

MEHA Project 1, The Early Detection of Hearing Loss in Infants

Accomplishments and Large Scale Impacts

Introduction

The Middle East Association for Managing Hearing Loss (MEHA) was formed in May 1998 under the auspices of the Canada International Scientific Exchange Program (CISEPO). MEHA was constructed to provide opportunities for health specialists, related professionals, and lay people from Israeli, Jordanian, and Palestinian communities to address issues of common concern related to hearing loss. His Royal Highness, Prince Firas bin Raad, is the Patron of MEHA. MEHA Project 1 has been acclaimed by regional and Canadian governments as a successful demonstration of technical development and of community and peace building.

Project Accomplishments

MEHA's Project 1 completed the screening and habilitation of nearly 14,000 Israeli, Jordanian, and Palestinian infants (5,040; 8,118; and 700, respectively) by the end of December 2003. During the two and a half year of the Project, its activities led to and supported the formation of additional cross border groupings and cooperative programs. The Project also facilitated knowledge transfer and sharing within the the region and the development of inter and intra national cooperation in the development of health services networks.

To date, 111 Jordanian children have been diagnosed with bilateral sensory neural hearing loss. The six month habilitation program with individual treatment programs has been offered to all of these children. Already, 58 of these infants have been fitted with hearing aids and provided with a range of 4 to 51 habilitation sessions.

Knowledge Transfer and Sharing

Nine, joint Canadian, Israeli, Jordanian, and Palestinian publication reflecting the results and cooperative activities of MEHA Project 1 were accepted for presentation at the International Evoked Response Audiometry Study Group (IERASG), June 2003, Scientific Conference and at NHS 2004: The International Conference on Newborn Hearing Screening, Diagnosis and Intervention, Cernobbio (Como), Italy, May 2004. See Annex 1 for a listing of the papers and Annex 2 for the abstracts for the NHS Conference.

Through MEHA's and CISEPO's efforts in Project 1, the Audiology and Speech Pathology program at the Faculty of Applied Medical Science, Jordan University of Science and Technology (JUST) has been accredited by the Ministry of Health of Israel. Palestinian and Israeli Arab students who train at JUST are now able to work at hospitals and other institutions in Israel.

Networking and Influence of Governments and Regional Institutes

The Director, Royal Medical Services Directorate, Royal Medical Services of Jordan (RMS), reported that, on the basis of the results of MEHA Project 1, the RMS has introduced universal screening of new born infants for hearing loss as a standard practice.

As reported in the local Amman press, 28/6/2003. “The Minister of Health, Dr.Walid Ma'ani, announced that his Ministry will adopt an advanced project for universal hearing screening in collaboration with an International Organization [MEHA].This project proved to be effective and essential for MOH future plan. Hereditary hearing loss seems to be common due to high consanguinity.”

The Minister of Health reported that based on his recommendations, the Ministry of Planning has allocated US\$20,000 to support the extension of Project 1's infant hearing loss screening project.

The MEHA Regional Centre in Amman regularly receives requests for consultations from the Arab world and international bodies related to implementing neonatal hearing screening program. On the basis of Project 1, MEHA staff were invited on behalf of Hamad Medical Institute, Qatar to visit and to assist in implementing a universal newborn hearing screening program in Doha.

MEHA, Jordan was invited by the Director of Holy Land Institute for the Deaf (HLID), Brother Andrew, to manage and implement a screening project for infants, sponsored by the Spanish Red Cross, to screen and to provide diagnostic and rehabilitative services in two of the most underprivileged areas of the country, Maan county and Shwneh districts (South and North Jordan Valley).

The MEHA Regional Centre in Jordan was invited by the Minister of Health, Dr.Hakim Al Kade, to present a workshop about Universal Neonatal Hearing Screening (UNHS) in Jordan, for Ministry officials and staff. The workshop was held in December 2003 with the participation of the Ministry, HLID, and the Royal Medical Services (RMS). Topics addressed included: Investigating and setting up UNHS at Mother and Child Clinics (MCCs); Developing a screening protocol suitable for Jordan; Supporting MOH in the same way as for the RMS program; Increasing public awareness; and setting up a good model for diagnosis and habilitation.

Peacebuilding and Cooperation

Ongoing tensions in the region placed pressure on individuals and networks. The threat of war and the actual war in Iraq disrupted planned meetings of government officials and Ministers organized to discuss MEHA and Project 1. Nevertheless, the cooperation at the operational level was maintained with joint training programs of Israeli, Jordanian, and Palestinian participants, meetings of the MEHA Operating and Steering Committees, and publication of joint scientific papers on the results of MEHA Project 1.

Project 1 has facilitated an ongoing level of contact among Canadians, Israelis, Jordanians, and Palestinians even during the ongoing heightened political unrest. The project also has facilitated communications across borders and additional cooperative activities between Arabs and Israelis outside of the project that otherwise would not have happened.

