Why skin-to-skin contact with infants is better for everyone

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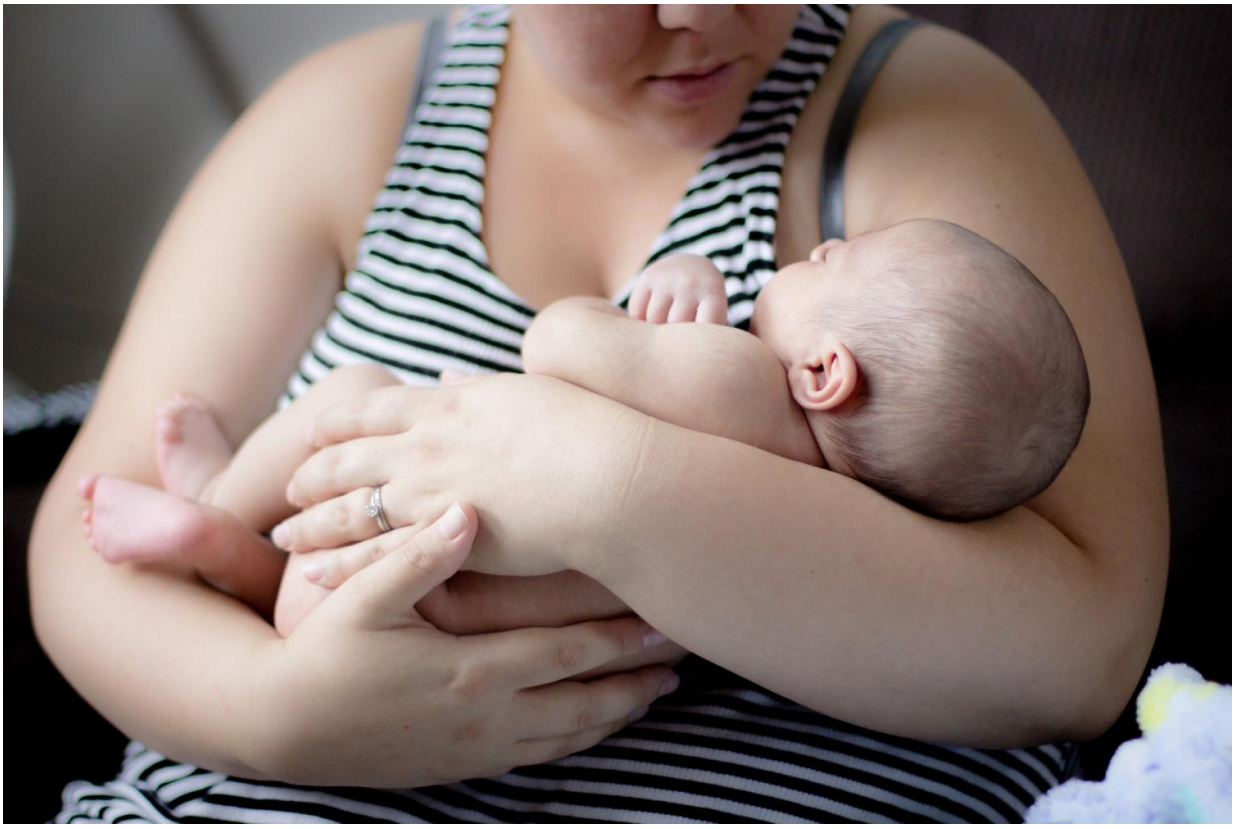

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Carmela Torres was 18 when she became pregnant for the first time. It was 1987 and she and her now-husband, Pablo Hernandez, were two idealistic young Colombians born in the coastal region of Montería who

moved to the capital, Bogotá, in search of freedom and a better life. When Torres told her father she was expecting, so angered was he by the thought of his daughter having a child out of wedlock that they didn't speak to each other for years.

