

A B S T R A C T

This three-group randomized controlled trial assessed the effectiveness of a postpartum public health nurse telephone visit on infant-care behaviours of primiparous women in Ottawa-Carleton. The impact of a clerk call on recruiting mothers to parent-baby groups was also described. Low risk primiparas were randomized into telephone visit, clerk call and control groups. At three months postpartum, there were no significant differences in infant-care behaviour scores among the study groups. Women who received the telephone visit had the highest parent-baby group attendance rates and among attenders, the highest rates of smoking during pregnancy, the least education, and lowest incomes. Analysis of variance revealed a significant interaction term between attendance at parent-baby groups and assigned study group. This effect disappeared after adjusting for age and education. The telephone visit was no more effective in producing the desired infant-care behaviour changes than a mailed out information package with or without a clerk phone call. However, the intervention did increase the utilization of parent-baby support groups by women who were more socioeconomically disadvantaged.

A B R É G É

Cette étude sur échantillons aléatoires et contrôlés répartis en trois groupes visait à évaluer l'efficacité des interventions téléphoniques faites par des infirmières de la santé publique au sujet des soins donnés aux nouveau-nés, dans le cadre d'un programme de suivi postpartum auprès de mères primipares de la région d'Ottawa-Carleton. L'étude décrit également les résultats obtenus avec les simples appels téléphoniques destinés à inviter les mères à assister aux réunions de groupes de soutien aux parents et nouveau-nés. Les mères primipares à faible risque ont été réparties au hasard entre le groupe des interventions téléphoniques, le groupe des simples appels téléphoniques, et le groupe de contrôle. Trois mois après leur sortie, on ne constatait pas de différences significatives dans les comportements en matière de soins aux nouveau-nés des trois groupes de mères. Les mères appartenant au groupe des interventions téléphoniques sont celles qui ont eu le taux le plus élevé de présence aux réunions de soutien aux parents et nouveau-nés et, de toutes, étaient celles qui avaient eu le taux le plus élevé de tabagisme pendant la grossesse, avaient fait le moins d'études et disposaient des plus faibles revenus. L'analyse de la variance a montré une corrélation importante entre le groupe étudié et la présence aux réunions des groupes de soutien aux parents et nouveau-nés. L'interaction a disparu une fois fait l'ajustement en fonction de l'âge et de l'éducation. Les interventions téléphoniques n'ont pas mieux réussi à susciter le comportement désiré en matière de soins aux nouveau-nés que l'envoi d'une trousse de documentation avec ou sans appel téléphonique préalable. Toutefois, elles ont amené les femmes plus démunies au plan socio-économique à davantage faire appel aux groupes de soutien aux parents et nouveau-nés.

A Randomized Controlled Trial of Alternative Approaches to Community Follow-up for Postpartum Women

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Home visits to postpartum mothers have long been a mainstay of public health nursing services. However, a shift in practice from individual- to population-based approaches and increasing fiscal constraints have placed additional demands on public health nursing time. This has led to the development of new strategies to service delivery for lower risk mothers including nurse-initiated telephone visits and parent-baby support groups.

Although telephone interventions have been used to deliver a range of community health services, including the provision of health information, anticipatory guidance, crisis intervention, assessing client status and tracking disease, encouraging timely screening, and promoting follow-up from referrals,¹⁻⁹ few authors have investigated the effectiveness of telephone visits as a means of postpartum follow-up.^{10,11} A randomized controlled trial of nurse-initiated telephone calls for low risk women found that the experimental group used a significantly larger number of community resources than the control group.¹⁰ The more recent trial by Oda, Heilbron and Taylor¹¹ compared public health nursing telephone contact with home visits on the likelihood of young children receiving

health assessments. No differences were found between groups.