Community Involvement

Parental acknowledgment and appreciation for the quality of service provided by MEHA regional centre is continuing to grow, especially among those included in the neonatal hearing screening program and habilitation. Pediatricians and other professionals are more aware of the importance and necessity for a universal hearing screening program. These results were achieved through the activities of the MEHA Project 1 and the scientific participations of MEHA members in international fora and publications.

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NHS 2004: The International Conference on Newborn Hearing Screening, Diagnosis and Intervention, Villa Erba Congress Center, Cernobbio (Como), Italy, May 27-29, 2004

Accepted Abstracts from MEHA Project 1:

Unique findings and constraints in early detection of hearing loss in the Middle- East: The joint Israeli, Jordanian, and Palestinian experience - *H. Pratt, P. Aber, M. Al Masri, J. Attias, R. Jebara*

Genesis of a Regional Organization to Focus on Hearing Loss in the Middle East: MEHA - The Middle East Association for Managing Hearing Loss - *P. Aber, M. Al Masri, J. Attias, R. Jebara, H. Pratt*

Economic Aspects of Early Detection of Hearing Loss for Israeli, Jordanian, and Palestinian Infants: The Middle East Association for Managing Hearing Loss (MEHA), Project 1, The Early Detection of Hearing Loss in Infants - *P. Aber, M. Al Masri, J. Attias, R. Jebara, H. Pratt*

Sensorineural Hearing Loss Among Israeli, Jordanian, and Palestinian Infants: The Jordanian Experience - *M. Masri, R. Jebara, P. Aber, J. Attias, H. Pratt, A. Noyek*

Congenital or Early Onset of Sensory Neural Hearing Loss among Israeli, Jordanian, and Palestinian Infants: The Israeli experience - *J. Attias, M. Al Masri, R. Jebara, H. Pratt, P. Aber, A. Noyek*

Sensory Neural Hearing Loss Among Israeli, Jordanian, and Palestinian Infants: The Palestinian Experience - *R. Jebara, P. Aber, M. Masri, J. Attias, H. Pratt*

Accepted Abstracts By IERASG 2003:

A NOVEL MEHA* PROJECT FOR EARLY DETECTION AND REHABILITATION OF JORDANIAN, ISRAELI AND PALESTINIAN NEW BORN WITH HEARING LOSS
J. Attias, M. Al-Masri, R. Jabarra and H. Pratt.

THE INCIDENCE OF CONGENITAL OR EARLY ONSET SENSORINEURAL HEARING IMPAIRMENT AMONG JORDANIAN AND ISRAELI HIGH-RISK CHILDREN
M. Al-Masri, M. Al-Omari, Y. Attias, R. Jbarah, L. Abu-Khaderah, S. Yagmoor, W. Abtush and H Pratt.

NEONATAL HEARING SCREENING OF JORDANIAN, PALESTINIAN AND ISRAELI NEONATES AND INFANTS: ADAPTING THE PROTOCOLS TO LOCAL CONSTRAINTS
M. Al-Masri, M. Al-Omari, J. Attias, R. Jebara, H. Pratt, A.M. Noyek, Z. Elnasser, J Levasseur, L. Abukader, S. Yagmor, W. Ebtush, A Qudah and P.G. Aber.

**Genesis of a Regional Organization to Focus on Hearing Loss in the Middle East:
MEHA - The Middle East Association for Managing Hearing Loss**

Phil Aber, the University of Toronto; Mohammad Al Masri, Jordan University of Science and Technology; Joseph Attias, University of Haifa; Rema Jebara, Al Quds University; Hillel Pratt, Technion – Israel Institute of Technology

The high incidence of hereditary hearing loss in the Middle East region makes its early detection a shared interest for Israelis, Jordanians, and Palestinians. The Middle East Association for Managing Hearing Loss (MEHA) was formed in May 1998 to provide opportunities for health specialists, related professionals, and lay people from Israeli, Jordanian, and Palestinian communities to address issues of common concern related to hearing loss. Project planning and implementation within MEHA was based on professional considerations and the requirement to establish an effective, cross-border organization focused on hearing loss.

MEHA's organizational structure accommodated local sensitivities and the need to address political realities within the region. MEHA's initiation of cooperative projects (e.g. MEHA Project 1, The Early Detection of Hearing Loss in Infants) was dependant on, and also contributed to, international cooperation.

MEHA's Project 1 completed the screening and habilitation of nearly 14,000 Israeli, Jordanian, and Palestinian infants (5,040; 8,118; and 700, respectively) and supported the formation of additional cross border groupings and cooperative activities. A key factor in the genesis and success of MEHA has been the participation of an external academic, scientific organization, the Canada International Scientific Exchange Program (CISEPO). The structuring and operation of MEHA can serve as a conceptual and operational model also suitable for generating cooperative actions in other disciplines and geographical areas.