Torres remained undaunted. Her pregnancy was trouble-free and she had a new life in Bogotá to get on with. But one December afternoon, suddenly, out of nowhere, her body began to convulse with sharp contractions. It was more than two months before her due date. She called Hernandez and together they rushed to the Instituto Materno Infantil (Mother and Child Hospital) in eastern Bogotá. Not long after arriving she gave birth naturally to a baby boy weighing just 1,650 grams (3 lb 10 oz).

Before she had a chance to hold him, her baby was whisked off to a neonatal intensive care unit. Torres was simply told to get dressed and go home. "I didn't even get to touch him," she says. "They said I could come back and see him but the visiting times were very restricted – just a couple of hours a day. When I did visit I was allowed to look but not touch."

On the third day she was at home preparing for her next visit when the phone rang. "It was the hospital," she says. "They called to say my baby was dead. They didn't tell me the cause of death or give me any diagnosis. Just that he was dead. I hadn't even named him yet."

Torres was traumatised. She became gripped with an acute feeling of isolation and started spiralling into depression. She knew she needed to do something to pull herself back so she enrolled on a teacher-training programme and immersed herself in her studies. "It gave me something to focus on," she says. "It saved me."

A decade passed before Torres was ready to become pregnant again.

This time round it was different. By now she was married to Hernandez and well settled in Bogotá. Her father had even started talking to her again. She was so excited about giving birth that, a couple of months before her due date, she decided to throw a big baby shower. But on the day of the party, familiar, severe contractions ripped through her body, stopping her in her tracks. She smiled, told no one and pretended it wasn't happening. By evening, once all the guests were gone, she could hide it no longer. She told Hernandez who again rushed her straight to the Instituto Materno Infantil.

"When we got there the doctor was furious with me for not coming earlier. He said I was ready to give birth," says Torres. "I was petrified, I didn't want another premature baby. I was taken to the exact same ward as where I had my baby which died. Memories came flooding back. I was extremely stressed."

At one o'clock the next morning Torres gave birth to another boy. She named him immediately, calling him Julian. He weighed almost the same as her firstborn and just like then, he was whisked straight into intensive care. History, it seemed, was repeating itself.

"I spent a very frightening night panicking that I was about to lose another baby," she says. "But the next morning a doctor came to see me. She told me about a thing called Kangaroo Mother Care – how I could act as a human incubator and carry my own baby and take it home with me. It was a ray of light at the end of the tunnel. Anything rather than leave my baby there."

That day Torres was taught how to hold her baby under her clothing, upright between her breasts with his airways clear. She was taught how even the finest layer of fabric between her and her baby wasn't allowed – it had to be continuous and direct skin-to-skin contact. She was taught how to breastfeed, how to sleep on her back propped up by cushions, and

strictly never to bathe him as this would waste his precious energy. Remarkably, the very next afternoon, with her tiny baby strapped to her chest under a blanket, Torres walked out of hospital.

"Julian was very small and fragile but I was much happier taking him home with me than leaving him there, where my other baby had died," she says. "Feeding him wasn't easy, but I had a lot of help. At first I had to go back every day for follow-up appointments and I was given a cellphone number that I could call any time I needed. We had to go back in when Julian got an infection on his umbilical cord and for phototherapy when he got jaundice, but in all I carried him for a month 24 hours a day, sharing shifts with my husband, until he hit his target weight of 2,500 g. Once he'd reached that we didn't have to do it any more and finally he got his first bath."

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Kangaroo Mother Care (KMC) is the brainchild of Colombian paediatrician Edgar Rey, who introduced it to the Instituto Materno Infantil in 1978. It was an idea born out of desperation. The institute served the city's poorest – those who lived crammed in the rickety makeshift dwellings in the foothills of the surrounding mountains. At the time this was the biggest neonatal unit in all of Colombia, responsible for delivering 30,000 babies a year. Overcrowding was so bad that three babies would have to share an incubator at a time and the rate of cross-infection was high. Death rates were spiralling and so too was the level of abandonment as young, impoverished mothers, who never even got to touch their babies, found it easier just to take off.

