

Workshop Summary: Racial and Ethnic Disparities in Pregnancy Outcomes: Exploring the Role of Paternal Involvement

***Eunice Kennedy Shriver* National Institute of
Child Health and Human Development (NICHD)**

Bethesda, Maryland

July 16, 2012

This workshop, sponsored by the Division of Special Populations and part of the NICHD Health Equity Seminar Series, focused on the prospective father's role in pregnancy outcomes. The workshop, which began at 1 p.m., brought together researchers, health care providers, and members of professional organizations to identify gaps in and barriers to research on this subject. The audience included about 40 attendees.

Reiko Toyama, Ph.D., Division of Special Populations, NICHD, introduced the program. Yvonne Maddox, Ph.D., Deputy Director, NICHD, provided opening remarks.

Panelists (in alphabetical order)

Jermame Bond, Ph.D., Joint Center for Political and Economic Studies, Health Policy Institute

Sally P. Darney, Ph.D., Office of Research and Development, Sustainable and Health Communities Research Program, U.S. Environmental Protection Agency

Latanya Mapp Frett, J.D., Planned Parenthood Global, Planned Parenthood Federation of America

Michael C. Lu, M.D., M.P.H., Maternal and Child Health Bureau, Health Resources and Services Administration

Stuart B. Moss, Ph.D., Reproductive Sciences Branch, NICHD

Peter Schafer, M.S., Baltimore Healthy Start

Marian Willinger, Ph.D., Pregnancy and Perinatology Branch, NICHD

Workshop Presentations

Racial and Ethnic Disparities in Pregnancy Outcome: The Role of Paternal Involvement

Michael C. Lu, M.D., M.P.H.

Dr. Lu described the current status of paternal involvement in pregnancy outcomes, addressing the question: What do fathers have to do with it? He noted that although the United States spends more money than any other country on maternal health, it still ranks near the bottom in terms of infant mortality. Large and persistent gaps remain, such as the fact that black babies are twice as likely as white babies to die during the first year of life.

There is currently no consensus on how to define and measure paternal involvement. Some measures were borrowed from the pediatric literature, which raises questions about their relevance and adaptability. Questions also remain about cultural and biological differences across groups.

From an ecological perspective, father involvement has been linked to individual, interpersonal, institutional, and public policy factors. From a lifecourse perspective, it is important to understand how boys become men and how men become fathers. Biological determinants include a growing list of environmental toxicants that have been shown to cause sperm damage.

Different pregnancy outcomes may have different mechanisms and pathways. For spontaneous preterm birth, there are four known major pathways: stress, infection and inflammation, placental complications, and over-distension of the uterus. While there is no direct evidence linking father involvement to maternal stress in preterm birth, some evidence suggests that black women may experience more partner-related stress during pregnancy, which may contribute to their higher risks of preterm birth.

There is a need for multilevel lifecourse interventions to improve father involvement and pregnancy outcomes.

Implications for Policy, Research, and Practice on Paternal Involvement in Pregnancy Outcomes

Jermene Bond, Ph.D.

Dr. Bond reviewed racial and ethnic disparities in pregnancy outcomes, described historical and contemporary aspects of paternal involvement, and identified pathways and recommendations for improving paternal involvement in pregnancy outcomes.

The U.S. currently ranks 31st among developed countries for infant mortality rates. The majority of disparities are seen in the South. A black baby born in America today is still more than twice as likely as a white American baby to die within the first year of life.

Fatherlessness has been called our nation's most pressing social problem and has received increased attention. Studies have shown that if fathers are involved during the pregnancy, they are more likely to be involved later. A better understanding of hormonal changes in men during pregnancy is needed (research has been done in animal models). Marital status and paternal age are important predictors of birth outcomes. Currently, we don't know the aspects that can lead to better outcomes, what theories offer the best explanations, and why disparities in outcomes still exist among racial/ethnic groups.

Researchers do not agree on the definition of paternal involvement or how it is measured. The Commission on Paternal Involvement in Pregnancy Outcomes (CPIPO) was assembled in 2009 to improve paternal involvement in pregnancy and family health by reframing debates and informing research, policy, and practice to support greater involvement of expectant fathers.

In 2010, the CPIPO published a report with recommendations to improve paternal involvement in pregnancy outcomes.

