Poverty during pregnancy: Its effects on child health outcomes

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It is estimated that nearly 100,000 children are born into poverty each year in Canada. During pregnancy, their mothers are likely to face multiple stressful life events, including lone-mother and teenage pregnancies, unemployment, more crowded or polluted physical environments, and few resources to deal with these exposures. The early child health consequences of poverty and pregnancy are multiple, and often set a newborn child on a life-long course of disparities in health outcomes. Included are greatly increased risks for preterm birth, intrauterine growth restriction, and neonatal or infant death. Poverty has consistently been found to be a powerful determinant of delayed cognitive development and poor school performance. Behaviour problems among young children and adolescents are strongly associated with maternal poverty. Sound evidence in support of policies and programs to reduce these disparities among the poor, including the role of health practitioners, is difficult to find. This is partly because many interventions and programs targeting the poor are not properly evaluated or critically appraised.

Key Words: Child health; Pregnancy; Poverty; Review; Social paediatrics

The purpose of the present article is to provide an overview of what is known about the impact of poverty during pregnancy on subsequent child health outcomes and what can be done to reduce the disparities that continue to occur. This is not a systematic literature review; however, the paper will focus on published literature that links maternal poverty to child health outcomes in economically advantaged countries that can be extrapolated to the Canadian context. This includes peer-reviewed publications of studies performed in Canada and in other industrialized, developed countries, and also includes the 'grey' literature published by organizations that advocate for improved health among the poor. Plainly stated, it is clear from these readings that to be born into poverty is not good for a child’s health. This is a well-established fact. To continue to experience poverty throughout childhood is even worse, with the health consequences for these children remaining with them for the duration of their lives (1-3).

While there exists widespread consensus regarding the detrimental impact of poverty or income disparities on health, there is considerable debate regarding the magnitude of and reasons for the impact (4,5). Pregnancy and birth are the first of several definitive life events that shape health outcomes within the course of an individual’s lifetime. With this in mind, the impact of poverty on pregnancy and subsequent child health needs to be placed within the context of the cumulative influence of multiple adverse exposures directly and indirectly experienced by those living in poverty, often from one generation to the next (6,7). This population health approach to conceptualizing the determinants of health, formulating health policies and developing interventions has its origins in the Lalonde report (8), published in Canada more than three decades ago. Subsequently refined by Evans and Stoddart (9) and others, societal or individual health is viewed to be a consequence of multiple, interactive determinants.
summarized within global (ie, physical, environmental and socioeconomic), middle-level (ie, health systems and behavioural interventions) and individual, household or community factors (ie, genetics, nutrition, behaviour, shelter and organizations). Some (10,11) have argued that the magnitude of the health impact of the above determinants of health is, in large part, a function of socioeconomic disparities that occur during developmentally sensitive periods of life, including pregnancy. Furthermore, what happens at the beginning of life can have long-term consequences well into adulthood and even intergenerationally (12,13). For example, it has been estimated (14) that childhood exposure to poverty doubles the risk of death by 55 years of age—a risk that increases to as much as fivefold if the exposure continues into young adulthood.

The present article was written in Dhaka, Bangladesh, where poverty 'hits you in the face'. Far from being hidden, families visibly struggle to live on daily incomes that would not buy a cup of coffee in Canada. For obvious reasons, colleagues in Bangladesh have difficulty grasping the idea that a Canadian family of four that earns $25,000 per year is considered to be living in poverty. When defined in terms of absolute incomes, 'poverty' in Canada and in Bangladesh are clearly addressing very different phenomena. These huge income disparities highlight the shortcomings of absolute poverty figures and the need for people to not focus on a dollar income threshold, but preferably on inequalities in income, ie, 'relative poverty'. Whether in Bangladesh or Canada, people living in relative poverty share much in common. They are less educated, less able to cope with stressful life events, and have access to fewer resources when required. Among pregnant women, added to this are greater proportions of teenage or single-mother pregnancies, unemployment, higher levels of stress, and exposure to more crowded and polluted physical environments (4,7). In Canada, a mother who becomes single has a 50% chance of becoming poor within 12 months and has less than a 30% chance of her or her children escaping from it (15).

POVERTY AND PREGNANCY

Depending on how one defines poverty, between 50,000 and 100,000 children are born into poverty each year in Canada (16,17). It is estimated (16) that one in five, or approximately 1.4 million, Canadian children live in relative poverty. The ratio of highest to lowest income quintiles in Canada is approximately 10:1. This inequality in income has, at best, been static since the 1970s and some studies (18) indicate that the inequality is actually increasing. In 1973, the lowest quintile of the Canadian population held 5.3% of the total Canadian market income. This value dropped to 2.3% in 1996. Over the same period, among the highest income quintile, the percentage of the total Canadian market income rose from 38.4% to 43.2% (18). In terms of household cumulative wealth, as opposed to annual income earnings, the disparities are even greater, with the upper 10% of Canadians holding 54% of the wealth, while the lower 10% hold none, ie, they are in debt (19).