Scouting around for a solution to these problems, Rey happened upon a paper on the physiology of the kangaroo. It mentioned how at birth kangaroos are bald and roughly the size of a peanut – very immature, just like a human pre-term baby. Once in its mother's pouch the

kangaroo receives thermal regulation from the direct skin-to-skin contact afforded by its lack of hair. It then latches onto its mother's nipple, where it remains until it has grown to roughly a quarter of its mother's weight, when finally it is ready to emerge into the world.

This struck a chord with Rey. He went back to the institute and decided to test it out. He trained mothers of premature babies to carry them just as kangaroos do. Working alongside his colleague Hector Martinez, he taught them the importance of breastfeeding and discharged them just as soon as their babies were able. The results were remarkable. Death rates and infection levels dropped immediately. Overcrowding was reduced because hospital stays were much shorter, incubators were freed up, and the number of abandoned babies fell.

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It's 8am and already the shiny new KMC unit at the San Ignacio University Hospital in downtown Bogotá is packed to the rafters. Rows and rows of women, and a surprisingly high number of men, too, squeeze together – a sea of colourful knitted hats and chunky coats, protection against the city's unpredictable cycle of hail, rain and heat. They sit on narrow pews in the centre of the room, with the tiniest little heads peeping skyward on their chests. It's warm, buzzy and a million miles away from the sterile atmosphere of a typical neonatal intensive care unit.

Many seem to have settled in for the day – one woman has her knitting out and another has her extended family in tow. Five paediatricians stand in a row behind a long, high bench examining baby after baby, testing their responses and bending their limbs this way and that. On an average day they will see more than 100. For a room full of newborns, it's oddly peaceful. Not one of them is screaming.

"Traditional units are closed and have very restrictive visiting hours," says Nathalie Charpak, the formidable French paediatrician who now heads the unit and lives just a short walk away. "An important element of KMC is that the unit is open and parents have access so they can sit with their infants, connect with each other and gain confidence seeing others with very small babies doing the same thing. Evidence shows there is less infection when units are open like this because the parents are checking to ensure the health professionals are washing their hands."

In one corner intensive breastfeeding sessions are taking place. Eleanora Rodrigez, a raven-haired 26-year old from northern Bogotá, had just returned from a walk in the park when her waters unexpectedly broke. She gave birth to twins Henry (1,700 g) and Joaquim (1,450 g) at 32 weeks. Her slightly jittery husband hovers about trying to second-guess their every need. Today, Rodrigez is being taught how to give surprisingly tough massages across her babies' heads, foreheads, upper lips and chins to stimulate their sucking motion. Joaquim, in particular, keeps nodding off.

"It's really hard," says Rodrigez, struggling to untangle both her babies from their oxygen tubes. "They are feeding every two hours. They have to gain 15 g per kg every day, the same growth as they would have had in the womb. If this is happening we know things are OK. I'm just waiting till they hit the magic 2,500 g."

In a side room, a clinical psychologist is doing a session with a small group of mostly nervous-looking teenage mums. One, wearing grubby grey tracksuit bottoms and what appears to be her boyfriend's football shirt, looks barely into her teens. Her baby is so tiny you might be scared to even touch it, yet she wanders around with it dangling from her arm with an insouciance that only youth can bring. All the babies here are born at less than 37 weeks or weigh below 2,500 g. Yesterday a bubbly 11-year-old girl popped in with her mother. She had been a kangaroo

baby herself, born here at 29 weeks and weighing just 500 g.

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Charpak moved from France to Bogotá in 1986, after falling in love with a Colombian university professor. She wound up at the Instituto Materno Infantil working alongside Rey and Martinez. Charpak couldn't believe the results she was witnessing. She understood immediately the need for rigorous scientific studies to prove to the world they were on to something very special.