There is accumulating evidence to suggest that, for high risk mothers, an intense intervention (e.g., weekly home visits) offered during both the prenatal and postnatal periods can impact on perinatal mortality, infant feeding, childhood injuries, emergency visits, and parental coping problems.¹²⁻¹⁷ In contrast, research investigating 'low dose' interventions (those requiring limited health professional involvement, e.g., studies in which fewer than five home or phone visits were made during the postpartum period) has shown minimal or no effect on maternal or infant outcomes.¹⁶⁻¹⁹

Study setting

This study was undertaken in the Regional Municipality of Ottawa-Carleton. Approximately 10,000 babies are born annually to women who live in this region of 720,000. Since public health nurses (PHNs) are not able to contact every new mother, a hospital liaison referral process is used to identify women who are most in need of postpartum follow-up. Postnatal clients are jointly assessed by hospital staff nurses and public health liaison nurses. Using a set of at-risk criteria (e.g., anxious mother with more than the usual number of questions; does not understand English or French; history of neglect or abuse; difficulty with reading), women's needs for public health follow-up are established. Higher risk mothers are referred for PHN contact while lower risk women are mailed an information package informing them of available public health nursing services (Parent-Baby Information Line, parent-baby groups and breastfeeding support drop-ins). All of these services are offered

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throughout the region at no charge and are available in both English and French.

Questions among Health Department staff regarding the optimal mix of public health nursing interventions for new mothers and the utility of reminder phone calls from a clerk to encourage attendance at parent-baby groups provided the impetus for this study. In the province of Ontario, primiparous women have historically been identified as those most in need of postpartum follow-up.^{20,21} For this reason, the present study focused on first-time mothers.

The research questions

This study was undertaken at the request of the Child and Adolescent Directorate of the Ottawa-Carleton Health Department. There were three research questions:

1. Do primiparous women who are randomized to receive a telephone visit have better infant-care behaviour scores at three months post-discharge from hospital than women who are randomized to receive a packet of information on infant care and an invitation letter to parent-baby groups with or without a clerk reminder phone call?
2. Do primiparous women who are randomized to receive a telephone intervention or a reminder phone call from a clerk utilize postnatal support services more often than women who are randomized to receive only an invitation letter and a packet of information?
3. Do infant-care behaviour scores differ between attenders and non-attenders of parent-baby groups?

METHODS

The research design was a three-group randomized controlled trial. Women who delivered in one of the five Ottawa-Carleton hospitals were entered into the study over a six-month period in 1993. Eligibility criteria included primiparity, being identified by the hospital liaison referral process as at lower risk, able to speak English or French, resident in Ottawa-Carleton, singleton birth, gestation 35 weeks or greater, and no congenital anomalies in baby. Within one week of the birth, all hospital liaison forms

obtained by the Health Department during the study period were screened by a research assistant using the inclusion criteria. Eligible women were randomized using a permuted block allocation procedure with a 1:0.75:1 ratio for allocation into the telephone visit, clerk call and control groups, respectively. Liaison forms for women in the telephone visit group were returned to the public health nursing team responsible for the visits.

Women in all three groups were mailed a package of information on infant care, safety and nutrition approximately 10 days after hospital discharge. Included in the package was an invitation to participate in parent-baby groups facilitated by PHNs. Mothers in the telephone visit group were called by a PHN one or two weeks after discharge. The standardized telephone protocol was developed and pilot tested by a committee of experienced PHNs who have been involved in hospital liaison and postpartum care in the community for an average of eight years. The protocol included areas for assessment and intervention guidelines supported by relevant theory and research, and addressed the most common concerns of postpartum women (Table I). The intervention was individualized to meet the needs of the client as appropriate. All 21 PHNs in the infant program were trained to use the intervention protocol during two inservice sessions.

In addition to the mailed-out package, women in the clerk call group were phoned by a Health Department clerk at five weeks postpartum reminding them of the parent-infant baby group in their area. If the woman had lost her invitation or had not received one, the clerk mailed out another package. Mothers in the control group received no reminder phone call from the clerk.

Two months after discharge from hospital, women were sent a letter describing the study. At three months postpartum, they were contacted by a telephone interviewer and their eligibility was reassessed. Eligible women were invited to participate and their consent was obtained. Those who agreed were offered a telephone interview at a time convenient to them.

Randomization took place before mothers provided consent because the interven-

tions that were used had been standard nursing practice for new mothers at different times during the recent history of the Health Department. The mail-out package provided for the control group was the standard of care for low risk women when this study was initiated. Women provided consent to be interviewed.

