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Online Supplementary Material

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Appendix 3. Detailed Results

SCREENING

We identified and reviewed 1,808 abstracts; 65 articles were retrieved for further review; and 6 studies met eligibility criteria.

No studies meeting eligibility criteria directly addressed the effectiveness of screening in reducing harm and premature death and disability. A limited number of studies described the performance of screening methods, such as self-administered questionnaires (sometimes in conjunction with interviews and medical record reviews), clinical staff-directed interviews, and clinical observation. All studies primarily assessed parents, rather than children directly, and none utilized specific physical examination protocols for screening. Examples of instruments and scoring procedures included in these studies are described in Appendix 4.[1-4]

Few studies evaluated the performance of these approaches in predicting child abuse and neglect outcomes. Screening instruments had fairly high sensitivity but low specificity when administered in the study populations. Best results were achieved when screening involved a 2-step method, however, these strategies have not been widely tested in other populations and have not been evaluated for feasibility in the primary care setting.

Self-administered Questionnaires

The Kempe Family Stress Inventory (KFI) was used in 3 studies meeting eligibility criteria (Table 1).[5-8] These studies used a score of 25 or more to define high-risk status. Study populations included predominantly young, single women with low socioeconomic indicators. A retrospective cohort study in Denver included 262 adolescent parents in a university hospital maternity program.[6] Cases of child abuse and neglect were recorded by medical staff. As part of a larger battery of measures, families completed the 10-item KFI, including questions about stressful events, parent behavior, and other risk factors associated with child abuse and neglect. High score on the KFI was the only statistically significant predictor of maltreatment at 1 year (relative risk [RR] 8.41, 95% confidence interval [CI], 5.77–10.01; $P = .0009$) and at 2 years postpartum (RR 5.19, 95% CI, 1.99-13.60; $P = .004$). In addition, families identified with high-risk scores on the KFI were more likely than low-risk families to initiate clinic visits for their children during the first year ($P < .0001$) and admit their children to the hospital during the first 6 months ($P = .06$).

A study conducted in Hawaii Healthy Start affiliated obstetrics clinics that included young, poor, pregnant women with high rates of domestic violence and substance abuse, utilized the KFI in a 2-step screening process.[2,5,7] Identification of high-risk women by initial review of medical records or interview using the 15-item Hawaii Risk Indicators Screening Tool was followed by the KFI. Results were then compared with the Child Abuse Potential Inventory (CAPI), a 160-item instrument. The 2-step procedure had 89% sensitivity and 28% specificity at 6-months follow-up.

An evaluation of the Oregon Healthy Families program also used the Hawaii Risk Indicators Screening Tool to screen 2,870 pregnant women considered at risk for child abuse because of history of previous abuse or neglect, history of substance abuse, and young age, among other factors.[8] Women who had high scores on this test (40% of cohort) were then given the KFI. Scores on the KFI were highly correlated with maltreatment rates (given per 1,000 children): 7 with low-risk scores, 18 with moderate, 45 with high, and 172 with severe. Sensitivity was calculated at 97%, specificity 21% for high- and severe-risk scores.[2]

Clinical Staff-administered Questionnaires

A study of 1,089 young pregnant women receiving care at a general hospital used the Maternal History Interview (MHI-2) to determine risk for child abuse.[9] This instrument uses open-ended questions and subscales to evaluate parenting skills, personality, discipline

philosophy, life stress, and others. The incidence of reported child abuse among mothers identified as high risk was 6.6% compared with 2.3% for low-risk mothers (RR 3.02, 95% CI, 1.02-8.90) based on public agency reports of physical abuse, neglect, sexual assault, or mother-child separation in the first 36 months. The MHI-2 had a sensitivity of 55.6% for physical abuse. This instrument did not predict neglect or sexual abuse.