Sensory Neural Hearing Loss Among Israeli, Jordanian, and Palestinian Infants: The Palestinian Experience

Rema Othman Jebara , Al Quds University , Phil Aber , the University of Toronto ; Mohammad Al Masri , Jordan University of Science and Technology : Joseph Attias , University of Haifa ; Hillel Pratt , Technion – Israel Institute of Technology .

As part of a joint cooperative project for Early detection of Hearing loss in Israeli , Jordanian and Palestinian infants , 700 Palestinian newborns were screened at The Makassid Hospital in , East Jerusalem

Despite the small sample, the structuring of the project demonstrated the effectiveness of the model for future endeavors, including the expansion of Middle East Hearing Association (MEHA) Project 1 to screen additional Palestinian infants. The approach in this prototype generated interest for the introduction of screening to other Palestinian hospitals in the Palestinian Authority such as Ramallah, Nablus, Hebron, and Gaza .

In this study we compared the Audix system for screening by distortion product otoacoustic emissions (OAE) and the IIO88 for transient click OAE

From our sample, one newborn was verified to have a unilateral, sensorineural hearing loss based on ABR results . The infant was in the high risk group because of cleft palate .

In addition, many other interesting and important features characterizing the Palestinian social and cultural structure were noted. In particular, the importance of newborn screening introduced with it the effectiveness of early habilitation of hard of hearing impaired children were demonstrated, as was the need in the community for additional professionals in the field of diagnosis and habilitation of these children .

**Unique findings and constraints in early detection of hearing loss in the Middle-East:
The joint Israeli, Jordanian, and Palestinian experience**

Hillel Pratt, Technion – Israel Institute of Technology; Phil Aber, the University of Toronto;
Mohammad Al Masri, Jordan University of Science and Technology;
Joseph Attias, University of Haifa; Rema Jebara, Al Quds University

Most data on hearing screening to date has been obtained in European and North American studies on relatively uniform populations in terms of socio-economic and genetic backgrounds. The Middle-East includes a wide variety of societies with widely different backgrounds. This region, therefore, affords a unique opportunity to validate screening practices accepted in Europe and North America and their appropriateness to other parts of the world that have different constraints. In the MEHA project on the early detection of hearing loss in infants, a variety of populations was examined using the same equipment and protocols. The findings of the project were compared among populations within the region and with other parts of the world.

The main findings of this project were an unusually high incidence of congenital and progressive or acquired hearing loss in some of the populations, as well as a different distribution of risk factors for hearing loss between populations, irrespective of economic conditions but highly correlated with consanguineous marriages. In addition, in the poorer populations, a high and seasonally fluctuating incidence of conductive hearing loss was observed, more so in rural areas. Delaying the age of screening to a few months has the benefit of detecting the progressive losses, but the interference of conductive loss with the ability to screen using otoacoustic emissions is then more likely.

These findings should be taken into consideration in instituting screening, habilitation and counseling programs in non-western societies, as well as in specific populations in western countries with unique socio-economic features. Special attention should be given to populations at risk for genetic or acquired hearing loss and to the interaction of socio-economic conditions with risk factors for hearing loss. Regional studies such as this have the added value of sharing the experience and expertise of all partners and thus they promote health and well being among all populations through cooperation.

Congenital or Early Onset of Sensory Neural Hearing Loss among Israeli, Jordanian, and Palestinian Infants: The Israeli experience

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During a joint, cooperative project amongst Israelis, Jordanians, and Palestinians, on the early detection of hearing loss in infants, the incidence of hearing loss was studied for the three populations. Special attention was given to exploring the differences in the prevalence and severity of the risk factors for hearing loss within, and between, the three communities. Within Israel, a comparison was made between Israeli-Jewish and Israeli-Arab populations. The screening systems and protocols were identical for the three populations: DPOAE, and if repeated testing failed, ABR, followed by a detailed audiological evaluation. When necessary, auditory rehabilitation was applied. In Israel, 5,040 new-borns were tested 89% of them Israeli-Jewish and 11% Israeli-Arab. Among the Israeli-Jewish population, the overall rate for bilateral, severe, permanent hearing loss was 1:1,260 with 1:4,878 in non-risk infants, and 1:54 in high-risk. Including unilateral hearing loss, the rate increased to 1:719 in the entire population, 1:1,219 in the non-risk, and 1:54 in the risk infants. However, the incidence of bilateral hearing loss in the Israeli-Arab infants was markedly higher than in the Israeli-Jewish population, with approximately 10-20 times higher rate of hearing loss. For the Israeli-Arab infants, both the severity and the prevalence of risk factors was greater than in the Israeli-Jewish infants, mainly in "family history" and in "syndromes associated with hearing loss". An even higher rate of hearing loss was found in the Jordanian part of the project. Although the three communities are situated in a similar geographical region, the incidence is remarkably different among populations and profoundly high compared to the incidence in Europe and the United States. Thus, the Arab communities might be considered as a special population that is at great risk for hearing loss. This unique study has also demonstrated that mutual research and clinical efforts among Israeli, Jordanian, and Palestinian investigators can promote health benefits for the children and contribute to peace among the communities.

