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Sequential screening for psychosocial and behavioral risk during pregnancy in a population of urban African-Americans

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Abstract

Objective: Screening for psychosocial and behavioral risks, such as depression, intimate partner violence and smoking, during pregnancy is considered state-of-the-art in prenatal care (PNC). This prospective longitudinal analysis examines the added benefit of repeated screening over a one-time screen in identifying such risks during pregnancy.

Design: Data were collected as part of a randomized controlled trial to address intimate partner violence (IPV), depression, smoking and environmental tobacco smoke exposure (ETSE) in African-Americans women.

Setting: PNC sites in the District of Columbia serving mainly minority women

Population: 1044 African-American pregnant women in the District of Columbia

Methods: Mothers were classified by their initial response (acknowledgement of risks) and updated during pregnancy. Risks were considered new if they were not previously reported. Standard hypothesis tests and logistic regression were used to predict acknowledgment of any new risk(s) during pregnancy.

Main Outcome Measures: New risks; psychosocial variables to understand what factors might help identify acknowledgement of additional risk(s).

Results: Repeated screening identified more mothers acknowledging risk over time. Reported smoking increased by 11%, ETSE by 19%, IPV by 9%, and depression by 20%. The psychosocial variables collected at the baseline that were entered into the logistic regression model included relationship status, education, Medicaid, illicit drug use, and alcohol use during pregnancy. Among these, only education less than high school was associated in acknowledgement of new risk in the bivariate analyses and significantly predicted identification of new risks (OR=1.39, 95%CI, 1.01-1.90). **Conclusions:** It is difficult early on to predict who will acknowledge new risks over the course of pregnancy, thus all women should be screened repeatedly to allow identification and intervention during PNC.

Keywords: pregnancy, African-American, psychosocial risk

INTRODUCTION

Psychosocial problems among pregnant women, such as poverty, mental health problems, including depression, substance abuse, violence and social isolation, have adverse impact not only on pregnancy outcome, but also on the child's health, behavior and development.[1,2] When women are seen for prenatal care, they should be screened for psychosocial problems. While many are not remediable to change within the clinical setting, identification of such risk factors can be helpful in targeting anticipatory guidance as well as referral to other health care or social service setting(s). Recommendations to screen for such risks are considered state of the art in peri- and prenatal care.[3] Exposure to risks considered in this study (depression, intimate partner violence (IPV), smoking and environmental tobacco smoke exposure (ETSE)) have all been causally associated with poor pregnancy outcomes. Depression during pregnancy is common, with rates ranging between 10 to 30 percent.[4-6] Depressive symptoms can lead to an increased risk for low birth weight (LBW) and preterm delivery (PTB),[6,7] poor mother-child relations, and poor psychosocial child development.[8,9] These findings are particularly relevant to the lives of African American women, as research has consistently shown they experience multiple sources of stress in their lives,[10,11] and that greater exposure to stressors is associated with increased depressive symptoms.[12] Exposure to IPV increases the likelihood of poor physical health, physical disability, psychological distress, mental illness, including depression, and heightened substance use including alcohol and illicit drugs.[13,14] Abused women have higher rates of sexually transmitted diseases, vaginal bleeding or infection and urinary tract infections.[15] Abuse during pregnancy has been associated with significantly higher rates of depression, suicide attempts as well as use of tobacco, alcohol and illicit drugs,[16-21] LBW, very LBW, PTB, very PTB and neonatal death.[14, 22-24] Smoking is known to increase the likelihood of LBW,[25, 26] PTB, [25, 27, 28] as well as infant mortality [28, 29] and morbidity.[30] Adverse effects of ETSE during pregnancy exist[31] and are similar to those for active smoking.[31-33]

This prospective longitudinal study examines the added benefit of repeated screening over a one-time screen in identifying psychosocial and behavioral risks during pregnancy.