- Research recommendations included the need for more funding to expand current efforts, especially in communities with marked disparities, and to identify effective clinical and population-based strategies.
- Policy recommendations focused on the removal of disincentives and barriers, particularly amending the Family Medical Leave Act to include paid parental leave, reducing the “marriage penalty,” revising Temporary Assistance for Needy Families eligibility and funding, and mandating that public programs serving children and families develop more “father-friendly” practices and programs.
- Practice recommendations included the improvement of reproductive lifecourse planning and contraceptive services for young boys and men, improvement of preconception health care for men, development of best practice models, and promotion of father-friendly hospital settings, practices, and policies.

A three-phase model of care for men should address preconception, prenatal, and interconception care. Preconception care should include risk assessment, health promotion, and clinical and psychological interventions. By working closely with pediatrics and obstetrics/gynecology, it is possible to design a study that can become an intervention.

Involving Men as Providers and Clients in Community-Based Reproductive Health Care

Latanya Mapp Frett, J.D.

As a representative of Planned Parenthood Global, Ms. Frett noted that the role of men in families differs for different cultures, and within communities. Men play roles as fathers, provider-advocates, community health workers, religious leaders, community health workers, and youth/peer providers.

In Africa and Latin America, men are most often the heads of households and society leaders who hold power; the fate of women rests in the hands of men. Men are often seen as gatekeepers and can keep women from getting health care. Planned Parenthood has a particular interest in talking with men, and this normally “opens the gates” to introduce health programs.

Ms. Frett gave several examples of successful programs that involve men in reproductive health care. In Sudan, male health care providers expanded women’s access to family planning services and advocated for a community based health system that addressed family planning and obstetric services. In Nigeria, relationships were built with religious leaders to allow for the gradual introduction of modern contraception, counseling for Sexually Transmitted Diseases and HIV, and post-abortion care into clinics. In Peru, partnership programs have been initiated with shamans.

Strong community health programs are important to provide support beyond the clinic. In Nicaragua, male counselors are talking to other males about reproductive health. Young men receive training to counsel and provide needed services not only to other boys, but also to girls. This program has been integrated into schools and is becoming an interesting source of counseling. In Guatemala, a popular radio program, *Sexo Tips Radio*, allows people to call in or text questions about sex. Violence is a very real issue in Latin America and Africa, but many boys are showing an interest in dispelling some of the “macho” ideas. In Ethiopia, street parties are

used as a way to get young people involved. Planned Parenthood Global is also exploring new technologies such as mobile apps for “Am I pregnant?” and “Do I have a sexually transmitted infection?”

Ms. Frett noted the need for more research to document the success of these efforts so that these practices can be made available throughout the world.

Paternal Involvement in Pregnancy Outcome: It’s More Than Just DNA

Stuart Moss, Ph.D.

Dr. Moss provided a basic science perspective on paternal involvement in pregnancy outcomes. He reviewed sperm formation, information provided by sperm, stressors on sperm integrity, and factors influencing the epigenome.

Damaged sperm can result in infertility, miscarriage, preterm labor, and birth defects. Stressors on sperm DNA integrity include environmental factors such as radiation, heat, and heavy metals. Paternal age is another stressor, with an increase in mutations seen with increasing age. About 20 autosomal dominant disorders are associated with paternal age. Lifestyle stressors such as diet, obesity, and lack of exercise also reduce sperm counts.

Dr. Moss discussed influences on the epigenome. Epigenetic changes can be passed on to future generations and result in transgenerational inheritance. For example, research has shown that male rats fed a high-fat diet produced offspring with a diabetes-like condition. In another study of male mice fed a high-fat diet, subfertility was inherited through multiple generations. Factors that affect the epigenome include environmental toxicants, diabetes, obesity, and stress. Another study in male mice showed that poor gamete quality could be reversed with improvements in diet. Animals fed a diet of the fatty acid docosahexaenoic acid experienced improved fertility.

The NICHD currently funds studies of gamete quality in natural and assisted reproduction. More research has been proposed to study epimutations—the types and their relationships to genetic alteration, mechanisms, and repair. From a basic science perspective, research on paternal involvement in pregnancy outcomes focuses on gamete quality, reversal of detrimental effects, health disparities, and the relation of transgenerational effects to adult-onset diseases. Decisions by fathers may affect not only their children, but also their grandchildren, and perhaps beyond.

Environmental Contributions to Healthy Fatherhood

Sally P. Darney, Ph.D.

Dr. Darney’s presentation reviewed the environmental factors that influence father-mediated fecundity and birth outcomes. She focused on chemical stressors, “take-home” exposures from the father’s workplace, the effects of lower socioeconomic status, and how healthy fatherhood can be improved.

