

COMMUNITY-BASED PERINATAL CARE FOR DISADVANTAGED ADOLESCENTS: EVALUATION OF THE RESOURCE MOTHERS PROGRAM

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ABSTRACT: This study compared the effects of a community-based lay home visiting initiative for pregnant adolescents, the Norfolk Resource Mothers Program, with the effects of a more traditional clinic-based program. The Resource Mothers Program (RMP) supports disadvantaged teens through the use of para-professional home visitors who are similar to the teens in race and socio-economic status. In addition to recruiting teens into the program and encouraging early prenatal care, the Resource Mothers Program provides teen mothers and their families with practical help and increases community awareness regarding infant mortality and adolescent pregnancy. When compared with a traditional clinic-based multi-disciplinary program (MDP) using health professionals, the Resource Mothers Program reached a higher percentage of high-risk adolescents (e.g., 75.5% RMP vs. 45.6% MDP clients aged 17 years old or under), promoted a higher level of prenatal care (e.g., 53.1% RMP vs. 32.6% MDP clients beginning prenatal care before the fourth month of pregnancy), and resulted in pregnancy outcomes that favored the MDP but were comparable (e.g., 89.8% RMP vs. 93.5% MDP client babies were over 2500 grams at birth).

INTRODUCTION

The advances in medical technology and practice in the past decades have yielded significant improvements in perinatal health in this country. For example, between 1950 and 1988 the mortality rate for U.S. infants dropped from 29.2 per 1,000 live births to 10.0 per 1,000 live births.¹ However, the U.S. infant mortality rate continues to com-

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pare poorly with those of other developed societies: the infant mortality rate of the United States ranks below over twenty other nations (see Table 1).²

Despite the need for continued improvement, there may be limits to the progress that can be realized through further advances in technology. Instead, advances in perinatal health in the coming decade are likely to be driven by changes in the behavior of pregnant women. While there is reasonable consensus on the maternal behaviors associated with healthy babies (early prenatal care; better nutrition; avoidance of alcohol and other drugs), adolescents from lower socio-economic backgrounds have remained isolated from the medical system for perinatal health and are particularly at-risk for improper prenatal care.^{3,4} Numerous health services and programs are available to these pregnant teens and teen parents today, but a gap exists in linking the adolescent with the programs.

The recognized need to bridge this gap has led to programs targeting those at-risk adolescents. To develop more effective programs, we need to understand better the alternative models of health care underlying the new programs. Several models of community outreach have been proposed and developed; one of the major needs in the field is to develop ways in which those models can be implemented and combined with other community resources. This paper contributes to this need by examining two current approaches to improving the prenatal care of those women most at-risk for perinatal complications. The more traditional of these approaches is represented by clinic-based programs built around multi-disciplinary teams of health professionals. One study of a program based on this model found that monthly visits by nurse clinicians to help young parents establish a positive parent-child relationship prevented a decline from normal levels of functioning that is common in economically disadvantaged children.⁵ No lasting increases, however, were noted on the developmental test scores.

An alternative approach, one that is of primary concern to this paper and which may warrant broader application, utilizes lay visitors (mothers and para-professionals from the immediate community) to provide emotional support for the pregnant teens and encourage them to engage in healthy behaviors and obtain prenatal care. These lay home visitors would not be able to replace the medical attention provided by the multi-disciplinary teams but might be able to help the high-risk teens in ways that medical teams do not. After reviewing programs in the United States and abroad, the U.S. General Accounting Office

TABLE 1

Infant Mortality Rates and Average Annual Percent Change: Selected Countries, 1983 and 1988¹

<i>Country</i>	<i>1983</i>	<i>1988</i>	<i>Average Annual % change</i>
Japan	6.2	4.8	-5.0
Sweden	7.1	5.8	-4.0
Finland	6.2	6.1	-0.3
Netherlands	8.4	6.8	-4.1
Switzerland	7.6	6.8	-2.2
Singapore	9.4	6.9	-6.0
Canada	8.5	7.2	-3.3
Hong Kong	9.8	7.4	-5.5
Germany (West)	10.3	7.5	-6.1
Denmark	7.7	7.5	-0.5
France	9.1	7.8	-3.0
Germany (East)	10.7	8.1	-5.4
Spain	10.9	8.1	-5.8
Austria	11.9	8.1	-7.4
Scotland	9.9	8.2	-3.7
Norway	7.9	8.3	1.0
Australia	9.6	8.7	-1.9
Ireland	10.1	8.9	-2.5
N. Ireland	12.1	8.9	-6.0
England & Wales	10.1	9.0	-2.3
Belgium	10.4	9.2	-2.4
Italy	12.3	9.3	-5.4
United States	11.2	10.0	-2.2
Israel	14.4	10.2	-6.7
New Zealand	12.9	10.8	-3.5
Greece	14.6	11.0	-5.5

¹Rankings are from lowest to highest infant mortality based on the latest data available for countries or geographic areas with at least 1 million population.