METHODS

Study population

The population included in these analyses was recruited to a randomized controlled trial (RCT), the District of Columbia Healthy Outcomes of Pregnancy Education (DC-HOPE) that was part of the National Institutes of Health-District of Columbia Initiative to Reduce Infant Mortality in Minority Populations. This RCT evaluated the efficacy of an integrated cognitive behavioral intervention targeting cigarette smoking, ETSE, depression and IPV during pregnancy. Women were eligible if they were at least 18 years of age, self-identified as an ethnic minority, were less than 29 weeks pregnant, English speaking, a Washington, DC resident and acknowledged at least one of the four targeted risks. Women were recruited and followed between July 2001 and July 2004 at six prenatal care sites. Women were screened using an audio-computer assisted self-interview (See El-Khorazaty, et al[34] for details.) For those women who were eligible based on their screening, baseline interviews were conducted an average of 9 days after screening. IRB approval was obtained from all participating institutions.

Of the 2,913 women who were screened, 1,398 were eligible and 1,070 were minorities. These women were consented, completed the baseline questionnaire and were randomized to either the intervention or usual care. Of these 1,044 self-identified as African-American and were still pregnant at the time of the baseline interview.

The intervention that was delivered as part of the RCT was conducted during routine PNC visits at the clinics by interventionists (master's level social workers or psychologists), who were trained specifically to deliver this intervention. The intervention was evidence-based and specific to each of psycho-behavioral risks.[35] At each intervention session the woman identified which of the four risks she was experiencing, and the intervention was targeted to address all reported risks reported, regardless of what the woman had reported previously. For example, the intervention for

IPV emphasized safety behaviors, provided information about the types of abuse and the cycle of violence, a Danger Assessment Component to assess risks, and preventive options women might consider (e.g., filing a protection order) as well as the development of a safety plan. The women also received a list of community resources. The intervention was designed to help women address the psycho-behavioral risks. Eight women (6 randomized to the intervention and 2 to usual care) were identified as suicidal during intervention or data collection. These women were immediately referred to mental health care and excluded from further participation in the study.

Data Collection

Data on sociodemographic and behavioral risk were collected by telephone interview at baseline and during the second and third trimesters (22-26 weeks and 30-34 weeks, respectively). Interviewers were blinded to randomization group. Smoking was based on self-reported cigarette smoking in the past week. ETSE was assessed by women's report of their partner, household members, or family/friends smoking and their estimated household exposure for the past 7 days as well as personal ETSE on a typical day at or away from home in the past week. Depression was measured using the 20-item Hopkins Symptom Checklist-Depression Scale and IPV was measured using the Revised Conflict Tactics Scale's physical assault and sexual coercion subscales. Both victims and perpetrators of IPV were classified as having IPV risk. The reference period for baseline IPV was the previous year and the reference period at each follow-up time point was since the previous interview.

Statistical Analysis

Risks acknowledged during the second and third trimester interviews were classified as new if they had not been reported at a previous interview. At each follow-up time point, the number of women with each new risk (smoking, ETSE, depression, IPV) was divided by the number of women who acknowledged the risk at baseline to calculate the percent increase in the risk compared to baseline. In order to understand what factors at baseline might help identify who was likely to acknowledge additional risk(s) moving forward through pregnancy, standard hypothesis tests compared women

who acknowledged a new risk to those who did not acknowledge a new risk based on psychosocial variables measured at baseline, including age, parity, gravidity, relationship status, education, Medicaid, illicit drug use, and alcohol use during pregnancy. T tests were used to compare the groups with respect to continuous variables, and chi-square tests were used for comparisons with respect to categorical variables. A logistic regression model was constructed to predict acknowledging any new risk at either follow-up interview. Predictors included in the model were those variables that were statistically significant at the $p < 0.10$ level in bivariate analysis.

