A randomized trial of two public health nurse follow-up programs after early obstetrical discharge

Steel O'Connor, Kathleen O; Mowat, David L; Scott, Helen M; Carr, Pamela A; et al *Canadian Journal of Public Health*; Mar/Apr 2003; 94, 2; ProQuest pg. 98

# A Randomized Trial of Two Public Health Nurse Follow-up Programs after Early Obstetrical Discharge

An Examination of Breastfeeding Rates, Maternal Confidence and Utilization and Costs of Health Services

Kathleen O. Steel O'Connor, PhD<sup>1,2</sup>
David L. Mowat, MB, ChB, MPH, FRCPC<sup>2,3</sup>
Helen M. Scott, MSc<sup>4</sup>
Pamela A. Carr, BScN, MSc<sup>5</sup>
John L. Dorland, MSc<sup>2</sup>
Kin Fan W. Young Tai, MB, BS, FRCPC<sup>6</sup>

#### **ABSTRACT**

**Objectives:** To determine whether the outcomes of routine home visiting by public health nurses (PHN) after early obstetrical discharge differ from those of a screening telephone call designed to identify mothers who need further intervention.

**Methods:** Primiparas delivering a singleton infant and eligible for postpartum follow-up were randomized to a home visit or screening telephone call. Data were collected by telephone from 733 participants located at two tertiary care centres in Ontario. Outcomes included maternal confidence at two weeks, health problems of the infants between discharge and four weeks postpartum, breastfeeding rates at six months and costs of the two models.

**Results:** Differences between the samples at the two sites necessitated stratified analyses. No differences were detected between the groups in maternal confidence (p=0.96), health problems of infants (p=0.87), or rates of breastfeeding at six months (p=0.22). However, at both sites the cost of routine home visits was found to be higher than that of screening by telephone.

**Conclusion:** Although universal access to postpartum support is important, the results suggest that a routine home visit is not always necessary to identify the women who need it. These results can be generalized only to low-risk women and infants.

La traduction du résumé se trouve à la fin de l'article.

- Public Health Research, Education and Development Program (PHRED), Kingston, Frontenac and Lennox & Addington Health Unit (KFL&A), Kingston, Ontario
- 2. Department of Community Health and Epidemiology, Queen's University, Kingston
- 3. Formerly of KFL&A Health Unit
- 4. Formerly of PHRED, KFL&A Health Unit
- 5. KFL&A Health Unit
- Kreak Treath Office
   Formerly of the Divisions of Neonatology and Paediatrics, Queen's University

Correspondence and reprint requests: Dr. Kathleen Steel O'Connor, KFL&A Health Unit, 221 Portsmouth Avenue, Kingston, ON K7M 1V5, Tel: 613-549-1232 ext. 578, Fax: 613-549-7896, E-mail: koconnor@healthunit.on.ca

**Acknowledgements:** The financial assistance of The Physicians' Services Incorporated Foundation is gratefully acknowledged.

The authors thank Barb Strauss for background research and project management, Hussein Hollands for help with analysis, and Dr. Chris O'Callaghan for statistical advice. Our thanks also to Nicki Sims-Jones and Janice Potter for facilitating recruitment and data collection at the second site.

The need for follow-up after early discharge has been recognized by the American Academy of Pediatrics,1 Canadian Paediatric Society,2 and the Ontario Ministry of Health.3 Provided that there is adequate community support after discharge, the consensus is that there appears to be little difference in most outcomes between healthy infants discharged prior to 48 hours and those who remain in hospital longer.4-7 Two Canadian studies<sup>8,9</sup> have shown a higher hospital readmission rate, mainly for hyperbilirubinaemia, as a consequence of early discharge, but postpartum follow-up was not considered in these analyses.

There are few studies that compare alternate follow-up programs after early discharge. A Canadian study randomized 586 women to home or hospital-based postpartum visits after early discharge, and found no differences in breastfeeding frequency, infant weight gain, maternal state anxiety or maternal satisfaction at 14 days postpartum.10 Two studies in California found no differences in clinical outcomes at 14 days, but satisfaction with follow-up care was higher among mothers visited at home.11.12 Home visits were more costly than those in the clinic setting. A British study found that, among women receiving usual postnatal support by community midwives, additional visits by a support worker did not influence health status, breastfeeding rates or use of health services.<sup>13</sup> Costs of care were higher in the intervention group.