(GAO) concluded that the home visitor approach has been used successfully for a variety of problems.⁶ For example, home visiting that provided psychosocial stimulation to malnourished children was associated with higher IQ scores than those of similar children who did not receive this stimulation.⁷ In another study, at-risk families who received home visiting, along with day care and medical support, were found ten years later, to have higher levels of employment, better housing, and better adapted children.⁸

Home visiting programs are being used increasingly to provide prenatal care, and here, too, the results are promising. A North Carolina study of 21,000 annual births found that women not in a lay home visiting project were 1.3 times as likely as project participants to give birth to children under 2500 grams.⁹ The Resource Mothers Program in South Carolina, studying matched pairs of rural teenage girls pregnant for the first time supported the conclusion that there was a greater percentage of patients with adequate prenatal care in the program group and program participants had fewer low birthweight and small-for-gestational-age infants.¹⁰ In addition to this positive impact on prenatal care, home visiting postnatal programs with young mothers appear to reduce the inherent risks of adolescent parenthood.¹¹

The above studies of lay home visiting programs for pregnant adolescents and others provide evidence of a consistent positive impact. But to develop effective public policy, we need to be able to relate the impact of this type of program to the impacts of other programs that compete for limited resources. As such, the goal of this research is to compare the results of a lay home visitor program with those of a more traditional clinic-based health program. The purpose of this comparison is not to argue that one approach should replace the other—each approach has its advantages, and each has been shown to be effective in improving perinatal health. Rather, this study seeks to establish that lay home visiting programs for adolescent prenatal care offer unique advantages and that such programs are natural complements to the more resource-intensive clinic-based approaches.

The lay home visiting program evaluated in this study was the Norfolk Resource Mothers Program (hereafter RMP). This program utilizes "resource mothers" to reach out to adolescents considered at high risk for inadequate prenatal care and poor pregnancy outcomes. A resource mother is a lay person—often indigenous to the culture of the adolescents—trained to assist adolescent parents and their families with the non-medical dimensions of pregnancy and child care. The resource mother is responsible for recruiting teens for the program, encouraging

them to get prenatal care, providing practical assistance to the teens and their families, and acting as a liaison between the teens and the relevant public agencies. One advantage of a lay home visitor program is its relatively low cost. Because the visitors are not highly paid professionals, a given level of resources would permit the lay visitors to make more frequent and longer contacts with the teen. Another potential advantage of lay visitors is that they often grew up in the same cultural milieu as the teens they serve (and often were teen mothers themselves) and so may be in a better position to provide empathy and social support. This combination of low cost and familiarity with the culture of the clients may allow the RMP workers to reach those high-risk clients who might otherwise be missed by a clinic-based program.¹²

The purpose of this study is to assess, through comparison with the results of a clinic-based program, whether these potential advantages of a lay home visitor program for pregnant teens can be implemented to achieve positive perinatal outcomes. To this end, three questions are addressed in this report:

1. Has the RMP been successful in reaching its target population of high-risk pregnant teens?
2. Has the RMP been successful in impacting the health-related behaviors of its clients?
3. Has the RMP been successful in affecting the perinatal health outcomes of the babies born to its clients?

METHODS

Two prenatal intervention groups—one using lay home visitors and the other using health professionals—are described in this paper along with a no-prenatal-care comparison group. The Norfolk Resource Mothers Program (RMP) lay home visitor project is administered through the Department of Nursing of Norfolk State University in Virginia. The program was formed in 1985 when the Virginia Task Force on Infant Mortality and the Virginia Department of Health sponsored and funded a policy initiative to address the special needs of pregnant and parenting adolescents in three cities having high rates of infant mortality and adolescent pregnancy—Richmond, Newport News, and Norfolk. The resulting program, the RMP, is a community service project initiated to serve teens in targeted neighborhoods having high rates of adolescent pregnancies and infant mortality. As mentioned above, the Resource Mothers Program recruits women from the community and provides them with intensive training to serve as resource mothers for pregnant teens with limited social and financial support.

The comparison model is a clinic-based multi-disciplinary program (MDP) with a public health component (known as the Baby Care Program, sponsored by the Virginia Medical Assistance Service) operated by the Norfolk Department of Public Health. This MDP program uses a team of professionals to provide eligible pregnant women and new mothers with medical services, nutritional services, home health services, and home visiting services. While the primary goal is to compare these two community-based programs, an additional comparison group is composed of adolescents who received no prenatal medical care during pregnancy.