Behavioural outcomes were chosen for this study based on two criteria: evidence of their impact on health; and a reasonable likelihood that an intervention by the PHN could positively influence the behaviour.^{16,17,19,22} Final outcomes were assessed in a telephone interview at three months postpartum and included breastfeeding at three months, early introduction of solids, misuse of child restraint devices, use of a safe crib, maternal smoking, immunization, and postpartum depression. With the exception of postpartum depression, all outcomes were assessed using the Infant-care Questionnaire, an instrument previously validated by one of the authors.²² Postpartum depression was assessed using the Edinburgh Postpartum Depression Scale.²³ Depression scores were dichotomized and women scoring 12 or more were categorized as depressed as recommended by the developers of the scale.²³

Data analysis was completed using SPSS-PC.²⁴ Outcomes were examined both individually and in a composite infant-care behaviour score. Each outcome was assigned a score of 0 or 2 with a low score indicating health-promoting behaviours (e.g., bottle-feeding and solids not introduced prior to 12 weeks postpartum, correct and consistent use of infant car seats, use of safe cribs). In the case of breastfeeding, a score of one was assigned to mothers who were still breastfeeding at 12 weeks postpartum but supplementing with more than one bottle of formula per day. All of the infant-care behaviours were equally weighted in summing the composite score. The final score potentially ranged from 0 to 14 with a lower score indicating more positive infant-care behaviours. Scores were not imputed for missing data. In each of the analyses, a casewise deletion method was used to handle missing data.

Both individual infant-care behaviours and the composite scores were compared across the three groups using Pearson chi-

TABLE I
Telephone Intervention: Selected Examples of Areas for Assessment and Intervention Guidelines*

Areas for Assessment	Assessment Questions	Intervention Guidelines and Strategies
Mother's emotional health, supports and stress	<p>Have you been crying or weepy since coming home from the hospital? Is this the first time you have felt this way?</p> <p>Are you getting enough help with the baby? How is your partner with the baby? Do you have family or friends nearby to help you?</p>	<p>It is normal to feel weepy when you first get home with a new baby. If these feelings get worse instead of better in 2-3 weeks, discuss feelings with your doctor. Advise mom to see her doctor anytime she is not able to sleep, eat, or care for her baby; or call Parent Baby Information Line to discuss feelings.</p>
Smoking environment	<p>Is there anyone in your household who smokes? When members of your household smoke, is the baby exposed? How do you handle this? Did you quit during pregnancy? Do you need some help to stay off cigarettes?</p>	<p>If mom quit during pregnancy, she may be making some decisions about resuming smoking. Brainstorm strategies to cope with other people smoking around her baby. Offer to send fact sheet on the effect of tobacco smoke on her baby as well as a list of coping strategies for mom to use instead of smoking. If mom is still smoking, offer smoking cessation resources.</p>
Baby's nutritional status	<p>Mother can assess whether infant getting sufficient breastmilk (wet and dirty 2 or more diapers per day).</p> <p>Is baby gaining weight? If breastfeeding, do you feel you have enough milk? Latch?</p> <p>If you are bottle-feeding, how are you preparing bottles? Are you aware of increased requirements of older baby? Dangers of microwave heating!</p>	<p>Reinforce value of breastfeeding. Cluster feeding is normal, try to avoid bottles before 6 weeks. Growth spurts occur at 2 weeks, 6 weeks, 2.5-3 months, 4.5-6 months. This varies from baby to baby.</p> <p>Reinforce importance of extra formula in each bottle to be available if baby needs it.</p>
Safety/injury prevention:		
A. Crib safety	<p>Do you have a new crib for the baby? If second-hand, was it made after 1986?</p>	<p>Awareness of standards if second-hand crib: leave name and telephone number of Consumer and Corporate Affairs.</p>
B. Car seat	<p>Use and misuse to be discussed with all mothers whose baby is driven in a car.</p>	<p>Car seats should be used in taxis, mention some of the common mistakes in car seat use. Loaner programs available.</p>
C. Awareness of community resources	<p>Have you heard about the Parent Baby Information Line, breastfeeding support drop-ins, well-baby drop-ins, and the You and Your Baby groups in your area?</p>	<p>Leave name and telephone number as well as locations and times for groups and the number of the Parent Baby Information Line. Briefly describe what to expect at groups.</p>
<p>* Additional areas for assessment included baby's health status, growth and development; medical follow-up for baby and mother; mother's physical health and nutritional status.</p>		

square statistics and analysis of variance, respectively. The impact of parent-baby support groups was initially examined using analysis of variance followed by analysis of covariance to control for differing characteristics of attenders and non-attenders.