Multiple interacting factors determine health and well-being and include inherent host factors (e.g., age, gender, genetics), environmental factors (e.g., pollution, chemical hazards), and social and economic factors (e.g., lifestyle, education, poverty, racism, crime, discrimination). Researchers are trying to understand these factors and their interactions.

Environmental stressors can affect the health of prospective fathers and cause infertility and damaged DNA in preconception. Exposures to heavy metals, pesticides, solvents, industrial chemicals, and heat may affect semen quality. Pharmaceuticals and contaminants may carry over to semen. Clinicians should at least ask about workplace exposures and drugs taken. Genetic damage to the sperm is associated with spontaneous abortions, birth defects, sperm chromatin damage, and sperm aneuploidy.

A Czech study examined effects on semen in healthy young men after high and low exposure to air pollution over 2 years. The results showed that air pollution was associated with sperm DNA damage. Increased sperm DNA damage was seen only in men with a genetic variation that diminished their ability to detoxify reactive chemicals in air pollution. The results were suggestive of risk for adverse pregnancy outcomes, although the study was not designed to evaluate a linkage with fertility or birth outcomes. It was also not possible to separate the effects of smoking and alcohol in the analysis.

Dr. Darney noted the methodological challenges of designing studies of exposures. For example, toxicants may impact both sexes but in different ways and at different critical windows of development, making it hard to attribute the impact to males, females, or both. Also, the use of semen outcomes is male-specific and not necessarily predictive of birth outcomes.

Fathers may influence exposures at home, or take home exposures from work. A study of agricultural pesticides in farm workers (Yakima Valley Experience) showed that the take-home pathway contributed to higher urinary levels of pesticide metabolites in the workers' children.

Health disparities observed in men of low socioeconomic status may not necessarily be related to race or ethnicity per se, but rather to exposures in communities that are near pollution. Environmental and socioeconomic factors may interact to produce health disparities.

Public health challenges include improvements in health literacy and male attitudes toward health. There is a lack of public health tracking data for fertility/fecundity, especially for specific groups or places. Semen studies are difficult to conduct and often do not evaluate sperm DNA damage. There is a lack of health screening exams and public health messaging for prospective fathers.

Suggested actions include safety assurances through regulations in communities and workplaces, workplace screenings, environmental assessments by medical care providers, and improved public health messaging for men.

Community Participatory Research to Eliminate Disparities in Pregnancy Outcome

Marian Willinger, Ph.D.

Dr. Willinger reviewed disparities in pregnancy outcomes. The rates of very preterm births are still much higher for blacks than whites, as are the percentages of infant deaths and fetal mortality. The rate of early fetal deaths at 20 to 27 weeks of gestation is almost three times higher for non-Hispanic blacks compared to whites. There is a large disparity for blacks versus whites in risk for stillbirth.

Eliminating disparity in the incidence of preterm birth will have a significant impact on disparities in infant mortality and morbidity. Preterm births of infectious and inflammatory etiologies are more common among blacks. The constellation of biomedical, sociodemographic, and environmental factors alone cannot explain the disparities.

The NICHD established the Community Child Health Network to implement community participatory research to address the interaction of individual, family, and community-level factors in mediating health or poor pregnancy outcomes.

A current prospective study of mothers and their partners will examine the determinants of parental stress and resilience and their effect on maternal allostatic load and the course of pregnancy. The study will assess biomarkers and other physical measures, and ultimately look at prenatal development and birth outcomes.

Issues involved with the enrollment of fathers may reveal important considerations for future research that involves fathers. The ratio of fathers to mothers enrolled in the study was higher for whites (69.8 percent) compared to blacks (45.1 percent). The rates of fathers participating in the study were more closely linked to relationship status than to race per se. The primary predictor of father enrollment rates was relationship type (i.e., married, in a relationship, neither). The secondary predictor was relationship quality issues (e.g., whether the mother was happy about the pregnancy). Marriage is increasingly uncommon in all races.

Panel-Led Discussion

Questions and comments from audience members included the following:

Effects of caffeine. Caffeine may not lead to negative pregnancy outcomes, and some studies have shown that caffeine protects against neurodegeneration. Caffeine use co-varies with nicotine; adverse effects [attributed to caffeine] may really be due to nicotine.

Dr. Lu: There are large gaps in the science of factors associated with sperm quality. We need improved science and better data.

Study designs. What factors would be included in designing studies of preconception care for males?

Dr. Lu: This is a question for a longer discussion. We know the importance of reproduction lifecourse planning for women and need to think about this for men. Just as we don't want to think of women as "reproduction vessels," we don't want to just improve sperm quality, but to

improve men's health as well as pregnancy outcomes. We need to think about risk assessment, health education, and what goes into the package of preconception care for men.

