

# Bedouin Children in Southern Israel: Epidemiological Factors Associated with Hearing Impairment

R Isralowitz, T Liss, W Martin, M Abu Rabia

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## Abstract

The purpose of this effort was to provide otoscopic examinations, tympanometric evaluations and pure-tone air screening screen among Bedouin children in the Negev and to assess the causes for hearing difficulties. Prospective examinations were conducted on 64 pre-selected Bedouin children aged 3 months to 15 years in a clinic setting and in tents and shanty dwellings. Of all the children examined, the most prevalent problem was middle ear effusion in at least one ear among 92% of the children. Five children were found to have untreated sensory neural hearing loss that may be related to genetic disorders and the consequences of consanguinity. Differences in living conditions among the Bedouin children, semi-nomadic and urban, tend to show that the desert children have more impacted cerumen that may be an outcome factor related to hygiene issues or access to bathing facilities. Future programs should be designed for and targeted to Bedouin in order to facilitate outreach services that promote early detection and prevention interventions.

## INTRODUCTION

In the southern region of Israel, the Negev, approximately 25 percent of the region's 440,000 inhabitants are Bedouin, derived from the Arabic word badawi - man of the desert. Among the 110,000 Bedouin, about 60 percent have settled in urban development towns ranging in size from a few thousand to as much as 35,000 in one location, specifically the town of Rahat. The remaining 40,000 Bedouin retain a semi-nomadic existence living in spontaneous hamlets throughout the region. Medical services are provided, primarily through the General Health Services Fund -- Kupat Holim Clalit; however, certain screening procedures such as hearing are neglected because of the lack of qualified personnel and resources required to provide intervention.

Hearing impairment is a common sensory impairment. According to one recent source, it is estimated that 120 million people in the world have hearing difficulties that effect their functional ability (Kapur, 1995). For young children, such an impairment left undetected and untreated will lead to development setbacks of communication skills including speech, language and social interaction (Bafaqeeh et al., 1994). In developing areas, hearing loss is a major source of disability (Wilson, 1990). It has been noted that:

...World Health Organization estimates that there are 42 million people in the world older than 3 years who have

moderate to profound hearing impairment (a loss of 42 dB or greater in the better ear). Two thirds of these people (28 million) are believed to reside in the Third World.... Otitis media, measles, mumps, rubella, trauma, noise exposure, meningitis, ototoxic drugs, cytomegalovirus, tetanus, Lassa fever, hypothyroidism, hypoxemia at birth, hyperbilirubinemia, foreign bodies, genetic factors, and other causes have all been associated with hearing loss. Many of these causes are preventable and others are curable (Seely, et al., 1995).

## METHODS

A pilot project was conducted to identify hearing problems among Bedouin children in the areas of Dimona and Rahat (population centers) in the Negev. The effort involved the coordination of a senior faculty member of the Department of Social Work, Ben Gurion University, the volunteer efforts of an expert in the field of audiology from the United States, the cooperation a physician with administration responsibility for Kupat Holim Clalit medical services in the region; and the field assistance of a Bedouin family physician responsible for health care among the target population. Otosopic examinations, tympanometric evaluations and pure-tone air conducted hearing screenings at 500, 1000, 2,000 and 4,000 Hz were conducted. The expert audiologist from the United States provided his own travel arrangements, otoscope, portable tympanometer, and

battery-powered audiometer. Arrangements for the audiometer were made through Rambam Medical Center in Haifa with the generosity of a medical supply company, Lemi-Op Ltd. in Bney Brak, Israel. The Bedouin physician and the physician/administrator of Kupat Holim Clalit provided home hospitality during the expert's visit to the Negev.

Regarding the selection process of the study cohort, the Bedouin physician contacted several families that had children suspected of having hearing problems and arranged for them to be at the Dimona Kupat Holim Clalit Clinic for evaluation. A quiet room at the Clinic was provided for testing and translation between the families and the visiting audiologist. Also, for children who could not be brought to the Clinic, the audiologist was taken into the desert to do testing on location (i.e., in tents and shanty houses). A concise summary of the results from otoscopic, tympanometric and air-conduction screening for each client was delivered to the Bedouin physician for clinical follow-up. Testing was also performed at the Kupat Holim Clalit Clinic in Rahat. An attempt was made to examine children from a local school but the students were not able to come for testing. Other children suspected of having hearing problems did come for evaluation and a graduate social work student provided translation. Evaluations in Rahat were performed in a quiet section of the Magen David Adom (Israel Ambulance Corp) station adjacent to the clinic. A summary of the results was provided to a Kupat Holim Clalit administrative nurse at the Clinic for follow-up. The findings from both locations (Dimona periphery – rural environment; and Rahat – urban setting) are reported under the Results section of this article.

While the study was prospective, it was expected that there might be different types and degrees of hearing losses found in the Bedouin children living in the desert compared to those living in an urbanized population center. The assumption was that the desert children would have a higher incidence or more severe expression of ear disease than the urban children because of differences in access to health care services. In fact, no survey of otologic problems among Bedouin children has ever been formally reported; therefore, no predictions of what would be found could be made.

It was expected that there would be an equal study sample of children from each environment setting. This was not possible. A total of 48 children were screened in the rural setting and 16 children from the urban environment.