In 1989, she did a study on a sample of babies from two of the very poorest hospitals in the city. She proved scientifically that KMC was safe – even the smallest premature babies weren't dying if you took them out of the incubator. In 1994, with funding from a Swiss NGO, she did a much larger randomised trial, which proved conclusively that not only were babies dying less, but breastfeeding rates were up, hospital stays were shorter and infection was down. Her findings were published in Pediatrics journal in 1997.

Charpak now lives with her husband and two sons (a third is studying in St Petersburg) in a large apartment at the top of a redbrick tower on Seventh Street, a broad thoroughfare that sweeps regally through the city. Her balcony looks out towards the astonishing orange sunsets over the city on one side and the lush mountain of Monserrate on the other. She's in her 60s now and has lived in Bogotá for 30 years. Every day she makes the short walk over the uneven pavements, through the famously perilous traffic, to her unit at the San Ignacio. Her father, Georges Charpak, won the Nobel Prize in Physics in 1992, for the invention and development of particle detectors. For Nathalie, KMC has become her life's work. On top of her clinical work, she is director of an NGO that researches and promotes KMC, the Fundación Canguro – the Kangaroo Foundation.

Employed alongside her at the Foundation is a young, glamorous and smart sidekick, Julieta Villegas, who is clearly being groomed to take on the KMC mantle whenever Charpak is ready to step aside, which isn't any time soon. "I'm Nathalie's replacement," is Villegas's brazen introduction. The pair are an undeniable force, driven by an unwavering belief in KMC. It's hard not to share their enthusiasm. There are now more than 1,600 studies which show KMC does so much more than just help a baby put on weight. Research shows, for example, a kangaroo baby bonds better with its parents than pre-term babies given conventional care. Its heart and respiratory rates improve better. It is more equipped to self-regulate and so is calmer and better able to sleep. Kangaroo mothers, too, perhaps given a sense of purpose after the guilt they often feel about giving birth prematurely, experience less post-natal depression. And, most remarkably, tests done on kangaroo babies at 12 months old show they have higher IQs and better cognitive development than those given conventional care.

"It is clear KMC is about much more than just saving the baby's life," says Charpak. "It is about allowing the baby to thrive and giving it the best possible quality of life. I have fought all my life to show that KMC has nothing to do with comfort or massage or anything fluffy like that. It is difficult to do and each baby is carefully followed up every six weeks for the first year, but the benefits are extraordinary."

Thanks, in large part, to Charpak's persistence in pushing all the research under the noses of the health ministry, KMC is now enshrined in Colombian law. All women with premature or low-weight babies will be sent as a matter of course to their nearest centre. We drive out to Tunja in the eastern Andes to see the unit there. Today, flash floods have turned roads into streaming rivers of grey mud, and alarming-looking stray dogs roam wildly. It's much poorer here and there's a palpable edge of desperation. Most of the locals are farmers who make a living growing potatoes and corn. The KMC unit at the San Rafael Hospital is

run by local paediatrician Jenny Lizarazo Medina. She tells me that about 40 per cent of the women here have low-birthweight babies not because they are born prematurely but simply because when their mothers were pregnant, they went hungry.

Maria 24, is one. She carried her daughter Natalia to term but the baby weighed just 2,170 g at birth. Wearing a baggy turquoise tracksuit, eyes shining with exhaustion, Maria arrives for her daily check dragging a bulky metal oxygen tank behind her, just as she would a shopping trolley. Tunja is 3,000 m above sea level, one of the highest cities in Colombia, so a lot of these babies need extra oxygen.

It's remote here and distance to the hospital is an issue. Maria has temporarily moved in with an uncle who lives nearby while her husband remains at their home in Cómbita, further north, working in a recycling factory. This means Maria is doing everything alone, including carrying her baby and dragging the oxygen tank up a steep mountain every day to get back to her room. In the very early days Natalia found it hard to latch on so Maria sat for hours, day and night, feeding her breast milk out of a tiny cup. "Each day my baby changes and is now making good progress," says Maria. "And every day I come here they say good things about her. It gives me confidence."