In Canada, postpartum follow-up is provided most frequently by public health nurses (PHNs) in the form of home visits. In this paper, we report the results of a study comparing alternate forms of PHN follow-up after early obstetrical discharge. These two models are referred to as Telephone Screen and Home Visit. Mothers in the Telephone Screen group were telephoned on the day following hospital discharge, and further interventions were provided if needs were identified. The alternate, Home Visit model was the routine provision of two home visits within 10 days of discharge.

The overall objective of this study was to determine whether the Home Visit and Telephone Screen models result in different outcomes. The outcomes of interest were rates of breastfeeding, levels of maternal confidence relating to infant care,

VOLUME 94, NO. 2

maternal reports of infant health problems, and the use of health services for infants in the interval between discharge and 28 days. Direct and indirect costs of the two models of care were calculated, including costs of health services. For purposes of program planning, we also provide an estimate of the need for additional interventions provided to mothers allocated to the Telephone Screen model.

# **METHODS**

The study was a randomized trial, approved by a University Research Ethics Board. The study sample was drawn from women delivering their infants at two sites, both tertiary care hospitals in southeastern Ontario, Canada. The target population was primiparas who 1) delivered a singleton infant vaginally during the study period January 27, 1997 to January 31, 1999. 2) were discharged within two days of the birth of their infants, 3) resided in the areas served by the local Community Care Access Centre\* (CCAC), and 4) were able to understand English well enough to give informed consent.† Signed consent was obtained in hospital. Allocation of each participant was determined by the intake co-ordinator on receipt of the referral at the health unit. She used a sequential set of sealed envelopes, prepared in advance by the research associate, containing allocations determined by random numbers.

tes of Follow-up by Site, Time of Follow-up and Allocation						
tates of Follow-up by Site, Tim	e of ro	mow-up an	u Alloc	ation		
Site		ohone reen	Hom	e Visit	то	TAL
Site A						
Eligible for Study	184		174		358	
Interviewed at two weeks	177	(96.2%)	168	(96.6%)	345	(96.4%
Interviewed at four weeks	175	(95.1%)	167	(96.0%)	342	(95.5%
Eligible for Six-month Follow-up	130		122		252	
Interviewed at six months	129	(99.2%)	119	(97.5%)	248	(98.4%
Cumulative Follow-up		(94.3%)		(91.9%)		(94.0%
Site B						
Eligible for Study	196		179		375	
Interviewed at two weeks	193	(98.5%)	171	(95.5%)	364	(97.1%
Interviewed at four weeks	185	(94.4%)	169	(94.4%)	354	(94.4%)
Eligible for Six-month Follow-up	136		133	(5.1.70)	269	(31.170
Interviewed at six months	133	(97.8%)	129	(97.0%)	262	(97.4%)
Cumulative Follow-up		(92.3%)		(91.6%)		(91.9%

Telephone Screen consisted of a telephone call to the new mother on the first working day following her discharge from hospital. The content of the call was structured to elicit the mother's concerns in the areas of infant feeding, her baby's general health and her emotional status. A home visit was made if either the mother or PHN identified a need. Referrals to other support services provided by the Health Unit, primary medical care or community support services were made if a need was identified. Otherwise no further contact was initiated by the PHN, although the mother was provided with the Health Unit telephone number and encouraged to call if she wished further support.

Home Visit consisted of two home visits by a PHN. Mothers allocated to this group were telephoned on the first working day following discharge, and arrangements were made for the first PHN visit as soon as possible. The second visit was scheduled to take place within 10 days of discharge, although in some cases it was delayed by a few days. The visits were structured to include a thorough infant and postpartum assessment. Referrals to other support services, primary medical care or community support services were made if needs for these services were identified by either the mother or PHN.

