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Improve the Outcome of Baltimore City Teen Pregnancy through Kangaroo Mother Care

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Abstract

Objectives: Explore methods that help improve the high infant morbidity and mortality problem associated with Baltimore city nation high teen pregnancy rate.

Study Design: Consider alternative hypotheses and present discoveries from high quality and rigorous research papers only.

Methods: Conduct a comprehensive search of peer-reviewed publications based on a wide range of keywords and overweigh the study results based on the quality and timing of the studies.

Results: Baltimore City has a teen pregnancy rate that is twice as high as the state of Maryland and three times as high as the national average, reflecting a kaleidoscope of social economic factors. A factor such as poverty is seen as a risk factor and a consequence of high teen births. Teen pregnancy carries higher risks of preterm babies and infant deaths. Teen pregnancy also hurt these adolescent mothers in terms of education and prospects later in life. Kangaroo Mother Care, a method emphasizing continuous skin-to-skin contact between mothers and their new-borns, has been medically proven to improve the health of preterm babies and reduce preterm related infant deaths. How does this work? Research suggests that skin-to-skin contact causes the body to produce more oxytocin, also known as the love hormone that protects us from pain and stress, in both the parent and the baby.

Conclusions: We advocate for the adoption of Kangaroo Mother Care as a cost effective and easy to implement an approach to alleviate problems with the high teen pregnancy rate in Baltimore City.

Keywords: Kangaroo mother care (KMC) • Teen pregnancy• Premature• Skin-to-Skin Contact• Oxytocin

High Rate of Teen Pregnancy and its Racial and Social Economic Roots in Baltimore

Although teen pregnancy incidence rate has declined across the world, as a result of better adoption of contraceptive measures, the US continues to have a higher teen pregnancy rate than other developed countries. Baltimore City, specifically, has a teen pregnancy rate that is twice as high as the state of Maryland and three times as high as the national average, according to Baltimore City Health Department.

Why? Based on data provided by the US Department of Health & Human Services, this unusually high teen pregnancy rate reflects a "kaleidoscope" of social economic factors that contribute to high teen pregnancy rate from multiple levels, including community level, interpersonal level and intrapersonal level, which call for institutional and structural changes in the communities, according to A Tanner in a 2015 research paper. Poverty has been implicated in high adolescent pregnancy in many studies. For example, in California, zip codes of higher poverty levels closely correlate to the pregnancy rate of adolescents [1]. A UK group also found indications that individual social and economic disadvantage could be transmitted to the next generation through early child bearing [2]. Specifically for Baltimore, GIS maps showed similar patterns of the city's teen pregnancy rate with the city's poverty rate, although the relationship is complex and not exact [3]. As the Strategic Plan to Reduce Teen Births in Baltimore City noticed: "Poverty is both a risk factor for and a consequence of teen births"[4].

Teen Pregnancy Carries a Higher Risk of Preterm Babies and Infant Deaths

Teen pregnancy carries an elevated risk for preterm and low birth weight births. This is a well-established pattern [5]. More specifically, in Baltimore, preterm and low birth weight babies have a much higher mortality rate, accounting for 12% of live births but 31% of all infant deaths [6]. This is partly because teen pregnancies are associated with a higher rate of complications (e.g. pregnancy induced hypertension and fetal growth retardation) that induce preterm delivery. More importantly, teen mothers tend to have higher incidence of preterm labour and delivery, even without other complications [7]. The reason for this higher risk of preterm labour has been well studied. On one hand, it is believed that young women's bodies have not fully developed, and the immaturity of their organs leads to the higher risk [8]. On the other hand, studies have found that adolescent preterm birth risk differs by social determinants. Multiple studies have shown that African American teen mothers face a particularly high risk of preterm delivery and require additional attention, likely as a result of their economic conditions that provide less resources and access to care. A study found that preterm births of African American adolescent mothers accounted for 28% of all births, compared to only 19% for White adolescent mothers. Both are extraordinarily high, but the rates for

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African American mothers are alarming [9]. Amjad & Ospinareviewed thirty-one qualified studies and found that African American teens had 67% higher probability of preterm birth and 53% higher probability of low birth weight. In addition to race, a Canadian study also found that maternal area of residence and low social economic score increased the risk of adverse maternal and birth outcomes, including low birth weight and preterm birth [10].

Teen Pregnancy Negatively Impacts Mothers and Mother-Child Relationship

Even in developed countries, adolescent child bearing has been correlated with worse social economic prospects for the mothers. For example, a study in Sweden, found that adolescent mothers were subject to significantly higher probabilities for lower education, single living arrangements, collection of disability pension and welfare dependency later in their lives[11]. Another study, found that adolescent mothers' future education was negatively impacted [12].

