

NURSE RESEARCHERS STUDY CHILDREN AND FAMILIES

Children and their families are an important focus of many studies at the School of Nursing.

Early experiences often involve family interactions and can have long-term influences on children. SON researchers are discovering more about the long-term effects of early parent-child interactions and are working to formulate interventions that can benefit the whole family.

Dr. Linda Beeber, professor, studies ways to help low-income Latina mothers who have young children and who

are experiencing depression. Maternal depression can have immense consequences on children in the infant-to-toddler age group. At this age the brain is developing quickly, and the child's interactions with its mother are an important part of acquiring language and motor skills as well as learning how to regulate emotions. However, depression can compromise a mother's ability to interact with her children.

This doesn't mean that the child is doomed or that the depressed mother can't parent, says Dr. Beeber, but low income women usually don't have a very supportive environment and their children already have a lot of strikes against them. "So it is a huge blow to grow up in poverty and have a depressed mother," she says. It is extraordinarily difficult to reach these mothers and to retain them in an intervention. "Much of our work has been in developing the science of how to reach low income populations, get mental health care to them, and get them to stay in it long enough to see the benefits."

Dr. Beeber's research team deployed an advanced practice psychiatric nurse and an interpreter to deliver counseling that was based around interpersonal relationships. "Our early descriptive work told us that these mothers cared a lot about their relationships with other people," says Dr. Beeber.

Delivering the intervention in the home meant that the mother didn't need childcare or transportation. Using a nurse to deliver the intervention had many advantages. Nurses are comfortable working in the home and can easily adjust to various settings and unanticipated surroundings. Most importantly, a nurse could come to someone's house

Dr. Beeber developed and tested an intervention that uses an advanced practice psychiatric nurse (left) and an interpreter (middle) to deliver home-based counseling to Latina moms with young children. The Espinola family models a session, with nursing student Camila Salvo as the nurse and Ginny Lewis as the interpreter.



for many reasons that neighbors or family wouldn't associate with mental health care. "It was a great way to deal with the stigma of seeking mental health care and to allow a woman to keep her need for therapy private." The result was a higher retention than anyone before them had accomplished. "We had as high as 80% retention," Dr. Beeber says. "It is phenomenal to get this particular population to stay in a therapeutic intervention that long."

By four weeks, the average clinical depression score for mothers in the intervention was reduced to a level considered to be non-significant and remained there for the rest of the six months. This meant that the children were exposed to depressive symptoms for about 14 weeks of the six months, while children in the control group were exposed to significant depressive symptoms for almost the entire six months. "Shortening the child's exposure to the depressive symptoms is one of the most important outcomes for this study," she says.

A second study showed that the intervention didn't just reduce depressive symptoms but also changed mothering patterns. "The mothers had much more positive interactions with their child, and now we're trying to see if we can get positive child outcomes. Then we could say that the intervention gets the symptoms down, helps the mothers mother in a more positive manner, and we could show positive outcomes in the children," says Dr. Beeber.

Early-Childhood Feeding and Obesity

It might seem intuitive that experiences with food during infancy and toddlerhood would shape behavior later in life, but this has not yet been fully established. Dr. Eric Hodges, assistant professor, is building evidence by studying



early parent-child feeding interactions to find out if problems lead to later issues with self-regulating eating. His belief is that if a parent is continually unresponsive to a child's hunger or fullness cues, then as the child gets older he or she may not recognize hunger and fullness sensations because they were consistently overridden early in life. This might mean the child eats only according to a schedule or continues to eat beyond fullness, which could lead to obesity.

"So much obesity work has been focused on interventions with school-aged and older children, but the interventions haven't been very successful long term," says Dr. Hodges. "We are now seeing more of an interest in looking earlier in child development." Research is beginning to show that the first couple of years of life are very important for setting the stage for obesity risk.

Dr. Hodges is a Robert Wood Johnson Foundation Nurse Faculty Scholar, and with this grant he is studying children who were part of the Infant Care, Feeding and Risk of Obesity Study (PI, Margaret Bentley of the UNC Gillings School of Global Public Health). This study followed first time African-American mothers and their babies from 3 to 18 months; these children are now four to six years old. "I want to see where the children ended up in terms of body

Dr. Eric Hodges studies early parent-child feeding interactions, looking for connections with later obesity or food-regulation problems.

mass index (BMI), fat mass, and fat-free mass to tease out whether the pattern of interactions in early feeding is related to what we see now. We're also going to see how well those kids are doing at regulating their food intake now."