The two sites differed slightly in the provision of service. At Site A, the PHNs were trained to provide either model of care. At Site B, standard care for postpartum follow-up was identical to the Telephone Screen protocol. Therefore mothers randomized to the Telephone Screen group were treated as a routine referral, while those randomized to the Home Visit group were referred to PHNs who were hired and trained specifically to provide this model of care.

Sociodemographic information was taken from the CCAC referral form. Mothers and infants at the two sites were compared, as were mothers and infants allocated to the two models of care.

		Site	A			Site	В		
	Telepho	ne Screen		e Visit	Telephor	ne Screen		e Visit	Site A vs Site B Significance
Age of Mother (Mean(SD))	27.0	(5.2)	26.3	(5.4)	27.9	(5.0)	28.1	(4.8)	p = 0.001†
	n	(%)	n	(%)	n	(%)	n	(%)	
Mother's Education									
Less than high school	23	(13.2)	27	(16.2)	26	(13.5)	21	(12.5)	p = 0.03‡
Completed high school	13	(7.5)	13	(7.8)	20	(10.4)	18	(10.7)	
Some post-secondary	28	(16.1)	24	(14.4)	15	(7.8)	16	(9.5)	
Completed post-secondary	110	(63.2)	103	(61.7)	132	(68.4)	113	(67.3)	
First Pregnancy§	135	(74.2)	141	(82.0)	152	(77.6)	120	(68.2)	p = 0.15‡
Male Sex	74	(40.9)	85	(50.0)	89	(46.1)	85	(47.8)	p = 0.70‡
Gestational Age (weeks)									
35-37	14	(7.8)	7	(4.1)	11	(6.0)	13	(8.0)	p = 0.05‡
38	17	(9.5)	21	(12.4)	37	(20.3)	22	(13.6)	
39	47	(26.3)	36	(21.3)	40	(22.0)	48	(29.6)	
40	53	(29.6)	64	(37.9)	59	(32.4)	50	(30.9)	
41-42	48	(26.8)	41	(24.3)	35	(19.2)	29	(17.9)	

The regional body responsible for providing or purchasing all home care services.

The intervention at Site B was offered in both English and French.

Confidence

In Hospital

Two Weeks

TABLE III Rates of Breastfeeding and Maternal Confidence, by Time Period, Allocation and Site Site A Site B Telephone Screen Home Visit Telephone Screen Home Visit **Breastfeeding** N Breastfeeding Cumulative % N Breastfeeding Cumulative % N Breastfeeding Cumulative % N Breastfeeding Cumulative % at Beginning/N Breastfeeding at at Beginning/N Breastfeeding at Beginning/N Breastfeeding Breastfeeding at Beginning/N Breastfeeding at End of Interval (%) Breastfeeding Breastfeeding at Breastfeeding at from from from from End of Interval (%) Discharge End of Interval (%) Discharge End of Interval (%) Discharge Discharge 147/167 (87.0) Two Weeks 87.0 % 130/149 (87.2) 145/165 (87.9) 87.9% 141/157 (89.8) 89.8% 133/140 (95.0) Four Weeks 130/146 (89.0) 77.4% 122/129 (94.6) 82.5% 136/143 (95.1) 83.4% 85.3% Six Months 69/129 (53.5)41.4% 69/118 (58.5)48.3% 80/133 (60.2)50.2% 77/129 (59.7) 50.9% Maternal N Confidence N Confidence N Confidence N Confidence

Score (SD)

(4.7)

(3.4)

32.6

34 7

Observed

191

191

Score (SD)

31.0 (4.7)

34.0 (3.4)

Score (SD)

32.5 (4.6)

34.4 (3.3)