RESULTS

At the baseline interview, 198/1044 (19.0%) women acknowledged smoking, 742/1025 (72.4%) acknowledged ETSE, 463/1044 (44.3%) women were depressed and 464/1041 (44.6%) women acknowledged IPV as victim, perpetrator or both. 591 women participated in the FU1 interview, 717 participated in the FU2 interview, and 458 participated in both. Overall 850/1044 (81.4%) had at least one FU interview during pregnancy (FU1 or FU2). Figure 1 provides a diagram of the numbers of women screened, their eligibility and follow-up in Project DC-HOPE. At the follow-up interviews in the second and third trimester, each woman was questioned again about each of the risks. Women acknowledging active smoking increased by 5.1% at the first follow-up visit and by 5.6% at the second follow-up visit. Women acknowledging exposure to ETSE increased by 11.9% at the first follow-up visit and by 7.1% at the second follow-up visit. Women acknowledging IPV increased by 3.7% at the first follow-up visit and by 5.0% at the second follow-up visit. Women acknowledging depression increased by 8.6% at the first follow-up visit and by 11.7% at the second follow-up visit. (See Table 1). The total number of risks acknowledged increased from 1867 at baseline to 2163 after the last follow-up interview, an overall increase of 15.9%. Because the RCT was designed to reduce risks, Table 2 reports results only by care group. Looking at the results by women rather than by risk, 13.4% of women randomized to the intervention acknowledged additional risks at the first follow-up and 9.6% at the second follow-up; in the control group 12.6% of women acknowledged new risks at the first follow-up and 12.2% at the second follow-up.

In the bivariate analyses, only education less than high school was associated with acknowledgement of new risks at the *p* <0.10 level (See Table 3). As the only independent variable in the logistic regression model, education less than high school significantly predicted acknowledgement of new risks (OR=1.39, 95%CI, 1.01-1.90).

The data reported here do not consider whether the women recruited to this study were randomized to the intervention or usual care. It should be noted that the intervention was designed to intervene on women's risks. The intervention was successful in significantly reducing IPV and ETSE, but not depression or active smoking.[14, 36]The overall effect of the intervention on all risks significantly reduced the occurrence of severe prematurity.[37]

DISCUSSION

Main Findings

It is evident from our results that sequential screening for psychosocial and behavioral risks will assist health care providers in identifying a larger percentage of women impacted upon by such risks. As noted by Harrison et al.[38] such screening allows providers a better assessment of multiple co-occurring risks and their impact on an individual patient. Despite this, such screening is not uniform in the US or abroad. Additionally, interventions to all four risk factors are available and have shown efficacy in improving pregnancy outcomes, either singularly or in combination.[14,36,37,39-41]

Some risks, such as depression, actually do wax and wane. It is quite common with mood disorders such as depression to observe variances over time, from depressed to normal or hypomanic moods or other variations.[42] Additionally, there are risks, such as smoking, from which women may abstain from when they realize they are pregnant. However, women who quit smoking during the first trimester voluntarily or due to a physical aversion may be likely to resume smoking during the latter part of pregnancy.[42-45]

The women in this sample brought with them many challenges to their pregnancies in addition to the risks for which they were screened, including poverty, and other forms of substance use. While they were willing to participate in the interviews (the data presented here), there was a portion of

women randomized to the intervention who did not participate although they represented a minority of the participants.

It is generally accepted that longitudinal data are preferable to cross sectional data and will provide a researcher with a richer data set. It has also been shown that socially desirable responses (e.g., answering negatively to questions about smoking during pregnancy) will decrease over time.[46] In this study, we did not measure social desirability, although it was likely decreasing over the repeated interviews.

We can only speculate why women with lower educational status were more likely to report new risks during later stages of their pregnancy. Although the questionnaire was designed for a low literacy level, participants may not have clearly understood the questions during the initial interview(s)While it is possible that the women did not understand the questions, this may not be the most likely explanation. Women with a lower educational attainment may also have the perception of being less empowered, from a socio-cultural perspective. These patients may have issues of trust with the health care providers and may be unwilling to share information that they perceive may expose them to judgment or further disempowered them. It is also possible that women were reluctant to share information about themselves to an unfamiliar interviewer or that additional stressors in their lives impacted the expression of risk directly or indirectly over the course of their pregnancy. All of these possibilities could have contributed to our findings and warrant further study, particularly a more in depth study of the correlates of emergent risks.