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One of the very first countries to investigate what was going on in Bogotá was Venezuela. In 1994 a small team, from a hospital just like the Instituto Materno Infantil, came to witness KMC for themselves. Others, mainly from low-income countries, came too. Brazil in 1995, Ethiopia in 1996, followed shortly by Madagascar, India, Cameroon and many more. Charpak used to put them up in her own home and give them 15 days of intensive training. Nowadays they stay in the Kangaroo Foundation headquarters in Bogotá. Then they return home to run their

own KMC programmes.

Many of these are very successful. In Malawi, which has the highest rate of premature births in the world (181 babies out of 1,000), there is now a KMC centre in every district. Over the ten years to 2015, the number of babies dying before their first birthday fell from 72 out of 1,000 to 43. "I have seen a significant drop in mortality," says Indira, a midwife at Zomba Central Hospital in southern Malawi. "It has also helped reduce congestion in the ward as babies are cared for at home. And it has helped reduce costs, because electricity is being saved as the mother is a perfect heat source for the baby."

In Cameroon, a country Charpak has been back and forth to many times, mortality of premature babies has dropped by around 30 per cent. According to a 2016 analysis by Cochrane, a global network of researchers, studies of KMC have found it to reduce mortality in pre-term newborns by 33 per cent. The World Health Organization has estimated that KMC has the potential to save as many as 450,000 lives a year.

Resistance, however, has come from where you might least expect it. For some health professionals, nurses and even paediatricians, Charpak tells me, it can be difficult to accept that care by mothers is better than anything they can offer themselves, especially if they have fought hard to bring shiny rows of incubators to their hospitals. There is also the prevailing idea that things are done better in Westernised countries.

While the idea for KMC may have been a product of necessity, Charpak and Villegas are now locked in a constant struggle to convince the world that it isn't just the poor woman's option. "It's not a cheap alternative. It's not something just to be done in poor countries," says Charpak. "There is a cost to it. It's a proper neonatal care with advantages that are clinically proven."

Undeniably, though, it is cheaper. The estimated cost of neonatal care for premature babies in the United States is $3,000–5,000 a day. In contrast, in low-income countries a KMC programme can cost as little as $4.60 a day.

One early visitor to Bogotá was Susan Ludington from Case Western Reserve University in Cleveland, Ohio. She went to visit Charpak in 1988 after seeing a short video of KMC being practised in Bogotá.

"I brought a team of researchers and moved into the Instituto Materno Infantil and I was quite blown away by what I saw," says Ludington. "The babies were so quiet and so calm. They were sleeping deeply and then they would wake up and suck with vigour. Our pre-term babies were upset all the time and not sleeping well. They were all in incubators. The mothers came to visit but they certainly weren't holding them. I thought it was really impressive. I had many, many questions."

Ludington returned home and tried to get some interest in doing research on KMC in the US. "I went to 18 different hospitals in the LA area. All of them turned me down. They said you should study this first on apes, and why would we want to put a premature baby on a mother's smelly, sweaty breast? Or, the baby will get cold and then we will be sued.

"You have to remember in the States as recently as the 1970s mothers were not even allowed into the intensive care unit to see a premature baby until the 21st day of its life. By 1988, when I am proposing skin-to-skin, the mothers are allowed in but are not allowed to take the babies out of the incubator, only to put a hand inside on the baby's thigh."

Eventually Ludington found support from the head of neonatology at the Hollywood Presbyterian Hospital. He agreed to let her do a study – the first ever in the US. "We were trying to determine if it was safe and we found yes, it was safe, better than safe," says Ludington. "We now know

the best protection from infection [for the baby] is to be colonised by its mother's bacteria. We also know the best thing for its brain development is skin-to-skin, the best way to maintain blood sugar levels so it doesn't get hyperglycaemic is skin-to-skin. And what we didn't know in 1988 was that there are a whole set of nerves on the baby's chest and on the mother's chest that only get stimulated by skin-to-skin contact, which send oxytocin messages to the baby's brain."