Observed

167

166

Observed

178 175

lealth Problems Report	ted by Mo	thers for th	neir Infa	ints, by A	llocation	and Site					
		Site A Site B		Significa	nce						
Health Problem		ne Screen : 175)		e Visit 167)		ne Screen (185)		e Visit 169)	-8		
	n	%	n	%	n	%	n	%	Common OR	p-value	
Concerns about weight	24	13.7	26	15.6	29	15.7*	42	24.9*	0.68	0.07	
Feeding difficulties	5	2.9	6	3.6	10	5.4	17	10.0	0.58	0.82	
Dehydration	3	1.7	2	1.2	4	2.2	3	1.8	1.31	0.99	
laundice	11	6.3	10	6.0	6	3.2	13	7.7	0.68	0.86	
Breathing problems	5	2.9	4	2.4	1	0.5	1	0.6	1.14	0.99	
Cold	5	2.9	8	4.8	5	2.7	8	4.7	0.57	0.88	
Congenital problems	4	2.3	11	6.6	3	1.6	3	1.8	0.46	0.86	
Concerns with cord	3	1.7	3	1.8	5	2.7	2	1.2	1.50	0.97	
Gastrointestinal/colic	11	6.3	14	8.4	11	5.9	18	10.7	0.62	0.77	
Infection	20	11.4	14	8.4	14	7.6	14	8.3	1.15	0.93	
Injury	3	1.7	0	1	0	_	0				
Rash	2	1.1	5	3.0	13	7.0	5	3.0	1.41	0.93	
Other problems†	6	3.4	4	2.4	15	8.1	14	8.3	1.08	0.99	
Total number of infants											
with health problems	86	49.1	92	55.1	110	59.5	86	50.9	1.06	0.87	

Baseline data were collected through personal interviews at intake, and outcome data through telephone interviews at two weeks, four weeks and six months after the birth of the infant. (Copies of instruments are available from the first author.) All data were collected by research assistants who were blind to the allocation of the mothers. All analyses were conducted using an intent-to-treat approach.

#### **Breastfeeding**

Questions to assess the extent to which mothers breastfed their infants were based on questions from The Infant Care Survey. These were included in the two-week, four-week and six-month interviews, but were asked only of mothers who were breastfeeding at the time of the previous interview. Mothers who were not breastfeeding at discharge were excluded from the analysis of breastfeeding outcomes,

since the intervention under study was initiated after discharge. The main outcome was the rate of breastfeeding at six months, but duration was also recorded. A Cox regression was used to test for differences in the duration of breastfeeding by allocation, controlling for site and other potential confounders. Allocation, site and significant covariates were retained in the model, but non-significant variables were eliminated by backward selection.

#### Maternal confidence

Levels of maternal confidence were assessed in hospital and at two weeks, using the Maternal Confidence Scale of Carty and Bradley. <sup>15</sup> Women were asked to indicate the extent to which they agreed or disagreed with eight statements such as "I can generally tell what my baby needs at this time". Responses were coded using a five-point Likert scale, and summed to give

a confidence score. A regression analysis examined post-test scores as a function of pre-test scores, allocation and site, controlling for other potential confounders. The latter were eliminated through backward selection if they were not significant in the regression model.

Observed

171

167

Score (SD)

32.0 (4.8)

34.1 (3.5)

# Documentation of infant health problems and use of medical services

At two weeks and four weeks following delivery, mothers were asked by telephone about health problems experienced by their infants in the previous two weeks, and the actions that were taken as a result. Visits to physicians, visits to emergency rooms, hospital admissions and contacts with other health care professionals were recorded. Mothers' reports of infant problems and the use of medical services were verified against medical records for the first 250 infants at Site A, and found to be accurately reported.

VOLUME 94, NO. 2

<sup>†</sup> Only mothers breastfeeding at discharge are included in this analysis