From a descriptive standpoint, what is known about women living in poverty and pregnancy? Poverty has been associated with increased total fertility rates, unintended or teenage pregnancy and being a single mother (20-22). In nearly all developed countries, youth living in poverty have a significant increase in risk for teenage pregnancy (22). In a recent Alberta survey (23), female teenagers living in poverty were found to have five times greater risk for pregnancy. When compared with higher income women, those living in poverty were more likely to smoke, to have poorer dietary habits, lower levels of education, and engage in higher risk and health-demoting practices (4,24,25). Lower socioeconomic status in Canada and elsewhere is associated with decreased prenatal care attendance (4,26).

PREGNANCY, POVERTY AND CHILD HEALTH OUTCOMES

Infant mortality

Infant mortality rates among the poor fell by 14% in the 1990s; nevertheless, income disparities persist (16,27). Luo et al (28) compared birth and mortality outcomes, and trends in infant mortality from 1985 to 2000 among British Columbia neighbourhoods, stratified by income status. Differences were found to be limited to urban populations. Comparing highest with lowest income neighbourhoods, infant mortality rates were two-thirds higher in the latter (4.5 versus 7.5 deaths under 12 months of age per 1000 live births) and these disparities had not diminished over time. Disparities in postneonatal mortality over this period actually rose. Similarly, in an analysis of the Quebec birth registry from 1991 to 2000 (29), living in a low-income neighbourhood was found to be associated with an increased risk for neonatal and postneonatal death. The study also found a 30% increased risk for stillbirths among women living in the lowest income neighborhoods.

Preterm birth and intrauterine growth restriction

Preterm birth and intrauterine growth restriction have been consistently associated with lower socioeconomic status, in particular within poor urban populations in Canada (27-29). By combining both of these outcomes, Spencer et al (30) reviewed British birth registration low birth weight data. They estimated that 30% of low birth weights could be attributed to a mother's lower social class. Explanations for these disparities in birth outcomes include higher rates of maternal smoking, poorer nutrition and a higher prevalence of genitourinary tract infections among lower income pregnant women. Kramer et al (4) and Seguin et al (31) have hypothesized that premature birth and/or intrauterine growth restriction may, to a significant extent, be explained by the greater exposure of poor pregnant women to accumulated chronic stressors, including crowded home environments, unemployment, single-parent households, less social support and financial problems (4). Looking at this from a social and physical environment perspective, it is evident that children living in poverty also accumulate a wide range of adverse risk exposures that in their totality, as opposed to
a single risk factor, explain why childhood poverty is so pathogenic (31).

Unmet potential in cognitive development

Poverty has consistently been found to be a powerful determinant of delayed cognitive development and poor school performance. This has been demonstrated (2,7,32) to be largely mediated by the physical and social environment in which poor children live, maternal characteristics, the learning environment of the home and community organization characteristics. It is far from evident what, if any, proportion of the observed cognitive delays can be attributed to exposure to poverty during pregnancy. What is clear is that, following delivery, poverty leads to decreased resources, which in turn leads to a host of household inputs that influence child development. This includes decreased stimulation and book reading in the early years, less responsiveness for language development, less comfort with teachers and homework routines, decreased monitoring of child activities, and perhaps less value placed on education. These experiences, in turn, lead to poorer academic (not intellectual) performance and early school dropout (33). As previously cited, there is a well-established increased risk among lower income women for preterm birth and intrauterine growth restriction. These birth outcomes are important predictors of subsequent deficits in neurocognitive function, lower educational attainment and lower socioeconomic status (34,35).

Behaviour problems

Behaviour problems among young children and adolescents is strongly associated with maternal poverty, but interacts with several other characteristics found among women living in poverty. These characteristics include lower education, poorer maternal health, marital conflict, one-parent households and the greater likelihood of health risk behaviours such as smoking (36-38). These characteristics often occur together over several years, reflecting a mother’s past childhood poverty and prepregnancy health (36). An inter-generational cohort study (12) of disadvantaged children with behaviour problems who were living in Montreal, Quebec, has provided important insights into the cyclical nature of poverty and behaviour problems. That cohort of low-income children with early childhood behaviour problems (aggression or social withdrawal) were more likely to adopt health-demoting practices and report poorer health as adolescents and young adults. This combination of low income status and poor health habits was associated with behaviour problems in adolescence, school dropout, early pregnancy, early marriage and mental health problems as parents. Several women in this cohort had children of their own. Their children have been found to have higher rates of reported common illnesses. They were also more likely to have been prescribed ritalin, in spite of no differences in attention deficit-hyperactivity disorder symptoms. This combination of poverty with behaviour problems, whether they are real or perceived, has followed individuals throughout their life, with transfer from one generation to the next.

