

Water Babies

Dr. Hagit Friedman



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Dr. Hagit Friedman has been involved in developing Infant Neuro Aquatics, a treatment for prematurely born infants suffering from developmental disorders. In this interview Dr. Friedman elaborates on the current state-of-the-art in the field and the results of her recent work.



As a starting point, please explain how your research background led to your current interest in premature birth?

Towards the end of my PhD I realized that I wanted to change direction and work with people rather than microscopes and neuronal cell cultures, to see the humans that are behind the synaptic proteins we tracked in my PhD project.

How did Infant Neuro Aquatics, as a developmental impairment treatment of premature infants, become your specific research interest? Where does your research fit in the larger context of current medical research?

I can identify two milestones in my biography that led me to choose my research questions. The first was a seminar course I took towards the end of my PhD on 'new findings about the biological mechanisms behind Psychiatric illnesses', where I "met" the molecules I tracked with the computerized confocal system, but in their clinical context. The second was meeting families with babies who were born premature, when I took my own child to a private water class, and the impression I had about the change in these babies along the three-month class.

Have you encountered any obstacles while doing your research?

As we work with a sensitive population (young infants that were born premature), and as my research projects are ground breaking, the first challenge is the ethics approval. We have clinical trials committees in both the institute (university / hospital) and the head office of ministry of health. We overcame the difficulties by good hard work together with the committees.

Have you made any major discoveries to date, and if so, what are the potential implications?

Amongst the major discoveries are those regarding safety: there has been no report of infant illness associated to training in water. Immediate beneficial results include eliciting of an infant "quiet alert" state in the water, decreased muscle tone and spasticity, reduction in anxiety and stress levels, improved sleep and feeding, and general comfort due to decreased tension. Our developmental track results show significant long term improvement of 40 per cent and significant immediate improvement of 60 per cent in developmental tracks of babies receiving Infant Neuro Aquatics compared to babies who did not.

We conclude that Infant Neuro Aquatics adjusted for young infants born premature, can be safely applied and regarded as a suitable aquatic rehabilitation approach. Additionally, early initiation of Infant Neuro Aquatics adjusted for young infants born premature, during pick activity of cortical sub plate, may be beneficial for their neural development.

Do you envision any type of Infant Neuro Aquatics treatments emerging from your work and how they might be implemented for the benefit of the public at large?

Until now, and although water activity has been widely known and popular for toddlers, it has not yet been scientifically proven as a developmental treatment for infants and hence has not become a part of the regular "basket of treatments" recommended by medical insurance and clinicians for young infants. I hope that our results, and results of additional studies alike, will change the current approach "from the field, and upwards".

What long-term consequences would you expect your work to have on future research and potentially on healthcare, society and policy?

With additional study projects I would expect the health care establishment to acknowledge Infant Neuro Aquatics as a safe and efficient early developmental intervention, and will include it in the battery of treatments funded by the government. This will allow families from remote settlements and low income parents to reach Infant Neuro Aquatics and give their babies a better chance for good health and development.

Are you planning to extend this research further? Where might you look next and why?

I want to establish specific long term protocols for specific neural conditions / difficulties. In the present stage we built a general protocol for the most common clinical characteristics of premature young infants, and we added to it a "personal touch" to assist with specific difficulties of certain infants. Next, I will want to build long term protocols for specific neural injuries in babies.

Is there anything else you wish to add?

I wish to thank the parents of the premature infants for their trust and participation – to allow us to track their infants' development and train with them in the water.

I love my work, still exciting me every day – big present.

I hope that after all the hard work we do in this project; we will be able to give the families of babies with developmental risk and practitioners an organized "cookbook", or at least a set of recommendations in this approach, based on our scientific research.

Infant Neuro Aquatics: Good for babies, good for parents

An increasingly large number of infants are born prematurely due to modern medical interventions such as In Vitro Fertilisation. Many of these infants suffer from various developmental impairments, and Dr. Hagit Friedman work aims to treat these impairments by exposing infants to water activity, a technique which she calls Infant Neuro Aquatics.

PREMATURE BIRTH

Premature birth is the birth of a baby at less than nine months of gestation. In Europe and many developed countries the preterm birth rate is generally 5-9 per cent, and in the USA it has risen to 12-13 per cent in the last decades. A continuously growing phenomenon, prematurity is a risk factor for multisystem injury, as body systems of the premature infants are not ripe for life out of uterus. Health problems may include immediate and long term complications. In the long term, prematurity leads to high risk for brain injury and developmental impairments, ranging from Minor Neurological Dysfunction, through ASD, to Cerebral Palsy. The earlier the baby is born, the greater the risks.

Early intervention may minimise developmental deficit for infants at risk. Our [...] results show 40 per cent long term and 60 per cent immediate improvement in developmental tracks of babies receiving Infant Neuro Aquatics compared to babies who did not.

Dr. Hagit Friedman has been focusing her research efforts on developing a technique named Infant Neuro Aquatics thought to aid premature infants develop normally. She explains that there has always been a "tradition" of water activity for children, mostly related to sports, and although, the nurses at the Neonatal Intensive Care Unit shared with her the positive changes in the behaviour of premature neonates after bath, there have been very few scientific papers in this field to rigorously study the effects of water activity on infant development and growth. Dr. Friedman

therefore set out to do a careful scientific analysis, hoping to show that this activity is indeed good for babies at developmental risk. She also hopes to develop suitable protocols and assess which impairments can be treated in this way. Dr. Friedman is, to her knowledge, the only researcher working on the effects of water activity on very young infants who were born prematurely.