He is also using a UNC Junior Faculty Development Award to examine the data from the Infant Care, Feeding and Risk of Obesity Study for patterns of feeding responsiveness between parents and their children over time. "I want to find out if there are differences among three groups: those who went from normal or underweight to overweight, from overweight to normal, and those that were normal weight all along. This will demonstrate if there is an association between feeding interaction quality and responsiveness over time," says Dr. Hodges.

If these longitudinal studies show that parent-child interactions do affect obesity risk or behaviors regarding food later, then interventions will come next. These might involve helping toddlers communicate hunger or fullness and helping parents to better recognize their child's cues. "We want to help parents understand that as long as their child

Dr. Diane Berry and her colleagues are conducting a feasibility study aimed at assisting women in losing weight after the birth of a child. The women in the Wake County study are shown here with instructor Gail Hall.



doesn't have any health concerns that affect growth, then research suggests that children can grow themselves quite well by listening to those internal cues in the context of good nutritious choices."

Preventing Obesity During and After Pregnancy

Associate Professor Diane Berry focuses her research on preventing and managing obesity and type 2 diabetes. One group for which obesity is particularly problematic is child-bearing age women. They may put on weight during pregnancy and then not lose it or may go into pregnancy already overweight and then gain more weight. Extra weight gained during pregnancy can increase a mother's risk for developing gestational diabetes, and research is showing that excessive weight gain can result in babies with higher birth weights. "This can set up the child for developing overweight and obesity later in life," Dr. Berry says. The extra weight can also cause other complications during pregnancy and delivery.

The 2009 Institute of Medicine (IOM) Report "Weight Gain During

Pregnancy: Reexamining the Guidelines" has taken this research into account by recommending that women be within a normal BMI range when they conceive and that they gain weight during pregnancy within the ranges in the guidelines. The new guidelines say that women who are obese during pregnancy should gain less weight than those who are normal weight. The report also recognizes the importance of weight loss plans and education such as the type that Dr. Berry is developing.

Dr. Berry and her colleagues are conducting two feasibility studies to assist women in losing weight after the birth of their child. One is aimed at English-speaking mothers in Wake County, N.C., and is funded by the N.C. Translational and Clinical Sciences (TraCS) institutes at UNC Chapel Hill and the John Rex Foundation. This funding was awarded to Dr. Berry and Drs. Sarah Verbeist and Alison Stuebe of the UNC School of Medicine. The second study is aimed at Spanish-speaking mothers in Guilford County, N.C., and is funded by a Duke Diversity Fellowship to Leslie deRosset, with Dr. Berry as her mentor. deRos-

set is the Latino campaign coordinator for the N.C. Preconception Health Campaign/March of Dimes. Dr. Berry included Spanish-speaking mothers because in previous work she observed the serious consequences of obesity in the Hispanic population. Hispanics have a higher genetic predisposition to developing type 2 diabetes and increasing numbers of young Hispanic women are immigrating to North Carolina.

Women in the experimental groups will receive education about nutrition and exercise and coping skills training from health educators every week for 12 weeks. Once the study is complete, the control group will receive the 12 classes. "We found that women gain weight during pregnancy, but then don't lose the weight before the next pregnancy," she says. "We are helping them get the weight off so that they are at a lower body mass index before they get pregnant again."

Improving Preterm Infant Feeding with Technology

Associate Professor Suzanne Thoyre's research is focused on children's early experiences with feeding. During feeding, very preterm infants tend to experience heart-rate changes, oxygen level drops, and general behavioral distress. "We have hypothesized that early stressful feedings may contribute to long term feeding problems that are typical for this group of children," she says. "Of the extremely preterm infants about a third have significant feeding problems that continue into their preschool years."

In her early work, Dr. Thoyre placed a microphone on the rim of a bottle and recorded sound and video of preterm infants feeding. "When the mothers listened to and watched the video they often rewound and replayed sections where they had jiggled the nipple to encourage their infants to keep suck-



Dr. Suzanne Thoyre plans to use a tiny microphone and earphones to help mothers listen to their preterm infants breathe as they feed.

ing,” she said. “They could hear there had been lapses in breathing prior to the infant stopping their sucking, and said things like ‘I didn’t realize he needed to breathe.’” It is common for a mother to jiggle the bottle nipple when a baby stops sucking, but a preterm infant might stop sucking to breathe. These infants have difficulty coordinating sucking, swallowing, and breathing. The jiggle will get the infant to suck again but at the expense of becoming more and more air hungry, or depleted of oxygen.