The Parenting Profile Assessment (PPA) is a 21-item nurse interview designed for the primary care setting.[4] Responses on the PPA were compared with self-reports about past episodes of abuse in a sample of 185 mothers who volunteered to be studied.[4] Results indicated 75% sensitivity, 86% specificity, 39% positive predictive value, and 97% negative predictive value.

Other Techniques: Clinician Observation

In a retrospective cohort study, nurses referred patients and their newborns to the hospital's child abuse committee from the postpartum unit after determining them to be at high risk for abuse based on a number of nonstandardized criteria, including parental substance use, income, social support, previous child abuse or neglect, and parenting behavior.[10] Information was gathered from direct observation and medical records. When compared with the low-risk patients, the rate of subsequent hospitalizations for medical and psychosocial reasons was significantly greater in high-risk patients ($P < .01$ and $P < .05$, respectively).

INTERVENTIONS

A total of 1,748 abstracts were captured in database searches. Seventeen studies, using 13 unique populations, met inclusion criteria. All studies evaluated interventions for pregnant and postpartum women and their infants. Nine randomized controlled trials were found with 4 subsequently published follow-up studies[11-14]: one rated good quality,[15] 6 rated fair quality,[16-21] and 2 rated poor quality.[9,22] One poor-quality quasiexperimental study,[23] 2 fair-to-poor quality cohort studies,[8,23] and 1 poor-quality cohort study[24] were also found. All studies are described in Table 2,[7,10-25] but only the randomized controlled trials rated good or fair quality are described in the text.

A trial of 400 low-income, pregnant women in a semirural county in New York State provided 3 levels of support services during and after pregnancy and assessed outcomes related to child abuse and neglect.[15] Women were actively recruited to the study through a variety of ways, including public health clinics and obstetric practices, if they had no other previous live births and were either younger than 19 years, single parents, or had low socioeconomic status, although women who requested to be in the study were also included. They were randomized to 1 of 4 groups: no intervention, intervention with transportation services to the medical clinic during pregnancy, intervention with transportation services and nurse home visits during pregnancy (every 2 weeks for approximately 9 visits), and intervention with transportation services and nurse home visits continuing through the child's second birthday. Nurse visits included parent education, support systems for the mother, and engagement of family members with other health and social services.

All infant participants received a sensory, developmental, and home environment evaluation at 1 and 2 years of age using Bayley, Cattell, and Home Observation for Measurement of the Environment (HOME) scales. In addition, records from the department of social services (Child Protective Services), emergency department visits, and other medical visits were reviewed for the presence of abuse and neglect. If there were suspected problems in the no-intervention group at the 1- or 2-year evaluation, subjects were referred to appropriate services. Data were also collected at ages 3,[11] 4,[12] and 15.[13,14] At the 15-year follow-up, outcome data included a life history calendar, self-report of criminal activity, parent-child conflict inventory, and domestic violence assessment.

Results at 2 years showed that high-risk women who had prolonged nurse visits were less likely to commit acts of child abuse and neglect compared with high-risk women without visits ($P = .07$).[15] At 3 and 4 years' follow-up, there were no differences between groups for child abuse and neglect outcomes.[11,12] At the 15-year follow-up, however, children in the nurse-visited group were less likely to be involved in reports of child maltreatment of any kind ($P < .05$).[14] Mothers in the nurse-visited group were less likely to be perpetrators of child abuse and neglect than mothers without nurse visits 15 years after the intervention ($P < .001$).[13]

Other related outcomes included fewer injuries or toxic ingestions at ages 2, 3, and 4 years,[11,12,15] and fewer visits to the emergency department at ages 3 and 4 years[11,12] for the nurse-visited group. Also, at the 2-year assessment, nurse-visited toddlers showed a higher developmental quotient than not-visited toddlers.[15] When compared with not-visited mothers, mothers in the nurse-visited group showed less impairment by alcohol and other drug use, fewer convictions, and less jail time at the 15-year follow-up.[14] This finding, however, was statistically significant only for the subgroup of unmarried women with low-socioeconomic status.