Strengths and Weaknesses

The main strengths of this study include that the data were collected as part of a prospective, controlled trial. Women were followed through their pregnancies. Additional strengths include that the sample is longitudinal and targeted high-risk expectant mothers, hence can thoroughly assess the research objective: to examine if repeated screening of risks might encourage certain mothers to acknowledge the presence of risks. A limitation of the study includes its restriction to high-risk

African American women. While it is likely that these results would apply to other high-risk minority pregnant women, there is a potential lack of generalizability to a broader population. Furthermore, the rates reported in our study are true for women receiving care at the same institution with a certain degree of continuity and interviewed by the same person. These findings may not be reproducible where care is fragmented or where patients interact with multiple providers over the course of their pregnancy. However, we believe that the results of this analysis and its importance can be extended to other populations of pregnant women. When the women were interviewed, they were queried about each of the risks. At each data collection time point, validated instruments were used. At baseline and during pregnancy, the Revised Conflict Tactics Scale was used to measure IPV, the Hopkins Symptom Checklist-Depression Scale was used to measure depression and ETSE and smoking were by self-report. We have no way to differentiate between a woman's failure to report a risk and the actual absence of it.

Interpretation

Whether the results presented here are a reflection of new risk exposure in a population free of that risk at baseline or whether they reflect an increased level of comfort in sharing risk status with the provider deserves further investigation. The data here do not allow us to understand whether it is one situation or the other or both, depending on the participant. The ability to differentiate these responses would enhance a provider's ability to target anticipatory guidance. A cross sectional approach toward risk evaluation at a particular moment in pregnancy, may be ill suited to the dynamic and longitudinal trajectory of biological and psychobehavioral circumstances. In these situations, a single measurement may give a poor indication of risk at a later point in pregnancy. Thus, repeated measurements are considered desirable to improve risk assessment. Regardless of which situation is occurring, repeated screening allows the provider the opportunity to offer interventions that may have otherwise not been available to the patient. Intervening on such newly identified risks at the time of discovery will likely be of benefit to mothers and their infants. It is difficult early in pregnancy to predict who will acknowledge new risks over the course of pregnancy,

thus all women should be screened repeatedly to allow identification and intervention during prenatal care.

CONCLUSIONS

The results as reported, support repeated psycho-behavioral assessment over the duration of a pregnancy to become incorporated as a standard of obstetric care. This issue cannot be left to the judgment of the individual health care provider since an initial negative screen may not be consistently predictive of psycho-behavioral risk later in pregnancy. This is particularly true in women with lower educational attainment as seen in this study. The exact reason of variation in risk expression over time needs further research and may only be possible in situations where objective measures can be matched against patients' report. Smoking would be a perfect example. In other risks such IPV, such an objective measure would be hard to obtain.

DISCLOSURE OF INTERESTS

None of the authors has any competing interests to declare.

CONTRIBUTION TO AUTHORSHIP

MK, as the NICHD Project Officer, oversaw all the activities of the study while it was in the field. She participated in the analysis and interpretation of the results. MK did a significant amount of the original writing of the manuscript, as well as revising it critically for important intellectual content. MK has given final approval of the manuscript.

MMG supervised data processing and creation of the analysis dataset, revised and contributed to the analysis plan, performed substantial statistical analyses, participated in the writing of the manuscript. MMG has given final approval of the manuscript for publication.

MNE, as the P.I. of the DCC, made substantive contributions to the conception, planning, design, sample size determination, development of the instruments, development of the Data Management System (DMS), and conduct of the study. He also monitored recruitment, data collection and follow-up activities, supervised data processing, developed the analysis plan, conducted interim analysis and performed substantial statistical analyses, participated in the writing of the manuscript. MNE passed away prior to the finalization of the manuscript.