Findings from this and other studies (12,13) suggest that a life-course approach to public health programs, targeting low-income women, holds the potential to reduce health disparities for them and their children. Table 1 summarizes income disparities for several health and social outcomes that affect Canadian children, as identified by the Canadian Longitudinal Survey of Children and Youth (39).

Preconception health

The link of preconception and adolescent health with pregnancy outcomes has, in particular, focused on nutritional exposures. Over the past decade it has become apparent that obesity is an important public health issue, with adverse health implications throughout the life cycle, including pregnancy. It is estimated that over 20% of Canadian women who are of reproductive age are obese (40). A recent Danish study (41) assessed the risk for adverse reproductive health outcomes among obese women. The study found that obese women had over two to three times the risk for stillbirth or neonatal death. From a public health standpoint, to deal with this issue will require that greater attention be given to preconception and, by extension, child nutrition. Childhood obesity is on the rise. By the end of primary school, the prevalence of childhood obesity is in excess of 10% of children and as high as 20% in lower income children (42). The majority of these children will remain obese through their teenage years and adulthood. The adverse reproductive health risks that can be attributed to preconception obesity are not well established and represent an important future research priority.

WHAT CAN BE DONE?

INTERVENTIONS AND PROGRAMS

Interventions that target poor women either during pregnancy or soon after delivery have, at best, had a modest impact on maternal and child health outcomes. Both individual and population-based strategies have been tried.
The strategies include prenatal and/or postpartum home visiting (43-46) or early parent training (47), as well as population-based programs that provide community social support (48) or urban regeneration (49) strategies. From a life course perspective, prenatal home visiting would seem to be the logical place to begin. For nearly three decades, varied home visitation strategies have been tested in lower income populations. Combined with postpartum home visits, prenatal home visits have been demonstrated to have positive benefits on health services utilization and parenting behaviours (43,44,50), but have been of questionable benefit in terms of physical or mental health outcomes. More encouraging is the finding that postpartum educational visits with a paediatrician among low-income women can improve parenting skills, in particular among primiparous mothers (51). In terms of maternal health outcomes, perhaps the strongest evidence is in support of favourable mental health outcomes attributed to group parenting programs. Over the short term, these groups have been shown to reduce anxiety or depression and improve self-esteem (47). Social support interventions have not been found to be as effective, and they suffer from several programmatic challenges, such as reaching and maintaining contact with those facing the greatest accumulated stress and in greatest need (48). A relevant set of literature not included in the present review is the impact of daycare on health outcomes among low-income children.

Nearly all the intervention programs reviewed have been stand-alone efforts and period-specific. Life course strategies that combine the best informed interventions, beginning either before conception or early in pregnancy but that are linked to early childhood and adolescent health events, deserve greater funding and program support. Such initiatives should target lower income neighbourhoods, working with all, rather than specific, families. This needs to directly include recipients in the planning, conduct and monitoring of services. Ideally, given proof of effectiveness, acceptability and cost, this would lead to better informed public policies that aim to reduce income and health inequalities.

PROFESSIONAL ROLES

Paediatricians, obstetricians, family physicians and other child health professionals have an ethical and professional responsibility to maintain the health of children in the populations they serve and in society more globally (51). This ‘social contract’ is at the heart of medical professionalism (52). Because poverty is a known, important determinant of maternal and child health, it begs the question, what are our roles and obligations? The pathways between poverty and health outcomes are not always clear and therefore professional roles become more obscure. This gap in understanding has recently been addressed by including ‘social paediatrics’ in paediatric training programs. This involves removing medical residents and other child health trainees from traditional clinical settings and providing community-based opportunities for more direct exposure to the social realities of poverty (53,54).

There are well-known, more proximal determinants of health that more commonly occur among lower income pregnant women, such as smoking or inadequate preparation for newborn and early infant care, that can be dealt with in clinical practice settings. Outside these settings, child health professionals can also play a role. Examples include becoming better informed of the evidence that links poverty to child health and using this knowledge to raise awareness in their communities and beyond. Locally, child health professionals can encourage and participate in community engagement with, and advocacy for, the poor through local and national nongovernment organizations. Those who teach or mentor health trainees have an opportunity to integrate their knowledge of social with physical and environmental determinants of health, thus encouraging a more holistic approach to disease prevention and curative care.

From a research standpoint, methodologically sound evidence in support of policies and programs that aim to reduce disparities in pregnancy outcomes, or, more generally, health among the poor is difficult to find (55). Many programs that target the poor are not properly evaluated and funding to support this is difficult to obtain. The prevailing attitude that ‘we know what’s wrong, now let’s get on with it’, fails to appreciate important gaps in knowledge that are required to guide the introduction of proven, effective interventions. These gaps can only be filled through continued funding support for formative and health systems research that provides the knowledge necessary for well-informed, prooor health policies and the widespread application of effective, affordable and acceptable interventions.

REFERENCES

Poverty, pregnancy and early child health outcomes