CAUSES AND TREATMENT

Preterm birth is the most common cause of death among infants worldwide. About 15 million babies are preterm each year (5 to 18 per cent of all deliveries). The causes of premature birth are frequently unknown, with diabetes, high blood pressure, twin, triplet, etc. pregnancies, obesity or being underweight, stress, etc. all contribute to an early delivery. In the last 20 years or so the fast development of IVF technology led to an increase in the number of preterm babies (many IVF pregnancies finish before term). However, recent advances in medicine enable increasingly more premature infants to survive. Indeed, complications from preterm births resulted in 0.74 million deaths in 2013 compared to 1.57 million in 1990. Many of these infants are nonetheless not healthy. Early assessment and detection of developmental impairments is crucial for early and effective intervention as early identification will support initiation of early treatment and may minimise neurological and functional deficits.

In developed countries premature infants are usually cared for in a neonatal intensive care unit (NICU). In developing countries where advanced equipment and even electricity may not be available or reliable, simple measures such as kangaroo care (skin to skin warming), encouraging breastfeeding, and basic infection control measures can significantly reduce

Researcher Profile



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Dr. Hagit Friedman is a researcher at the Department of Nursing of University of Haifa and a Lecturer at Kinneret Academic College. Dr. Friedman's research projects focus on early diagnosis and early intervention in neural development, reflecting her academic knowledge and the clinical certification & training she did, in Israel and abroad. Dr. Hagit Friedman has a scientific academic background in neurobiology (MSc, HUJI) and in neurodevelopment and neuroimaging (PhD, T-IIT). Dr. Friedman is also Dipl. in Acupuncture (TAU, IL), licensed in neurodevelopment assessment in multiple tools - basic and advanced problem solving level (RMUoHP, USA) and Dipl. in Infant Aquatics (Hydrotherapy unit EMC, IL). She is devoting her knowledge and academic work for the advancement of health and development of infants at risk.

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KEY COLLABORATORS

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preterm morbidity and mortality. The chance of survival at less than 23 weeks is close to zero, while at 23 weeks it is 15 per cent, 24 weeks 55 per cent and 25 weeks about 80 per cent. The chances of survival without long term difficulties when born in these early weeks are low

Some children adjust well during childhood and adolescence, although disability is more likely nearer the limits of viability. Studies of people born premature and investigated later with MRI brain imaging, demonstrate qualitative anomalies of brain structure and grey matter deficits within temporal lobe structures and the cerebellum that persist into adolescence. Throughout life they are more likely to require services provided by physical therapists, occupational therapists, or speech therapists.

INFANT NEURO AQUATICS

In many western countries children are now diagnosed at a relatively young age (1.5 - 3 years old), however diagnosis at this age may be late, due to the fast change in plasticity of brain neural circuits which regulate the infant's sensory, cognitive and emotional skills. Retrospective studies found that the majority of children diagnosed with neurodevelopmental impairment exhibited early behavioural signs during their first 12 - 15 months of life. Infant Aquatics have been found to benefit infant health, being based on the physical properties of water and their physiologic outcomes on the sensory, motor, cardio-vascular, and respiratory functions.

Preterm birth is emotionally traumatic for parents and may lead to depression, anxiety and stress, affecting parents' function, and the development of deep emotional bond with their infant. Parent-infant negative interaction in NICU may lead to non-functional parenthood. Early intervention of Infant Aquatics, starting in NICU and continuing at home and hydrotherapy pool may benefit parental resilience, function and bonding with the infant; and advance infant brain development, during an important developmental time window.

In the pool, babies are placed in warm water in vertical and horizontal positions, supported by the buoyancy of water and the caring hands of parent or hydrotherapist. Training starts with a set of pre-structured movements through which parents practise handling of the infant in the water, in a way that enables free and integrated

movement, eye contact, vocal communication and increased confidence. The working technique employed is modified for premature infants and the specific needs of each infant. Training includes passive mobilisation, various rotations, relaxed floating, and 8-shape delicate mobilisation when the infant is supported under occiput and rib cage, and more. During this developmental stage infants have mainly spontaneous movements, which reflect neurodevelopment stages and abnormalities long before they are fully pronounced. Dr. Hagit has pioneering results showing that Infant Neuro Aquatics is positively correlated with better neural development indexes of the premature infants. Using the non-intrusive General Movements (GM) tool they show above 80 per cent versus about 30 per cent immediate developmental improvement without Neural Infant Aquatics and better coping parameters for the parents.

HEALTHCARE APPLICATIONS

Alongside publishing a scientific paper and participating in scientific meetings, Dr. Friedman has also been invited to share her experience with major teams of developmental clinics. It is her hope that these interactions and publishing the results, as well as this interview, will advance a more supportive approach / concept based on scientific data, and produce a position paper or even a white paper that will bring this intervention into the heart of "evidence-based treatments" for young infants. When this is achieved, and more infants can have Infant Neuro Aquatics treatments subsidised by their medical insurance, it is expected that the health and development of more infants will improve.

With additional study projects the health care establishment is likely to acknowledge Infant Neuro Aquatics as a safe and efficient early developmental intervention, and will include it in the battery of treatments funded by the government. This will allow families from remote settlements and low-income parents to reach Infant Neuro Aquatics and give their babies a better chance for good health and development.