ABLE V			
alculation of Costs			
Category of Cost	Source of Data	Details	Unit Cost
Category of Cost Physician visits	OHIP fees*	Unscheduled visit (A007)	\$24.80
		Home visit (A901)	\$38.25
		Consultation (A265)	\$105.40
		General re-assessment (A264)	\$32.55
Chiropractic visit	OHIP fees		\$9.65
Lactation consultant	Hourly PHN rate, senior level	Salary, benefits, overhead,†	\$41.78
		60-minute contact	
Breastfeeding clinic	Hourly PHN rate, senior level	Salary, benefits, overhead,	\$10.45
	0.110	15-minute contact	
Laboratory tests	OHIP fees	Bilirubin	\$7.76
		Urinalysis	\$10.36
F		Ultrasound	\$30.71
Emergency room visits	Actual operating costs, as reported by hospital		\$76.80
Hospital admissions	Direct apprehing scale as reported by beauty.	divided by number of patient visits	W : 11 1 1 1 .
nospital admissions	Direct operating costs, as reported by hospital	Direct costs (nursing, direct administrative support, supplies) of floor on which infant admitted times	Variable, calculated for each infant
		RIW;‡ plus costs of drugs, diagnostic tests and	for each infant
		therapies; plus physician costs	
PHN visits	Costs eligible for reimbursement by CCAC	Assessment of mother and infant	\$88.95
PHN telephone calls	Hourly PHN rate, midrange	Salary, benefits, overhead, 30-minute contact	\$17.79
Costs assumed by families	riodity trittrate, initialize	Salary, belieffs, overflead, 50-minute contact	\$17.79
Medications	As reported by mothers	Reported use; cost from pharmacy price list	Variable
	7,	including dispensing fee; included whether or	variable.
		not paid by insurance.	
Work loss	Replacement cost method		Variable
Other	Parental report	Parental estimate; includes telephone,	Variable
		transportation, meals, parking, child care.	

Notes:

- \* Ontario Health Insurance Plan fee payable for the service provided, according to the tariff in effect at the time. Most specialists and some family physicians at Site A are members of an alternate funding plan, and receive salary or equivalent payment in lieu of fees. The billing code is not necessarily recorded, in which case we ascertained the type of visit and assigned the amount corresponding to the applicable OHIP fee.
- † direct overhead, as reported by the Health Unit.
- ‡ RIW = Resource Intensity Weight; a widely used measure of the relative resource impact of an episode of illness, based on diagnosis, age and morbidity.
- Il Does not include costs of not breastfeeding; information on exact duration of exclusive and partial breastfeeding not available.

Problems experienced by infants at the two sites were compared with a test of homogeneity. When the results demonstrated that the health experience of infants at the two sites did not differ significantly, a common odds ratio was calculated and tested for significance using the Mantel-Haenszel test.<sup>16</sup>

#### Calculation of costs

Direct and indirect costs were calculated, in Canadian dollars as of January 1999, for the use of health services and medications. Details are provided in Table V. Direct costs included publicly funded, out-of-pocket and insured payments. Indirect costs were most often borne by the family.

The full cost analysis was performed for subjects enrolled at Site A. In a secondary and confirmatory analysis, costs calculated from Site A were applied to the utilization data from Site B. The two hospitals are teaching hospitals in the same province; the public health nursing pay scales are similar and the physician reimbursement rates are identical.

# Sample size

A priori sample size calculations considered the outcomes of breastfeeding rates and

maternal confidence. It was estimated from local data that the breastfeeding rate at six months would be 35% in the Telephone Screen group, and would be increased to 45% in the Home Visit group; a sample of 375 per group would provide 80% power to detect this difference with 95% confidence.<sup>17</sup> For maternal confidence, 336 per group would achieve 90% power to detect a difference between follow-up scores of .25 SD, with 95% confidence, based on the t-test.17 Anticipating some loss to follow-up, targets of 400 per group were established. The study had to be extended to two sites in order to meet sample size requirements.

# **RESULTS**

### Accrual to the study

The participation rate among eligible women was 89.2% at Site A and 80.0% at Site B. Of 733 participants, 358 were accrued at Site A and 375 at Site B (Table I). Loss to follow-up was 3.3% between intake and two weeks and 1.8% between two and four weeks. Only mothers breastfeeding at four weeks were followed to six months; loss to follow-up

was 2.1% in this interval. More than 90% of mothers were followed to completion of the study protocol. The study had powers of 90% to detect the hypothesized difference in maternal confidence at two weeks and 74% to detect the predicted difference in breastfeeding rates at six months.<sup>17,18</sup>

# Comparability of the samples

Table II presents characteristics of mothers and infants accrued at each of the two sites, showing statistically significant differences in age and educational level of the mothers, but no difference with respect to gravidity or sex of their infants. The difference in gestational age was of borderline significance. Because of the observed differences and the likelihood of further, undetected differences, subsequent analyses were stratified by site.