RESULTS

Study sample

Using data from the hospital liaison referral forms, 972 women were initially found to be eligible for the study. In total, we were able to contact 873 (90%) of these subjects at three months postpartum when their final eligibility was ascertained and their consent to be interviewed

requested. Forty-four of these mothers were ineligible for the study, in most cases because they had moved out of the region. Only 31 mothers (3%) refused to participate. In total, 793 women completed the interview. Among this cohort were five women in the clerk call group who were only asked questions about awareness and utilization of community resources. This was due to an administrative error and these women are excluded from analyses. Of the 788 women who completed the full questionnaire, 9 women had missing data for one or more of the infant-care behaviour items and their composite score was not computed.

The majority of mothers reported English as their first language (69%),

were 25 years of age or older (84%) and had more than high school education (75%). Only 10% of women came from households with incomes below \$20,000 per annum. Nearly 80% of respondents were Canadian born. Consistent with a regional trend towards shorter hospital stays for postpartum women, 58% of the sample had been discharged within 48 hours of the baby's birth. There were no significant differences in sociodemographic characteristics among women in the three study groups. Similarly, infants' average birthweight, and the mothers' type of delivery and self-reported smoking status during pregnancy were comparable across the three groups.

Three-group comparison

Respondents' self-reported knowledge and utilization of public health nursing services for postpartum women are presented in Table II. While women in the clerk group were more knowledgeable about these resources, utilization rates were no better than in the control group. However, significantly more mothers who received a telephone visit attended the parent-baby group than women in either the clerk call or control groups.

Individual infant-care behaviours and composite scores for the three groups are compared in Table III. Immunization rates were close to 100% and therefore were excluded from the final summary score. Infant-care behaviour scores ranged from 0 to 10 with an average score of 3.78 (95% CI, 3.61, 3.95). There were no statistically or clinically significant differences in individual or composite infant-care behaviour scores among the three study groups.

Bivariate analysis showed that overall, attenders of parent-infant baby groups were significantly older, less often reported smoking during pregnancy, had more education, and higher incomes. Among attenders, women who had received the PHN telephone call had the highest rates of smoking during pregnancy, the least education, and lowest incomes. In an analysis of variance comparing infant-care behaviour scores of parent-baby group attenders and non-attenders among the three study groups, there was a significant main effect ($p=0.035$) and a significant interaction between type of postpartum intervention and parent-baby group attendance ($p = 0.047$). However, both of these between-group differences were eliminated in an analysis of covariance controlling for education and age.

DISCUSSION

With respect to infant-care behaviours, the findings indicate that the PHN telephone visit used in this study was no more effective than a mail-out package. Most likely, the telephone visit was not intensive enough to make a difference in the way a mother cared for her baby. Nurses were expected to both assess the mothers' learning needs and provide education and coun-

TABLE II
Self-reported Knowledge and Utilization of Postpartum Services by Study Group

Type of Service	PHN Telephone Visit (n = 279)		Type of Intervention* Clerk Call (n = 218)		Control Group (n = 291)		sig
	No.	%	No.	%	No.	%	
Knowledgeable about:							
Baby Information Line							
Yes	227	82	183	84	216	75	0.019
No	51	18	34	16	73	25	
Parent-Baby Group							
Yes	186	67	169	78	189	65	0.001
No	92	33	49	22	100	35	
Breastfeeding Group							
Yes	205	74	184	85	211	73	0.002
No	73	26	32	15	77	27	
Utilization of:							
Baby Information Line							
Used	80	29	58	27	63	22	0.045
Did not use	198	71	158	73	225	78	
Parent-Baby Group							
Attended	57	20	28	13	40	14	0.034
Did not attend	222	80	190	87	250	86	
Breastfeeding Group							
Attended	17	6	16	7	22	8	0.76
Did not attend	261	94	202	93	267	92	

* Columns do not all sum to total number of women due to missing data.