## **RESULTS**

A total of 64 children between the ages of 3 months and 15 years of age were evaluated. Among those examined, 94% (60) had some form of otologic pathology. In general, the results indicate a very high incidence of true otologic problems in this pre-selected population. The most prevalent problem was middle ear effusion as indicated by flat tympanograms in at least one ear of 86% (55) of the children with problems. In terms of otoscopic examinations, external or middle ear problems were identified in 39% (25) of the children. The problems included tympanic membrane retraction, redness, extensive scarring and perforations, red ear canals, and white discharge. The third most common problem was impacted cerumen found in 23% (15) of the children. Most of these problems are all medically or surgically treatable and some will undoubtedly be self-resolving. Some disorders that do not spontaneously resolve will probably increase in severity over time. Other problems were present but a relatively low rate of incidence was found.

The most serious problems observed were five cases of probable sensory neural hearing loss that were untreated up to the time of the examination. Three of the cases were young children with Bartter's Syndrome (juxtaglomerular cell hyperplasia), all from one family. An explanation for this finding may be related to genetic disorders and consequences of consanguinity.

Regarding the differences in otologic problems between semi-nomadic and urban Bedouin children, there was a tendency among the semi-nomadic children to have more impacted cerumen than the urban children. This result, based on speculation only, could be related to hygiene issues or access to bathing facilities. The relative proportions of other major problems, especially flat tympanograms and abnormal otoscopic examinations, were very similar.

**Figure 1**

Table 1: Summary of Clinical Findings Among Bedouin Children (N = 64 children, ages 3 months to 15 years)

<u>Noted Problem</u>	<u>Number of cases</u>
	(Percentage of those children who failed and exhibited some form of otologic pathology)*
Flat tympanograms in at least 1 ear	55 (86%)
Abnormal otoscopic exams (including tympanic membrane retraction, redness, and excessive scarring and perforations, red ear canals, and white discharge)	25 (39%)
Impacted cerumen	15 (23%)
Probable sensory neural hearing losses	5 (8%)
Cases of Bartter's syndrome	3 (5%)
Negative pressure tympanograms	3 (5%)
Low compliance tympanograms	2 (3%)
Tympanic membrane perforations	2 (3%)
Reported delayed speech	2 (3%)
Skin lesions of the pinna	2 (3%)
Preauricular tag	1 (2%)
Occluded tympanic membrane ventilation tube	1 (2%)
Tay-Sach's disease	1 (2%)

\*Note: Percentage scores are rounded off to the nearest whole number

**DISCUSSION**

It is apparent that even a limited endeavor such as this undertaking has considerable potential for enhancing the quality of life of children with hearing problems providing follow-up services are made available and are used. From this experience, the importance of individualized and aggressive follow-up by a physician or other health specialist appears to be a major determinant influencing the extent of professional attention children will receive. Often, especially in underdeveloped third world living conditions, the personal factor including an individual's motivation and ability to communicate, coordinate and cooperate resources for clients tends to be one of the most important determining factors influencing the success of intervention and the amelioration of problems.

Clearly, the results of this pilot effort reveal that there is much work to be done with the Bedouin of the Negev. Hearing problems exist in large proportions, most of which can be medically or surgically treated. Other problems requiring aural rehabilitation and amplification also exist and need to be addressed. To address this condition, consideration should be given to establishing a hearing-screening program for Bedouin children, especially for those living in semi-nomadic conditions without access to health clinics and schools where normal screening is provided to the general Israeli school age population. A mobile outreach program that includes a trained health services professional with portable equipment, similar to Negev Project Vision, a cooperative effort involving the Department of Social Work,

Ben Gurion University, the Department of Ophthalmology, Soroka Medical Center in Beer Sheva and Kupat Holim Clalit, which addresses eye problems among Bedouin, Ethiopian and other underserved populations in the region (Isralowitz et al., 1995) may be an efficient and effective way of providing needed otologic care.

In the context of community organization, a number of issues seem particularly relevant. The first aspect is social support. Through the use of Bedouin social work students and community-based service personnel, relations were developed with families and their children to promote their understanding of the importance of proper hearing. Like many other minority "out" groups, Bedouins -- especially those living in semi-nomadic and nomadic conditions, are relatively isolated from formal sources and channels of information. They tend to be influenced by networks of friends, family members and tribal leaders more so than physicians and other health care professionals. The informal network is an influential means of achieving the goals of services organization and provision targeted to the Bedouins. Second, by providing a successful experience in the form of hearing examinations and follow up treatment, a natural campaign of early detection and intervention can be created among Bedouins for the health care of their children. A third aspect of the project that should be considered for development involves the need for multiple tactics of organization rather than a reliance on a single intervention. Neighbor-to-neighbor appeals especially for those living in an urban setting; publicity campaigns via print and other media distributed in schools, cultural and sport centers as well as places of religious worship places; and, group programs may be included in community organization programs. Thus, individuals isolated from one channel of information because of factors such as low literacy or economic disadvantage may be reached by another. This approach calling for multiple outreach strategies generates a condition whereby the aggregate effects of all may exceed by far the impacts of individual interventions (Fisher, et al., '992).

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**Author Information**

**Richard Isralowitz, PhD**

Department of Social Work, Ben Gurion University

**Tzvika Liss, MD**

Kupat Holim Clalit, Negev Region Office

**William H. Martin, PhD**

Oregon Hearing Research Center

**Muhammed Abu Rabia, MD**

Kupat Holim Clalit, Negev Region Office