Within the two sites, Telephone Screen and Home Visit groups were well matched on the variables available for examination.

#### Rates of breastfeeding

At the time of discharge, 90% of all mothers in the sample were breastfeeding. Table III presents the numbers of women breast-

CANADIAN JOURNAL OF PUBLIC HEALTH 101

TABLE VI

Direct and Indirect Costs of Health Services, by Allocation – Calculated Costs, Site A and Imputed Costs, Site B

		Tele	phone Scre	en (A=175, B=	185)	Н	ome Visit (	A=167, B=169	)
Service	Cost per unit (\$)	Number of	f Services B	Cost/100 i	nfants (\$)	Number o	f Services B	Cost/100 i	nfants (\$)
Routine visits to family physicians/paediatricians Well baby care	24.80	294	276	4,166.40	3,699.89	269	299	3,994.73	4,387.69
Unscheduled visits to family									
physicians/paediatricians									
Well baby care	24.80	113	97	1,601.37	1,300.32	101	105	1,499.88	1,540.83
Consults to paediatricians	105.40	4	5	240.91	284.86	5	9	315.57	561.30
Home visits	38.25	0	0			1	0	22.90	_
Follow-up visits	32.55	3	2	55.80	35.19	4	6	77.96	115.56
Visits to other health professionals									
Lactation consultants	41.78	6	0	143.25		4	0	100.07	-
Breastfeeding clinics	10.45	0	69	_	398.76	0	51	_	315.36
Chiropractors	9.65	0	2		10.43	3	0	17.34	
Emergency department visits	76.80	14	10	614.40	415.14	18	12	827.78	545.33
Hospital admissions	Variable	6	4	4,405.91	2,381.41	3	3	1,318.69	1,955.15
Laboratory tests									
Bilirubin	7.76	11	6	48.78	25.17	6	8	27.88	36.73
Ultrasound	30.71	0	1		16.60	0	0		
Urinalysis	10.36	0	0	achi-li		0	1		6.13
Public health nurse contacts									
Telephone calls	17.79	80	186	813.26	1,788.62	23	15	245.01	157.90
Home visits	88.95	111	16	5,641.97	769.30	237	300	12,623.44	15,789.94
Cost to health care system				17,732.05	11,116.69			21,071.26	25,411.92
Cost to parents				877.83	486.51			997.69	900.71
Medications	Variable	17	24	137.87	179.77	21	14	187.83	106.93
Total costs	variable		47	18,747.75	11,782.97	41	17	22,256.78	26,419.56

	ntion to Mothers by Allocation and by Site (n (%))								
	Site A	Site B	Significance						
Telephone Screen	n = 180	n = 196							
Telephone call only	83 (46.1)	186 (94.9)	p<0.001						
One visit	76 (42.2)	4 (2.0)							
Two visits	21 (11.7)	6 (3.1)							
Home Visit	n = 173	n = 179							
Telephone call only	26 (15.0)	15 (8.4)	p<0.001						
One visit	52 (30.0)	28 (15.6)							
Two visits	95 (54.9)	136 (76.0)							

feeding at the beginning and end of each interval of follow-up, by site and allocation. A Cox regression revealed no significant difference between the Telephone Screen and Home Visit groups (p=0.22), after stratifying by site and controlling for mother's age and education and gestational age of the infant.

### Maternal confidence

Average maternal confidence scores in hospital and at two weeks were similar in the two groups, for both sites (Table III). In a regression analysis, maternal confidence at two weeks was unrelated to allocation (p=0.96), after controlling for initial levels of confidence and site.

# Health problems in infants in the telephone screen and home visit groups

Tests of homogeneity showed that similar health problems were experienced by infants at the two sites (Table IV). Common odds ratios were therefore calculated, and in no case was this significantly different from unity. The total number of infants who experienced health problems did not differ significantly between the two groups.