Several sources of quantitative data were used: (1) a database was constructed from the monthly reports of Norfolk births, prepared by the Virginia Center for Health Statistics, based on birth certificate information; (2) information concerning prenatal intervention program participation was obtained from RMP and MDP client lists; and (3) perinatal statistics for Perinatal Region of Virginia were obtained from state and national sources and compared with outcomes from the evaluation study. These sources led to three comparison populations of births to young women (restricted to those 19 years old and younger) during a 12-month period: all births to clients in the RMP (total of 49 births); all births to clients in the MDP (total of 46 births); and all births to teens in Norfolk who had not received any prenatal care (NoPNC; total of 29 births). Two additional teens had been clients of both the RMP and the MDP and were excluded from analysis.

The effectiveness of the RMP lay home visitor program is evaluated in terms of: (1) outreach objectives—the ability of the program to reach high risk pregnant teens; (2) behavioral objectives—the impact of the program on the health-related activities of the pregnant teens; and (3) health objectives—the effect of the program on health outcome measures for the neonates.

RESULTS

In keeping with the three research questions described above, the results are presented in three subsections—outreach outcomes, behavioral outcomes, and medical outcomes.

Outreach Outcomes

Outreach deals with the success of the RMP in reaching the high-risk pregnant teens. Based on Virginia statistics, high-risk is characterized by young maternal age, non-white race, completion of less than a high school education, and no prior pregnancies (factors placing them at an increased relative risk for inadequate prenatal care, pre-term delivery, low weight infants, intrauterine growth retardation, and neonatal compromise). For example, in Virginia, 5.7% of white infants have low birthweights (2500 grams or less) compared to 11.7% of non-white

infants; similarly, prenatal care begins in the first trimester for 84.0% of those mothers with a high school education while only 59.7% of those without a high school education begin care that early.¹³ Also targeted by the RMP are those teens residing in census tracts having low family income levels.

Table 2 summarizes the percentage of participants in the three comparison populations that are characterized by the risk factors of young maternal age, non-white race, residence in neighborhoods with low family income levels, completion of less than a high school education, and no prior pregnancies. The majority (75.5%) of adolescent mothers participating in the RMP are young (17 years or younger), 91.8% are black, 91.9% reside in targeted neighborhoods with low family income levels, 93.9% have not completed high school, and 81.6% are first time mothers. When compared with the MDP and NoPNC clients, these findings indicate that the clients of the RMP are at increased risk for compromised pregnancy outcomes (two-tailed difference-of-proportions Z tests show that these differences between RMP and the other two groups are significant at $p < 0.01$ with the exceptions of the comparison of RMP and MDP first time mothers for which $p > 0.30$ and the RMP-NoPNC ethnicity comparison, $p > 0.10$). The conclusion is that the RMP has been able to contact and enroll teens at high-risk for premature and low birthweight babies.

Behavioral Outcomes

The second research question explores the impact of prenatal intervention group participation on the effect of the prenatal care re-

TABLE 2

Maternal Characteristics and Prenatal Program Participation
(in percentages)

<i>Characteristics</i>	<i>RMP</i> (<i>n</i> = 49)	<i>MDP</i> (<i>n</i> = 46)	<i>NoPNC</i> (<i>n</i> = 29)
Age (< = 17 years)	75.5	45.6*	44.4*
Black	91.8	69.6*	79.3
Poor Neighborhood	91.9	59.1*	62.0*
Education (< = 11th grade)	93.9	76.1*	72.4*
First Time Mothers	81.6	78.3	41.4*

*Comparisons with RMP significant at $p < 0.01$

TABLE 3

Adequacy of Care and Prenatal Program Participation
(in percentages)

<i>Adequacy of Care</i>	<i>RMP</i> (<i>n</i> = 49)	<i>MDP</i> (<i>n</i> = 46)	<i>NoPNC</i> (<i>n</i> = 29)
Entry into PNC ¹	53.1	32.6*	0.0
Prenatal Visits ²	87.8	73.9	0.0
No Hospital Delivery ³	0.0	2.2	3.5

*Comparisons with RMP significant, $p < 0.05$

¹Month care began: before the 4th month of pregnancy.

²The number of prenatal visits: more than six times.

