (Das, 1996)^[2]. Our selection criteria for hearing loss is similar to other studies and selection of patient standards in non-modern textbooks (Douek, 1999)^[3]. More studies are needed to investigate the gene targets in this population to better understand the genetics of sensorineural deafness.

The high rate of hearing loss with vestibular disease also coincides with other studies (Lavender *et al*, 2022)^[6]. This is due to the vestibular system and the inner ear auditory portion sharing similar structures such as hair cells and ion channel changes. Hence both would have similar aetiologies.

5. Conclusions

The high sensorineural deafness prevalence in this study could be linked to a high rate of consanguineous marriage in the region. The high rate of hearing loss with vestibular disease is linked to the sharing of similar structures such as hair cells and ion channel changes. Hence both would have similar aetiologies. This study shows that the provision of known evidence-based interventions to improve hearing loss outcomes has been fully acknowledged in this ENT

clinic in Bahrain. Quality criteria such as cochlea implants provision is on an equal footing to that of NHS centre in Scotland. More studies are needed to confirm these findings.

6. Declarations

Ethical approval and consent to participate.

Ethical approval was provided by RCSI-Bahrain and BDF.

7. Consent for publication

Not applicable in this publication

8. Availability of data and materials

These are available upon request.

9. Competing interests

The authors declare no competing interests.

10. Funding

This study was funded by RCSI-Bahrain.

11. Acknowledgement

We would like to thank the staff at BDF for their help in accessing the data. RCSI-Bahrain provided funding for this study.

12. Author contributions

SA wrote the paper. MM and HA collected data. MA and AA did the analysis.

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