# Costs of health services for infants in the telephone screen and home visit groups

Direct, indirect and total costs of health services per 100 infants were greater for the Home Visit group than for the Telephone Screen group at both sites (Table VI).

# The extent of need for PHN intervention identified by telephone screen

More than 30% of Telephone Screen mothers requested or were assessed as needing at least one home visit, although almost all were at Site A (Table VII). Further analyses showed that mothers in the Telephone Screen group who were visited did not differ from those who received only a telephone call with respect to age, gravidity or gestational age of the baby. However, at Site A, mothers who required or requested at least one visit had significantly lower levels of confidence, both initially and at two weeks (data not shown). At Site B, very few Telephone Screen mothers received home visits (n=10); the confidence of these mothers was not significantly different from those who were not visited.

About one third of Home Visit mothers refused one or both of the home visits; again this occurred less frequently at Site B. There were no differences between mothers who accepted and refused the home visit with respect to age, gravidity, or initial levels of confidence, or in the sex or gestational age of their infants.

VOLUME 94, NO. 2

#### DISCUSSION

This study of more than 700 mothers with good follow-up demonstrated no significant differences between the two groups in the rates of breastfeeding, gains in maternal confidence in the first two weeks postpartum, or medical problems experienced by infants in the first four weeks.

At both sites, the cost of the Home Visit model exceeded that of the Telephone Screen model. The difference in costs between the two models was much greater at Site B than at Site A. At Site A, more than half of women in the Telephone Screen group received a visit, whereas this happened infrequently at Site B. This suggests a difference in practice between Sites A and B, but other explanations are possible. Women at Site A may have been more in need of visits, as they were younger and had lower levels of education. Women at Site B had more access to breastfeeding and well-baby clinics.

Because no significant differences in outcomes between the two groups in either city were detected, and because the cost of Home Visit was found to be substantially higher than that of Telephone Screen, the results suggest to policy-makers that when related services are available, it may not be necessary to provide a postpartum home visit to every mother. A standardized telephone call by a PHN can be used to identify those needing further intervention.

The generalizability of these results is limited by the fact that the composition of the samples at the two sites differed in this study, as did implementation of the protocol. Furthermore, results can be generalized only to low-risk mothers and infants who can be discharged together within two days of delivery, and who are fluent in the main language of the community in which they reside.

This study had adequate power to detect what we judged to be the minimal clinically significant differences that would support the increased resource intensity of the Home Visit model of care. It is important to state that we did not have sufficient power to show equivalence, and therefore cannot say that the two interventions resulted in the same outcomes. Furthermore, we did not study such outcomes as health prob-

lems beyond four weeks of age. For all these reasons, further research is needed.

Under the Healthy Babies Healthy Children program, public health units in Ontario are mandated to telephone all mothers within 48 hours of obstetrical discharge, and to offer a home visit.<sup>19</sup> Our results suggest that, for low-risk primiparas, routine visiting does not achieve significantly different outcomes than a careful assessment of risk, with visits confined to those identified as needing PHN services, depending in part on the support services available in the community. However, even in communities with a wide range of supports for new mothers, some women will need a PHN visit. We believe that a critical component of the initial telephone contact is careful assessment of the need for further PHN intervention.

#### REFERENCES

- Committee on Fetus and Newborn. Hospital stay for healthy term newborns. *Pediatrics* 1995;96:788-90.
- Canadian Paediatric Society, Fetus and Newborn Committee. Facilitating discharge home following a normal term birth. *Paediatric and Child Health* 1996;1:165-68.
- Ontario Ministry of Health. Backgrounder: Follow-up Home Visits and Longer Hospital Stays. Released March 24, 1999.
- Yanicki S, Hasselback P, Sandilands M, Jensen-Ross C. The safety of Canadian Early Discharge Guidelines. Effects of discharge timing on readmission in the first year post-discharge and exclusive breastfeeding to four months. Can J Public Health 2002;93:26-30.
- Egerter SA, Braveman PA, Marchi KS. Follow-up of newborns and their mothers after early hospital discharge. Clinics in Perinatology 1998;25:471-81.