³Baby delivery at non-hospital facilities.

ceived by the teens. Adequacy of prenatal care indicators in this study are the month of pregnancy when prenatal care began, the number of medical prenatal visits completed, and the place of baby delivery (i.e., hospital or no hospital). Table 3 supports the relative success the RMP has in enrolling at-risk teens into prenatal care during the first trimester—53.1% receiving prenatal care in the first trimester compared with 32.6% for the MDP (two-tailed difference-of-proportions Z test yielded $p < 0.05$; NoPNC were different by definition and their differences not tested). Table 3 also indicates that RMP clients were more likely than MDP clients to have at least six prenatal medical visits ($p < 0.10$). Finally, in contrast to RMP participants, some of the MDP (2.2%) and NoPNC (3.5%) patients delivered at non-hospital facilities (for the RMP-MDP comparison, $p > 0.25$; for RMP-NoPNC, $p > 0.15$).

Health Outcomes

The final research question relates to the effect of prenatal intervention group participation on the occurrence of preterm delivery and low weight births: Is the RMP effective in improving the perinatal outcomes of the babies born to its clients? Table 4 compares pregnancy outcomes by prenatal intervention program participation (outcomes reported in percentages).

Comparison of the RMP and MDP health outcomes favors the MDP, but the differences in birthweight appear minor (e.g., 44 of 49 RMP infant birthweights were above 2500 grams while 43 of 46 MDP infants were over 2500 grams; chi-square analysis of RMP and MDP

TABLE 4
Pregnancy Outcomes and Prenatal Program Participation
(in percentages)

<i>Pregnancy Outcomes</i>	<i>RMP</i> (<i>n</i> = 49)	<i>MDP</i> (<i>n</i> = 46)	<i>NoPNC</i> (<i>n</i> = 29)
Birthweight Outcomes¹			
1499 Grams and less	0.0	2.2	13.9
1500 to 2500 grams	10.2	4.3	8.4
2500 Grams and over	89.8	93.5	77.7
Gestational Age at Delivery²			
Less than 38 Weeks	12.2	4.3	14.3
38-42 Weeks	87.8	95.7	85.7 ³

¹Chi-square analysis of RMP-MDP birthweight outcomes not significant ($p > 0.30$); chi-square of RMP-NoPNC is significant ($p > 0.05$)

²Difference-of-proportions comparisons with RMP not significant ($p > 0.10$)

³Includes the proportion (0.4%) of over 42 weeks.

clients yields $p > 0.30$ for birthweight). The birthweight differences between RMP clients and those with no prenatal care are, on the other hand, much larger (chi-square analysis of RMP and NoPNC clients yields $p < 0.05$). As such, the birthweight outcomes of the RMP and MDP, while favoring the MDP, are comparable and both programs produce results much better than those experienced by clients with no prenatal care.

The gestational age outcomes show less positive impact of the RMP: RMP results are somewhat weaker than those found with the MDP (two-tailed difference-of-proportions test yielded $p > 0.15$) and similar to those with no prenatal care ($p > 0.75$). This lesser effectiveness of the RMP on gestational age may reflect the greater relative importance of pre-existing client characteristics on this outcome when compared to the birthweight outcome.

DISCUSSION

This study sought to examine the relative effectiveness of the RMP, a lay home visitor program, by comparing it to a more traditional multi-disciplinary health team approach (MDP); several research con-

clusions are warranted. First, the RMP reached pregnant adolescents characterized by young maternal age, black race, residence in targeted neighborhoods with low family income levels, less than a high school education, and no prior pregnancies. The RMP participants demonstrated these demographic risk factors to a greater degree than teens served by the MDP and to a greater degree than even those teens who had received no prenatal care. This ability to reach the high-risk adolescents highlights the special strength of lay home visiting programs. As stated in the GAO evaluation of these programs (p. 35), a "primary reason for using home visitors is to reach families who might otherwise not have access to services."⁶ This is important as the targeted population of disadvantaged adolescents is confronted by financial, social, and psychological barriers to prenatal health care.¹¹⁻¹⁶

Second, the improved adequacy of prenatal care for RMP participants indicates that outreach by the RMP can help overcome these barriers to prenatal care. Even though the clients of the RMP are from subpopulations at greater risk for poor prenatal care than those in the MDP, they demonstrated better behavioral outcomes. Third, perhaps because of the improved prenatal care noted above, the birthweight outcomes appear comparable to those in the MDP. This result is important in that it is not enough to say that home visiting is better than no home visiting; to recommend the widespread use of these programs requires evidence that home visiting is not an inferior option when compared to readily available alternatives. The absence of very low birthweight infants (< 1500 grams) in the RMP group is particularly important because it represents a substantial reduction in human and financial costs, both present and future.