According to the map on the wall in the offices of the Kangaroo Foundation in Bogotá, there are now KMC centres in almost 70 countries across the world, including Australia, Spain and France. This simple yet smart idea, which originated amid grinding poverty, is now spreading to the very richest parts of our globe. In parts of Scandinavia it is offered as a matter of course. The University Children's Hospital in Uppsala, Sweden, is leading the way and is now doing skin-to-skin with mothers of babies born at just 25 weeks.

So why haven't we all ditched our incubators to take up KMC? "It's just not that simple," says Angela Huertas, consultant neonatologist at University College Hospital in London. "In Uppsala the mother is admitted to hospital as soon as the baby is admitted. There, they have two years maternity and one year paternity leave so they have the support to do that. Even if we desperately wanted to do KMC here in UCLH we wouldn't be able to do it. We don't have the infrastructure for mothers to stay, nor the nursing staff for support. Families here are different from those in Colombia or Scandinavia. People have to work, and who is going to look after their other children? It's not just the parent's wishes or the baby's needs, you've got to have the political will to make changes as big as this."

Also, there are times when Huertas believes babies are actually better off in incubators. "Very premature babies have skin so thin it's almost transparent – you can see their veins through it," she says. "These babies

are clearly better off inside an incubator as they need a humid environment until their skin can thicken."

She thinks we need to find a balance. "There are many neonatal units in London that won't allow the parents in more than one hour a day," she says. "They say it's quiet time and send the parents away so the babies get looked after by the nurses. There is an awful lot we can do about that."

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Last November a group including Charpak, Villegas and Ludington came together for a meeting in Trieste, Italy. It was a seminal moment, marking the 20th anniversary of the first ever global KMC meeting – now with a much bigger and vocal group. Charpak and Villegas unveiled the most ambitious study yet into KMC. They had decided to see if they could track down the 716 families who took part in Charpak's original 1994 study and measure the effects of KMC at 20 years to see if any of the benefits persisted. They launched a nationwide search, advertising on the radio, on TV and in the press to find the original kangaroo mothers. 441 of them came forward.

One of the first to volunteer was Carmela Torres. It turns out that seven years after giving birth to Julian she had had a third premature baby. This one, called Pablo, was born at 33 weeks and weighed 1,600 g – even less than his brothers. Torres remembered Charpak well from Julian's birth. "She treated him like family. When he had to go back in to hospital with an umbilical cord infection I'd go in early every morning and last thing at night to do kangaroo care. If ever I was late I'd find that Dr Charpak had picked Julian up and was carrying him in the kangaroo position herself. Doing KMC the second time round was completely different. I was confident. I knew exactly what I was doing. Pablo gained weight much faster than Julian."

So Julian, now aged 22, along with all these other original kangaroo babies, was subjected to a series of rigorous checks including MRIs, neuroimaging, blood tests, psychosocial tests and physical evaluations. Each was measured for self-esteem, depression, hyperactivity, aggressiveness and more. So were the grown-up babies from the original control group, who had received traditional care. The full results were published in Pediatrics journal at the end of last year.

"The findings are ground-breaking," says Villegas. "We found the kangaroo babies were less hyperactive, less antisocial and they even earned higher wages. This is especially significant because these were babies who were the most fragile to begin with and who came from a lower socioeconomic background. We also discovered if the father helped carry the infant, 20 years later there is a stronger family bond and less separation. Results show if you take a mother, no matter what her economic background, and give her the tools and education she needs to look after her own child, it will have the same outcomes as if she were from a higher economic status. It's a way of shortening the gap between social and educational status. This is why we say with kangaroo care, we fight inequality. We don't just save lives, we change lives."

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