In addition to the poor effect on the teen mothers' prospects, studies indicate that many adolescent mothers live in a distressing social-economic environmentand a high percentage of them have been subjected to physical abuse [13,14]. Such bad situations could result in physical abuse and maltreatment of their children [15]. Home-visiting programs by nurses or social workers have been found to alleviate the risk of childhood injuries. However, these programs are very costly. A study reviewed parenting programs and found that specific programs aimed at improving maternal attitude helped improve mother-infant interaction, language development, parental attitude, and parental knowledge [16].

Kangaroo Mother Care Improves Outcome in Preterm and Low Birth Weight Babies

Kangaroo Mother Care (KMC) is defined as continuous skin-to-skin contact between a mother and her new-born [17]. Kangaroo Mother Care was pioneered by Dr.Sanabria, in 1978, in Bogota, Colombia. It was introduced to curb increasing mortality rate in infants due to the shortage of caregivers and resources. Sanabria suggested that mothers have continuous skin-to-skin contact with their low birth weight babies to keep them warm and to give exclusive breastfeeding as needed, which also freed up overcrowded incubator space and caregivers. The method gained support rapidly as many studies emerged to promote its benefits, including randomized controlled studies [18,19]. A meta-analysis by Ellen Boundy and Grace Chan reviewed 124 qualified studies out of a 1,035 study pool in 2016, and found that compared to conventional neonatal care, KMC reduced mortality of low birth weight (mostly pre-term) babies by 36% at discharge [20]. It decreased baby sepsis by 47%, hypothermia by 88% and hospital readmission rates by 58%. Babies receiving KMC also had lower pain measures, 50% more exclusive breastfeeding, higher oxygen saturation, and head growth. Importantly, another study reported a long term follow-up to evaluate the persistence of KMC benefits in young adulthood and showed that KMC had significant and sustained social and behavioural protective effects in twenty years after intervention [21].

The Mechanism by Which KMC Improves the Clinical Outcome in Preterm Babies

Studies found that skin-to-skin contact between parents and infants increases salivary oxytocin, which is often referred to as the "love" hormone, in both parents and their infants [22]. It is known as the "love" hormone because it is released when people are able to bond socially, but its physiologic role in social interactions is much more complex. Parents with higher oxytocin levels displayed more synchrony and responsiveness when interacting with their infants. In addition to oxytocin, in infants, skin-to-skin contact reduces salivary cortisol, which is often referred to as the stress hormone.

Studies have found that oxytocin is also a hormone that protects against pain and stress and promotes prosocial behaviors [23,24]. In the days immediately following birth, oxytocin is found to regulate maternal behaviors by promoting social interactions and positive emotions [25,26]. Reduced oxytocin production, following mother infant separation or stress during the neonatal period, correlates with poor maternal behaviours that have long term negative impacts on both mothers and infants in terms of their social behaviours. Animal studies have documented that a single dose of oxytocin injection can reverse the effects of maternal separation and many other adverse effects in rodent pups [27]. Preterm babies tend to experience maternal separation, and skin-to-skin contact induces the production of oxytocin, providing alleviation of negative factors in pre-term baby developments [28].

Advocating for the Adoption of KMC to Help Alleviate the Related Problems of High Teen Pregnancy in Baltimore

As discussed above, teen pregnancy has a high risk of preterm and low birth weight babies, which in turn has a higher infant mortality rate. KMC is an effective tool to improve the health outcome of preterm and low birth weight babies by both reducing mortality rate and promoting health and growth.

Baltimore's high teen pregnancy rate is deeply rooted in its social economic situation of its residents, including low income levels and racial factors. These issues have been long lasting and have not been easily improved. The low cost and low barrier for adoption of KMC therefore makes it a particularly appealing tool for the city [29,30].

Discussion

The increased production of oxytocin, in addition to the reduced levels of stress hormones, as a result of KMC, in both teen mothers and their babies are also extremely beneficial. Oxytocin's prosocial effect might help to also boost the teen mothers' likelihood of continuing with their education and eventually having a better living. Lower stress hormone also helps teen mothers cope with the hardship brought about by their existing social economic status, which must be exacerbated by the early pregnancy and infant rearing. Similarly, higher oxytocin and lower cortisol levels in preterm babies should protect them from difficult development paths they must endure in order to survive. Additionally, mother infant bonding facilitated by the production of oxytocin may also help reduce infant negligence and abuse [31,32].

Conclusion

Although KMC is not the most traditional technique for nurturing preterm/low birth weight babies, it can be a highly beneficial tactic for areas with less accessibility to resources, where preterm births are more prevalent, due to its cost-effective and easy-to-implement nature. With further promotion and adoption, infant mortality rates in preterm babies could potentially be reduced for the City of Baltimore, and specifically in low-income families that are not able to afford costly medical treatments.

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