- Grullon KE, Grimes DA. The safety of early postpartum discharge: A review and critique. Obstet Gynecol 1997;90:860-65.
- Braveman P, Egerter S, Pearl M, Marchi K, Miller C. Problems associated with early discharge of newborn infants. Early discharge of newborns and mothers: A critical review of the literature. *Pediatrics* 1995;96:716-26.
- Lee KS. Perlman M, Ballantyne M, Elliot I, To T. Association between duration of neonatal hospital stay and readmission rate. J Pediatr 1995:127:758-66.
- Lock M, Ray JG. Higher neonatal morbidity after routine early hospital discharge: Are we sending newborns home too early? CMAJ 1999;161:249-53.
- Gagnon AJ, Dougherty G, Jimencz V, Leduc N. Randomized trial of postpartum care after hospital discharge. *Pediatrics* 2002;109:1074-80.
- Lieu TA, Braveman PA, Escobar GJ, Fischer AF, Jensvold NG, Capra AM. A randomized comparison of home and clinic follow-up visits after early postpartum hospital discharge. *Pediatrics* 2000;105:1058-65.
- 12. Escobar GJ, Braveman PA, Ackerson L, Odouli R, Coleman-Phox K, Capra AM, et al. A randomized comparison of home visits and hospital-based group follow-up visits after early postpartum discharge. *Pediatrics* 2001;108:719-27.
- Morrell CJ, Spiby H, Stewart P, Walters S, Morgan A. Costs and effectiveness of community postnatal support workers: Randomised controlled trial. Br Med J 2000;321:593-98.
- Simms-Jones N. Summary of Breastfeeding Findings, Infant Care Survey. Ottawa-Carleton Health Department, Ottawa, Ontario, 1992.
- Carry EM, Bradley CF. A randomized, controlled evaluation of early postpartum hospital discharge. *Birth* 1990;17:199-204.
- Pagano M, Gauvreau K. Principles of Biostatistics. Belmont. CA: Duxbury Press, 1993.
- Popcock SJ. Clinical Trials: A Practical Approach. Toronto, ON: John Wiley and Sons, 1983.
- Cohen J. Statistical Power Analysis for the Behavioral Sciences, Second Edition. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
- Ontario Ministry of Health. Healthy Babies, Healthy Children: Postpartum Enhancement Implementation Guidelines, 1999.

Received: August 2, 2001 Accepted: July 18, 2002

# RÉSUMÉ

Objectifs: Déterminer si les résultats de visites à domicile ordinaires effectuées par des infirmières de santé publique auprès de mères ayant reçu un congé précoce après l'accouchement diffèrent de ceux d'un programme d'appels téléphoniques visant à identifier les mères ayant besoin de soutien.

**Méthode :** Des primipares admissibles au suivi post-partum et ayant accouché d'un nourrisson unique ont reçu de façon aléatoire une visite à domicile ou un appel téléphonique de dépistage. Les données ont été recueillies par téléphone auprès de 7.33 participantes dans deux établissements de soins tertiaires en Ontario. Les résultats étudiés comprenaient l'assurance manifestée par la mère après deux semaines, les problèmes de santé du nourrisson entre la date du congé et quatre semaines après l'accouchement, le taux d'allaitement à six mois et les coûts des deux modèles.

**Résultats :** Les différences entre les échantillons aux deux établissements ont nécessité des analyses stratifiées. Aucune différence n'a été observée d'un groupe à l'autre à l'égard de l'assurance maternelle (p=0,96), des problèmes de santé du nourrisson (p=0,87) ou du taux d'allaitement à six mois (p=0,22). Toutefois, dans les deux établissements, le coût des visites à domicile ordinaires était plus élevé que celui du dépistage téléphonique.

Conclusion: Bien que l'accès universel au soutien post-partum soit important, ces résultats laissent entendre qu'une visite à domicile ordinaire n'est pas toujours nécessaire pour déterminer les mères qui ont besoin de soutien. Ces résultats ne peuvent être généralisés qu'aux mères et aux nourrissons à risque modéré.

CANADIAN IOURNAL OF PUBLIC HEALTH 103