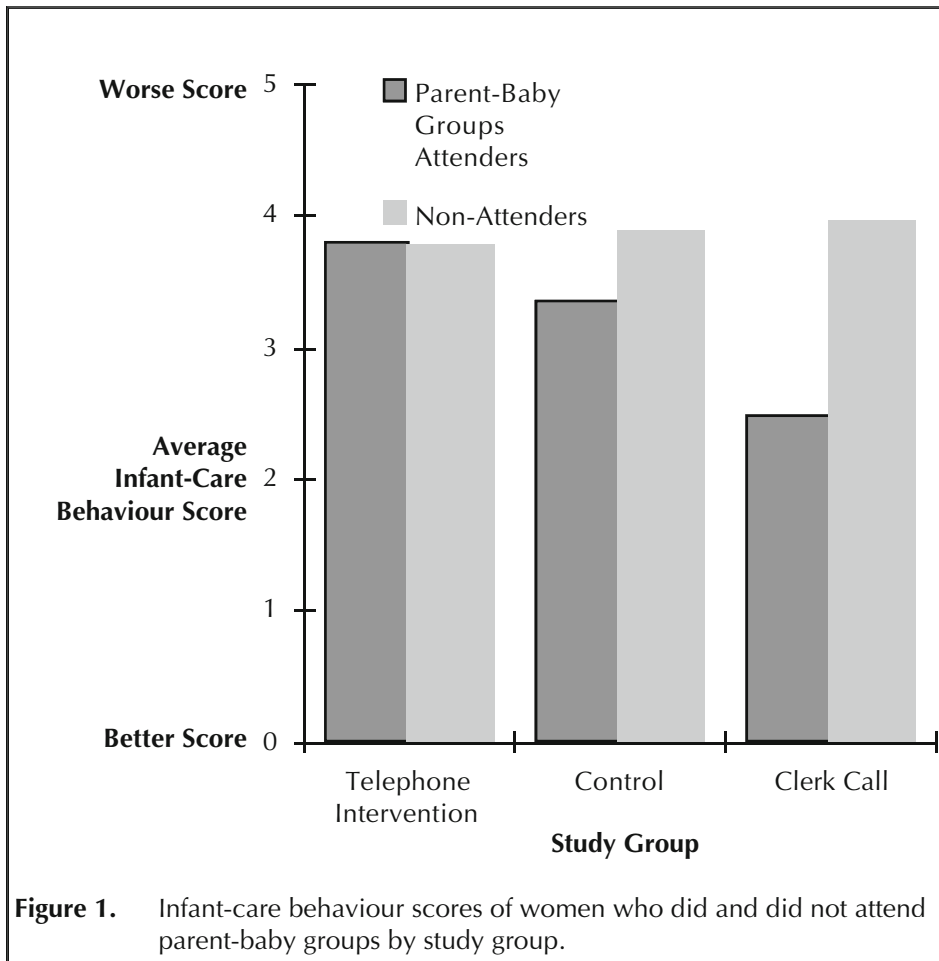
TABLE III
Comparison of Individual Infant-Care Behaviours and Composite Scores Among Study Groups at Three Months Postpartum

	PHN Telephone Visit n = 279	Study Groups Clerk Call n = 218	Control Group n = 291
Infant-Care Behaviours Composite Score* \bar{x} (SD)	3.78 (2.35) %†	3.77 (2.49) %†	3.80 (2.33) %
Infant Feeding‡			
Breastfeeding ≤ 1 bottle daily	38.8	42.2	39.5
Breastfeeding > 1 bottle daily	13.3	11.5	11.3
Bottle feeding only	47.8	46.3	49.1
Early Introduction of Solids			
Yes	44.1	40.8	44.7
No	55.9	59.2	55.3
Misuse of Child Restraint Device			
Yes	40.5	50.9	45.7
No	59.5	49.1	54.3
Unsafe Crib			
Yes	32.3	26.1	32.3
No	67.7	73.9	67.7
Maternal Smoking			
Yes	19.5	18.2	17.9
No	80.5	81.8	82.1
Postpartum Depression			
Yes	6.5	4.2	3.8
No	93.5	95.8	96.2

* Nine women who had missing values for one or more infant-care behaviours excluded from composite score
 † Some totals not equal to 100% due to rounding errors
 ‡ Bottle feeding with non-breast milk

selling on a number of infant-care topics during a relatively brief telephone call. Furthermore, phone calls may not have been timely with respect to women's needs for counselling on decisions about breast-

feeding cessation or smoking resumption. A telephone intervention was also problematic for hands-on behaviours. For example, helping mothers to appropriately modify cribs to make them safe is challeng-



ing without being able to provide visual demonstrations that complement verbal instructions.