Six fair-quality trials evaluated home visitation programs linked to prenatal clinics or hospital care.[16-21]

Studies varied in the types and duration of interventions. All but 1 study[19] used inclusion criteria based on an assessment of risk for child abuse and neglect, although no study used standardized or validated instruments. Studies generally considered positive responses to criteria, such as social or demographic risk factors (unmarried, low level of education, unemployed),[16,20] drug use during pregnancy,[18] low birth weight,[21] or a history of other risk factors (human immunodeficiency virus infection, homelessness, substance use),[17] among others. Follow-up ranged from 2 to 24 months after delivery, and abuse outcomes were determined by medical record review, face-to-face interviews, home observation, questionnaires on child abuse potential, and county social service records. Evaluations of the home included assessment of the safety and developmental appropriateness of the home and play environment.

None of these studies described significantly fewer reports of abuse and neglect in intervention groups compared with control groups, although not all studies were designed for this outcome.[20] Five of the studies reported other significant intervention effects related to abuse and neglect, such as medical care utilization, parent-child interactions, punishment, stressful life events, parental mental illness, and drug use.[16-18,20,21]

A trial in Memphis randomized 1,139 pregnant women seen in a public obstetric clinic to 4 different intervention groups, including a home nurse-visit group.[20] This study had a design similar to the New York State trial[15] but differed in implementation of the intervention and measurement of outcomes. Furthermore, study groups had different income levels at baseline. Outcome measures included mothers' perceptions of child abuse and neglect, punishment, and child rearing; medical visits; and life events; but there were no verified reports of abuse and neglect. By the 24th month, nurse-visited women held fewer beliefs about child rearing associated with child abuse and neglect, such as lack of empathy, belief in physical punishment, and unrealistic expectations of an infant ($P = .003$). Nurse-visited children had fewer health care encounters related to injuries or ingestions in the first 2 years compared with comparison groups ($P = .05$).

A trial using prenatal assessment indicated that 43 drug-using minority women had CAPI scores significantly above the norm ($P < .01$).18 At 18 months follow-up, an intervention group that had received biweekly nurse home visits reported total abuse scores on the CAPI to be within the norm, whereas the control group continued to show total scores above the norm ($P < .01$). Women in the treatment group were more emotionally responsive to their children ($P = .03$), had a more stimulating home environment ($P = .053$), reported being drug free ($P = .002$), and were compliant with primary care ($P = .016$) compared with the women without home visits.

In a trial conducted in California, 191 pregnant women were referred to a specialized home visitation program after being determined to be high risk and were observed for 2 months postpartum.[16] Before the program, the intervention group had more reports of child abuse than the control group. After the intervention, the control group had a greater increase in unsubstantiated reports ($P < .05$). No differences were found for substantiated reports, well-being, prenatal care, birth outcomes, baby temperament, child welfare, or court-ordered in-home or out-of-home services.

In Philadelphia 246 pregnant minority women participated in a study of home visitation from prenatal to 12 months postpartum.[17] There were no significant differences between groups on the HOME inventory. Treatment women showed a decrease in overall psychological distress ($P < .002$) and had more help with household tasks and attaining household items ($P < .001$), higher total social support ($P < .005$), and more support from grandparents ($P = .04$) and friends ($P < .004$).

A trial of nurse home visitation for low–birthweight babies included 79 postpartum women at the University of Pennsylvania Hospital.[21] Low–birthweight infants in the intervention group were discharged 11 days earlier ($P < .05$) than the control group, and were on average 2 weeks younger. At 18 months' follow-up, there were no differences between groups for reports of child abuse or foster care placement, measures of rehospitalizations, numbers of acute care visits, or incidence of failure to thrive.

In a trial of home visitation in North Carolina, at 12-month follow-up, there were no differences between groups for reports of child abuse and neglect, number of hospitalizations, or number of emergency department visits.[19]

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