Intergenerational perspectives. Data from the Dutch famine study show that it's not just what happens during pregnancy that affects outcomes; there are also multigenerational effects.

Dr. Lu: If we want to look at paternal involvement, we must look at the whole lifecourse and consider intergenerational perspectives. For example, the relationship of paternal involvement and teen pregnancy rates may be an important research question.

Paternal rights.

Ms. Frett: In some countries, family paternal rights are more profound than the rights of the woman. It depends on whether there is a maternal or paternal culture. The father's family could have more say about a child than the mother. In Africa, for example, a child could be forced to live with the father's mother.

Legacy of slavery. Do you think the legacy of slavery is driving what we see today, both directly and indirectly?

Dr. Bond: This is a very challenging topic and just touching on it leaves unanswered questions. It's a 400-year-old problem. We won't see solutions in our lifetime; it's so ingrained in our everyday lives. The best thing I can suggest is for us to change our education—the small period where students learn about slavery should be changed. We should think about what that means for young black children. The challenges are so deep for us and ingrained in the media. We can do things related to strength and resilience.

Birth centers. Did you imply that it would be a good thing to bring back birthing centers?

Dr. Maddox: Recent data showed that issues related to preterm birth were better [at birthing centers]. I agree that this is something we don't want to advocate across the country in numbers, but it shows that there are so many aspects to care that are missed in the hospital setting.

Lifecourse planning. How soon should we start? Once men know what's going on, they want to be a part of it. It's just how we bring them into the big picture. Do you have any suggestions?

Dr. Lu: I think the lifecourse perspective broadened our timeline of when interventions will be effective. We really don't pay a lot of attention to middle childhood and adolescence. If we really want to improve paternal involvement, we need to start much earlier—at 4th, 5th, and 6th grades. They are critical periods in the lifecourse trajectory, and I think we're missing windows of opportunity.

Ms. Frett: In our overseas program, education starts at age 12 and goes beyond health and into sexuality. People know that by age 12, kids have a fairly clear understanding of sexuality.

Dr. Willinger: We talk about sex education and contraception, but it needs to go beyond that to have children delay the motivation for childbearing. This is a huge problem in communities where children don't have a vision of how they can be successful adults. Education itself may not be enough.

Broader perspective of health issues. There are about 2 million men in prison, mostly African Americans, who learn a new culture of crime while in prison. It's such a newsworthy item.

Mr. Schafer: Something seen as a civil rights issue has huge health implications. If we do reforms in criminal justice, there will be great benefits for family and health.

Effects of income level on stress. A study showed that college-educated blacks had higher rates of sudden infant death syndrome (SIDS) than college-educated whites.

Mr. Schafer: Generally, the protective benefits of higher income on stress are not seen in blacks or Hispanics. With blacks, it flattens out. It seems that with the reduced stress of higher income, there's some additional stress for black women.

New models of care.

Mr. Schafer: I think we have a lot to learn from the international arena in terms of moving beyond the traditional models of care. Mothers come to the clinic to have their babies vaccinated, but do not go for postpartum care because they are feeling fine. So they do not get contraceptive care. We could learn a lot from international models. When I looked for supporting literature, it was all in international care.

Ms. Frett: In the South, Planned Parenthood is trying to integrate some of the models used overseas. A big part is building relationships. We are trying to integrate health care into their issues, rather than just have outsiders coming in. That's a huge part of what we do in the international programs. I think we can do a lot of exchanges. Sometimes we forget how similar our issues are to those in Guatemala.

Young girls married to older men.

Ms. Frett: We do see quite a bit of this. But we can't expect changes over a short period of time. We need to look at a couple of generations to change. The global community is making inroads in trying to protect the girls in those situations by working with the families, where it has to do with economics and social stature. Many young girls have very little say, including about what happens to their children. In most cases, paternal grandparents have more rights.

Peer educators. So many young men are signing up to be peer educators. Did you have an opportunity to study the effect that has had on them as fathers?

Ms. Frett: We have very little empirical data, but young men are delaying pregnancy and marriage. We also found the same thing for girls, but girls are less likely to be engaged in activities where they talk to people. They are not as outgoing culturally or socially. The boys see it as an opportunity to be more social and play a leadership role.

The workshop session concluded at 5 p.m. Jean Flagg-Newton, Ph.D., Assistant Director, Division of Special Populations, NICHD, provided the closing remarks.