In her latest work Dr. Thoyre developed an intervention in which the feeder uses a microphone placed on the very preterm infant and an earphone to listen to the infant’s breathing while feeding. In future work, this intervention will be trialed with nurses working with mothers. In the beginning a trained nurse will listen with the mother and guide the mother as she feeds her infant. Gradually the mother will assume responsibility

and begin to learn how to interpret the infant’s feeding sounds and behavior without the device. Dr. Thoyre will study the short and long term outcomes of this intervention to see if the infant has more stability during feeding and learns to eat faster, for example. “The pilot study demonstrated that when we listened during feeding, the infants were more stable in their physiology, heart rate, and oxygen levels. They were also calmer and had more organized swallowing and breathing rhythms when we coded their behaviors.”

To carry out this intervention, Thoyre’s team needs a durable and wireless device with which to train the mother to hear the infant’s breathing. The device must be as noninvasive as possible because there are already a lot of instruments attached to infants, and mothers learn that lines coming off means their infants are getting healthier. Dr. Thoyre has worked with Brant Nix, the lab manager of SON’s Biobehavioral

Laboratory, on several iterations of the device that have made the microphone and earphone smaller and less invasive.

“A wireless stick-on microphone to detect sounds and a wireless earphone would be ideal,” she says. She is now working with the UNC chemistry department to further develop the device, which is called an audio-trainer. “We would like the audio trainer to be as small as possible and wireless to make it acceptable to a parent and to increase the ease of using it.” They are also working to develop a way to isolate the swallowing signal from the recorded sounds, with hopes to patent the signal-processing method. Swallowing is an important part of the picture because studies have shown that when preterm infants have difficulty with feeding coordination they tend to prolong holding their breath during swallowing, increasing their risk for apnea, or they may swallow prior to inhaling, increasing the risk for aspirating milk into their lungs. ■

RESILIENCE IN FAMILIES WITH DOWN SYNDROME

One out of every 691 newborns in the U.S. has Down syndrome, yet the birth of a child with Down syndrome is an unexpected event for most families. Because of this, many new parents experience a great deal of uncertainty following the birth of a child with Down syndrome. Many are worried about how their child's diagnosis will affect their family. Dr. Marcia Van Riper has an ongoing program of research concerning factors that contribute to adaptation and resilience in families of children with Down syndrome.

When Dr. Van Riper started her program of research, much of the focus was on negative consequences. For example, most researchers in this area were assessing levels of stress, depression, anxiety, marital, and family dysfunction. However, in her initial interactions, Dr. Van Riper noted that families she met with did not look or sound like the families of children with Down syndrome in the literature. That is, rather than using words like burden, tragedy, and suffering to describe their child with Down syndrome, families were using words like joy, challenge, and thriving.

Her research has since supported her observations by showing that negative consequences are not inevitable following the birth of a child with Down syndrome. In fact, most families adapt well and many actually thrive. "Nurses and other health care providers can play a critical role in how families respond to the birth of a child with Down syndrome," says Dr. Van Riper. "We can set the tone. When we give balanced, up-to-date information we help families move forward on their journey. In contrast, when we give biased, out-dated information we make the journey more difficult."

She is now conducting the pilot study for a large, cross-cultural investigation concerning adaptation and resilience in families of children with Down syndrome. The



study's main purpose is to examine how culture, interactions with health care providers, and family factors all contribute to adaptation and resilience in these families. Her overall goal is to develop a body of knowledge that health care providers can refer to when they inform families their child has Down syndrome. She also hopes to identify the best areas for targeting interventions with families of individuals with Down syndrome.

Through surveys and in-person or telephone interviews with families Dr. Van Riper and her collaborators are gathering information on the family's initial experience, decisions they made, and how they are doing at the present time. She is looking to eventually include over 1000 participants from at least six countries. Expanding to other countries is important, she says, so that the study takes into account cultural differences.

The questionnaire used for the survey has been translated into Korean, Spanish, and Taiwanese, and the Dutch and Italian versions are almost finished. She has also had interest from contacts in Thailand, Japan, and New Zealand.

"Families and individuals with Down syndrome have been my best teachers," she said. "They have helped me figure out what direction to go next and which areas are important. I never wanted to be one of those researchers that did research just to do research. I wanted to do research that was meaningful to people." ■