AAE was directly involved in the design and implementation of all aspects of this study. He monitored all activities related to recruitment and retention as the Executive P.I. of the study team. AAE also participated directly in the analysis plan and the interpretation of results. He participated in the authorship of the paper; he reviewed and edited, when necessary, and approved the text as presented in its final form.

DETAILS OF ETHICS APPROVAL

This study was approved by the Human Subjects Committees at Howard University (for the clinical sites), RTI International (the data coordinating center) and the *Eunice Kennedy Shriver* National

Institute of Child Health and Human Development. Copies of the Institutional Review Board approval have been archived and I no longer have access to them. The data were collected as part of a clinical trial, registered at ClinicalTrials.gov, www.clinicaltrials.gov, NCT00381823

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TABLE CAPTIONS

Table 1: Acknowledgement of risk at baseline and at follow-up interviews during pregnancy

Table 2: Acknowledgement of risk at baseline and at follow-up interviews during pregnancy by care group

Table 3: Bivariates of women reporting vs. not reporting new risks at follow-up interviews during pregnancy

WORD COUNT: 2527

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Table 1

Acknowledgement of risk at baseline and at follow-up interviews during pregnancy

Risk Factor	Baseline (4-28 wks)	Follow-up 1 (22-26 wks)	Follow-up 2 (34-38 wks)
Active Smoking	198	+10 (5.1%)	+11 (5.6%)
ETSE	742	+88 (11.9%)	+53 (7.1%)
IPV	464	+17 (3.7%)	+23 (5.0%)
Depression	463	+40 (8.6%)	+54 (11.7%)

Table 2

Acknowledgement of risk at baseline and at follow-up interviews during pregnancy by care group

Risk Factor	Care Group	Baseline (4-28 wks)	Follow-up 1 (22-26 wks)	Follow-up 2 (34-38 wks)
Active Smoking	Intervention	106	+4 (4.0%)	+6 (6.0%)
	Usual Care	92	+6 (7.0%)	+5 (5.0%)
ETSE	Intervention	365	+44 (12.0%)	+25 (7.0%)
	Usual Care	377	+446 (12.0%)	+28 (7.0%)
IPV	Intervention	229	+18 (8.0%)	+23 (10.0%)
	Usual Care	234	+22 (9.0%)	+31 (13.0%)
Depression	Intervention	241	+8 (3.0%)	+10 (4.0%)
	Usual Care	223	+9 (4.0%)	+13 (6.0%)

Table 3

Bivariates of women reporting vs. not reporting new risks at follow-up interviews during pregnancy

Characteristic	Value	New Risks after Baseline (n=256)	No New Risks after Baseline (n=594)	p-value	Total (n=1044)
Maternal age	Mean ± SD	24.1 ± 5.1	24.5 ± 5.4	0.3161	24.6 ± 5.4
Pregnancies (including current)	Mean ± SD	3.5 ± 2.2	3.7 ± 2.4	0.2145	3.7 ± 2.4
Previous live births	Mean ± SD	1.4 ± 1.6	1.4 ± 1.5	0.7940	1.4 ± 1.6
Education level	< High school	88 (34.4%)	163 (27.4%)	0.0420	251 (29.5%)
Relationship status	Single/separated/widowed /divorced	193 (75.4%)	457 (76.9%)	0.6260	650 (76.5%)
	Married or living with partner	63 (24.6%)	137 (23.1%)		200 (23.5%)
Medicaid	Yes	194 (76.1%)	460 (77.7%)	0.6052	654 (77.2%)
Alcohol use in this pregnancy	Yes	51 (19.9%)	135 (22.8%)	0.3579	186 (21.9%)
Illicit drug use in this pregnancy	Yes	28 (10.9%)	71 (12.0%)	0.6720	99 (11.7%)
Care group	Intervention	123 (48.1%)	300 (50.5%)	0.5108	423 (49.8%)
	Usual care	133 (52.0%)	294 (49.5%)		427 (50.2%)