In addition, the timing of phone calls was not equally optimal for all infant-care behaviours. For mothers who experienced difficulty breastfeeding shortly after hospital discharge, a phone call when the infant was two weeks old may have been too late for her to maintain breastfeeding (50% of the women who quit breastfeeding by three months postpartum had quit in the first month). In contrast, it is possible that information on the early introduction of solids was presented too early as most women were not yet experiencing the pressure of family and friends to start feeding the baby solids. Similarly, women who did not experience postpartum depression until after the telephone visit would have had their depressive symptoms "missed" by the early postpartum assessment process.

A recent qualitative study of smoking and smoking relapse during the postpar-

tum period²⁵ indicates that interventions to prevent smoking relapse should begin prior to delivery and involve the partner. During protocol development, some nurses expressed concern that introducing the topic of smoking during a telephone visit might impede their ability to form a trusting relationship with the client and hinder the receptiveness of mothers to other areas of teaching (e.g., breastfeeding and use of child restraint devices). It was a significant shift in practice to get smoking on the nurses' postpartum visit agenda. PHNs focussed on exposure of the infant to environmental tobacco smoke as a comfortable entry point to discuss this issue.

As documented in previous regional and provincial studies, attendance rates for the parent-baby and breastfeeding support groups were low.^{20,22} Therefore, program planners should not rely on group activities to meet the needs of the majority of new primiparous mothers. In addition, it was largely socially advantaged women who

used these services. The reasons that less advantaged women choose not to attend parent-baby groups need further exploration. The discrepancy between the large number of women who were knowledgeable about groups and the small number who accessed these services illustrates that awareness does not necessarily translate into utilization.

The significant interaction between study cohorts and parent-baby group attendance for infant-care behaviour scores was unexpected. It is likely that the telephone call by a PHN established a level of trust between the client and the nurse that encouraged socioeconomically disadvantaged, higher risk clients to attend the parent-baby groups. This conclusion is supported by two facts. First, attendance rates for parent-baby groups were significantly higher among women who received the PHN telephone visit. Second, women attending the parent-baby groups in the telephone visit cohort were a more disadvantaged population. The infant-care scores for women who received two interventions, a telephone visit and parent-baby group support, may have been less favourable because of this socioeconomic disadvantage. Among women attending parent-baby groups, 65% of the difference in average scores between telephone visit and clerk groups was accounted for by two infant-care behaviours, smoking and bottle-feeding (rates for both behaviours were higher in the telephone visit group).

It is interesting to note the higher smoking rates among parent-baby group attenders who received the PHN phone call (smoking rates were 25%, 15% and 0% among attenders from the PHN phone visit, control and clerk call groups, respectively). An interpretation of these findings that is consistent with the Transtheoretical Model^{26,27} is that the PHN phone visit successfully recruited women in a non-"action" stage (with respect to changing their smoking behaviour) to attend a support group. The larger difference in smoking rates between control and clerk call groups is difficult to explain. It is possible that the clerk call inadvertently discouraged smokers from attending parent-baby groups. When the clerk spoke to women, she mentioned topics that are commonly

discussed in parent-baby groups (e.g., infant feeding). Additional analyses (not shown here) indicate that women who smoke postpartum are significantly more likely to bottle-feed. Thus, a clerk's comment that infant feeding (presumed by mothers to be breastfeeding) would be discussed at parent-baby groups may have increased the chances that smokers would view parent-baby groups as irrelevant to their needs.

The telephone visit boosted the recruitment of more disadvantaged women to parent-baby groups for a relatively low cost. Enthusiasm for this approach, however, is tempered by the less than optimal attendance rates (20%). If such a recruitment strategy were to be used, it is important that the services offered through the parent-baby groups be matched to the characteristics and needs of those recruited. For example, although this study indicates that a brief telephone intervention by a PHN can increase parent-baby group attendance rates among women who smoke, smoking cessation and environmental tobacco smoke exposure were not issues that were consistently discussed in the parent-baby groups at the time of this study.

A limitation of the present study was that only primiparous women were included in the sample. There is some indication that multiparous women have their own special needs that must be addressed postpartum.²² The telephone visit assessed in this study has become a routine mode of health care delivery for low-risk postpartum mothers. Unfortunately, it was no more effective in producing the desired infant-care behaviour changes than a mailed-out information package with or without a clerk phone call. However, the incremental increase in utilization rates of parent-baby support groups among mothers receiving the telephone visit may offset the costs of these visits. In addition a telephone intervention allows us to identify high-risk women who may have been mis-

classified as low risk by the hospital liaison referral process.

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