These research findings suggest that the lay home visitor approach to reaching high-risk teens can contribute to more adequate prenatal care and, thus, should be promoted as an important component of a comprehensive approach designed to improve the perinatal health outcomes in the United States to levels found in other developed societies. Before considering the policy implications of these findings, however, we need to consider three issues that might limit the significance of this research; in methodological terms these issues correspond to concerns with internal validity, external validity, and construct validity of treatment. First, we are asserting that participation in the RMP has a positive impact on prenatal care and perinatal outcomes. A potential counter to this conclusion is that the participants in the RMP were in some way less at-risk for inadequate care and early, low birthweight babies. This threat to internal validity of positive selection bias is impor-

tant to consider and cannot be ruled out entirely for a non-experimental study; indeed, even random assignment of lay home visiting prenatal care does not rule out bias due to client attrition.¹² But in this case the threat is rendered less plausible by the population characteristics reported in Table 2: those factors that indicate high risk clients—young maternal age, no prior children, limited education, non-white race, and residence in low income neighborhoods—are more prevalent in the RMP group than in other groups. To the extent that there are pretreatment differences in the clients of the three groups, they are likely to be working against the apparent effectiveness of the RMP, a negative bias that may be responsible for the shorter gestational ages of the RMP infants. Thus, it is reasonable to conclude that at least some of the positive outcomes for the RMP clients are due to program impact.

The second issue to be addressed involves the potential generalizability of our findings. Here the concern is the extent to which the positive impact of the Resource Mothers Program in Norfolk can be expected for similar programs elsewhere. This concern with external validity needs to be addressed before recommending policies that direct substantial resources to these programs. The results of this study alone cannot answer this question, but the consistent positive findings reported by the GAO for a variety of well-run home visitor programs (e.g., pregnant teens and developmentally delayed children) in diverse settings (e.g., rural South Carolina, urban Texas, and a nationwide program in Great Britain) suggests that there is some positive impact of these programs that is robust and dependable.⁶ This evidence of overall positive impact argues for implementing some type of lay home visitor program wherever there are concentrations of at-risk adolescents. A more subtle question, however, concerns the impact of community and client characteristics on the process of home visiting and the qualitative differences in outcomes. This refined question, which ultimately leads to questions about modifying programs to best fit their communities, deserves to be addressed through large-scale multi-site evaluations.

The third issue to be considered before disseminating these programs to other locales involves identifying the program elements that are most responsible for program success. This concern with the causal impact of program elements (construct validity of what constitutes “treatment”) is a difficult issue to resolve, but, again, previous research suggests some consistent features of programs found to be effective. At the programmatic level, the GAO evaluation found that two important features of successful home visiting interventions were that they: (1) provided structured services that often involved formal curricula to be

covered during visits and (2) helped organize the many services needed by clients by offering a variety of services internally and establishing strong linkages to other community service agencies.⁶ Focusing on the activities of the home visitors, the Resource Mothers Program in South Carolina was conjectured to impact perinatal health by providing social support.¹⁰ The importance of social support was reinforced by a study that demonstrated a positive relationship between social support and positive health attitudes and behaviors.¹⁷ These training, liaison, and social support activities were mentioned also by RMP staff as factors promoting program effectiveness, but the presumed causal mechanisms must remain tentative and need to be considered more fully in future research. In that program elements that are most effective in one community may not be so in another, this question also deserves to be addressed in the context of multi-site evaluations.

The convergence of current findings with those of previous research suggests that the three concerns discussed above have been addressed sufficiently to support several policy conclusions. First, we know enough about the expected impact and likely generalizability of the lay home visitor approach to recommend widespread dissemination. Special emphasis should be given to targeting programs to address identified population groups at known risk of poor pregnancy outcomes. For example, we should increase recruitment and enrollment activities targeting young teens (younger than 17 years old) in order to develop primary pregnancy prevention services for them. Second, structured training, coordination of multiple services, and social support are promising program elements with sufficient evidence supporting them that they should be considered for inclusion in all home visiting programs. Coordination of the many needed services is likely to require policies that encourage increased cooperation among local government agencies responsible for health, education, and social service. Third, these tentative conclusions need continued evaluation to see if current models of program impact provide sufficient guidance in developing maximally effective programs that are sensitive to local client and community characteristics.

Infant mortality and low weight births may never be eliminated, but perinatal health in this country can be improved by changing the prenatal behaviors of those in high-risk populations. Prenatal lay home visiting is one effective and cost-efficient strategy for reaching teens who might otherwise fail to receive adequate care. If coordinated with existing service agencies, lay home visiting has the potential to function as a bridge between community resources and the disadvantaged ado-

lescents in need of service who are isolated by reason of economics, culture, ignorance, or fear.

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