Sensorineural Hearing Loss Among Israeli, Jordanian, and Palestinian Infants: The Jordanian Experience

Mohammad Al Masri, Jordan University of Science and Technology; Rema Jebara, Al Quds University; Phil Aber, the University of Toronto; Joseph Attias, University of Haifa; Hillel Pratt, Technion – Israel Institute of Technology; and Arnold Noyek, the University of Toronto

Abstract

Universal neonatal hearing screening programs are becoming a goal and widely recommended in the developed countries. In the Middle East, where congenital and early onset sensorineural hearing loss seems to be notable, universal neonatal hearing screening is far from being adopted or considered in the priority of governmental policies. The Middle East Association for Managing Hearing Loss (MEHA) was established in 1998, by Canadian, Jordanian, Israeli, and Palestinian scientists. The first project of MEHA was directed to investigate the needs for universal neonatal hearing screening programs and to develop mechanisms suitable for Middle Eastern society.

About 14000 Jordanian, Israeli and Palestinian neonates and infants were screened. In Jordan, over 8000 neonates and infants aged less than 3 months were screened using TEOAE and/or DPOAE of ILO 92 and/or AuDx systems. The sample was selected randomly from all counties in Jordan. The results illustrate that the incidence of congenital or early onset of sensorineural hearing at the age 0-36 hrs is approximately 0.9% and at the age of 1-3 months is about 1.2%. The study also investigated the effects of genetics, hereditary, social and economic status, age of screening, and geographic locations on the incidence of hearing loss and parental acceptance of hearing screening. It also revealed that these factors have a significant effect on the incidence of hearing loss. Apparently, the social and economic status has a strong correlation with parental acceptance of a universal hearing screening program.

A comparison between Jordan and other populations in the region reveals that the incidence of hearing loss in Jordan is remarkably higher than that among the Israeli-Jewish population, and is comparable to Israeli-Arab and Qatari populations.

It was concluded that a universal hearing screening program is necessary and should be adopted in Jordan. Apparently, screening at the age of 1-3 months with the first vaccination is more effective and is advantageous over neonatal screening.

**Economic Aspects of Early Detection of Hearing Loss for
Israeli, Jordanian, and Palestinian Infants:**
*The Middle East Association for Managing Hearing Loss (MEHA),
Project 1, The Early Detection of Hearing Loss in Infants*

*Phil Aber, the University of Toronto; Mohammad Al Masri, Jordan University of Science and
Technology; Joseph Attias, University of Haifa; Rema Jebara, Al Quds University; Hillel Pratt,
Technion – Israel Institute of Technology*

MEHA's Project 1 completed the screening for hearing loss of nearly 14,000 Israeli, Jordanian, and Palestinian infants (5,040; 8,118; and 700, respectively) with follow-up habilitation provided as appropriate. The screening and habilitation took place in a controlled project situation with costs for the various, individual activities identified and verified, including the planning, acquisition of equipment, recruiting and training of professional staff, cross-border cooperative initiatives, and analysis of results. This raw data was used to calculate the costs in each community: for individual screenings, for identifying cases of hearing loss, and for habilitation services to these infants. The costs varied greatly, ranging from an average of US\$14 for screening an infant where testing equipment was "borrowed" and therefore did not require purchasing, to an average of US\$48 per infant across the total 14,000 population screened. The key issue in defining and calculating meaningful costs is the extent to which the existing infrastructure for the screening of hearing in infants is already established in the private sector and/or by government.

The program for the Jordanian dimension of the project required that a complete infrastructure be established. In this instance, the costings provide realistic estimates for the introduction of UNHS programs where no infrastructure exists; a consideration of interest to governments when contemplating UNHS as a new policy initiative. Costs in the project for the Israeli contingent reflect the "net investment" required for introducing a screening program when an extensive hearing loss-management, infrastructure already exists. The costs for screening infants in the Palestinian pilot project demonstrated that costs can be minimized when cooperative services are provided or volunteered and equipment is donated. These latter findings demonstrate an alternate model for the introduction of specialized health services. In most instances, the activity costs which are identified, particularly salaries, reflect the different economic and social conditions existing for the Israeli, Jordanian, and Palestinian communities.