WHAT WERE THE OUTCOMES OF HOME FOLLOW-UP VISITS AFTER POSTPARTUM HOSPITAL DISCHARGE?

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ABSTRACT

Objectives:

To assess health outcomes of home follow-up visits after postpartum discharge and assess relationships between the number of home visits and selected outcomes among women who gave birth at two Queensland, Australia, regional hospitals.

Design:

A cross sectional study. Services provided during the home visits were responsive to a woman's need rather than having a structured protocol of services.

***Main Outcome Measures*:**

The four measured health outcomes were: 1) postpartum depression; 2) confidence to undertake maternal roles; 3) breastfeeding; and, 4) satisfaction with postpartum care.

Results:

Of 210 women who were invited to participate in the study, 143 (68.1%) provided information. Women who received a higher number of home visits had significantly lower confidence to undertake maternal roles than those who received fewer home visits. There was a positive correlation between the number of home follow-up visits and postpartum depression among women who gave birth at one hospital (Hospital B), but not at the other (Hospital A). No relationship was found between the home postpartum visits and the other outcomes.

***Conclusion*:**

These results could be explained in that home follow-up visits were offered to all women at Hospital A while Hospital B only provided home visits to women who had a health risk due to their social, physical and psychological characteristics. The lack of protocol home visits and the characteristics of women receiving the visits were probably the major factors which influenced these limited beneficial outcomes.

INTRODUCTION

In the past two decades many researchers (Ransjo-Arvidson et al 1998; Fraser et al 2000; Lieu et al 2000) have assessed the outcomes of home follow-up visits after postpartum discharge as hospitals have reduced the hospital stay of postpartum women after the birth of their infants.

Health outcomes of postpartum women and their infants who were discharged early and received home follow-up visits were compared with women who had a longer hospital stay (Armstrong et al 1999; Kendrick et al 2000). A wide range of outcomes have been measured, including maternal depression and satisfaction with care and hospital readmissions (Lieu et al 2000).

The results of these studies recommended the provision of home visits to postpartum women, particularly first time mothers, single mothers and mothers who intend to breastfeed their infants. Another common and consistent outcome derived from these studies was that mothers who received home visits were

more likely to be satisfied with the postpartum care or to be more confident to seek help from health care providers than women who did not receive this care (De Koninck et al 2001).

The major approach relating to home visits after postpartum hospital discharge was having systematic and well planned protocols in order to achieve specific health outcomes. For example, Barros (1994) and Brent (1995) developed a protocol of services during home visits to postpartum women in order to increase their exclusive breastfeeding (see also Sikorski et al 2004). Such evidence-based practices were strongly recommended by health policy makers as they demonstrated outcomes based on a structured protocol of health services and systematic investigations. However, the adoption of these protocols was limited due to a range of administrative and practical factors.

Other factors included lack of understanding of nurses and midwives relating to the process used to develop the protocols of the best practices or their inability to obtain such protocols (Hay et al 1999). Results of the study by Hay et al (1999) suggested that at relatively small hospitals, health issues need to be prioritised so that appropriate protocols to deliver evidence-based practices could be developed to address such issues.

In September 2004, data based on six Queensland regional hospitals gathered by the researchers of this study, showed there were three major patterns of home visits provided to women after hospital postpartum discharge.

The first pattern was that nurses or midwives visited all women who lived within a designated area at their homes after the hospital discharge. There were objectives for the visits with a clear protocol for the visits.

The second pattern was that nurses or midwives visited all women who lived within a designated area at their homes after the hospital discharge. No structured protocol was written for the visits. Referral of women who lived outside of the boundary to other health centers might be made.

The third pattern was that women who had special needs due to physical, psychological or social problems would receive home visits provided by nurses or midwives after hospital discharge.

The pattern of home visits adopted by health organisations varied from one to another relating to the number of visits, time of initial and subsequent visits after hospital discharge and the range of protocols for services. If required, women or their infants were referred to other health professionals such as social workers, general practitioners or paediatricians for appropriate care. In general, care provided by nurses or midwives during these home visits aimed to prevent and detect complications among the women and their infants. Grullon and Grimes (1997) and Lieu et al (2000) who reviewed services provided in many countries including the United Kingdom and the United States suggested these included physical, psychological and social assessment, health education and anticipatory guidance.

Studies in the United Kingdom, the United States and Canada assessed the outcomes of these home follow-up visits after postpartum discharge (Frank-Hanssen et al 1999; Johnson et al 1999; Lieu et al 2000; Morrell et al 2000; De Koninck et al 2001).

Comparing the results of one study with other studies was problematic due to the difference in outcome measures, study designs, periods between hospital discharge and data collection, protocol and content of home visits, and, types of health care providers (Frank-Hanssen et al 1999; Johnson et al 1999; Lieu et al 2000). For example, Johnson et al (1999) assessed the success or continuation of breastfeeding while Lieu et al (2000) assessed a number of mother and infant outcomes including newborn re-admission, newborn urgent clinic visits, maternal re-admission and maternal postpartum depression. Lieu et al (2000) used an experimental design and Frank-Hanssen et al (1999) used a cross-sectional descriptive design. Only women who had vaginal deliveries were included in the study by Meikle et al (1998) whereas Armstrong et al (1999) focused specifically on high-risk women, excluding low risk women.

In Australia, all women and their infants are entitled to receive publicly funded health care during the perinatal period (Australian Institute of Health and Welfare 2003). As mentioned earlier, not all women received postpartum home visits after hospital discharge. The availability of, and accessibility to, the home visit is influenced by many factors, including hospital policies, financial support and the number of deliveries to justify cost-benefits. Many women in rural or regional areas travelled long distances to give birth in regional referral hospitals while the distance and availability of midwives in local communities limited the delivery of post hospital discharge care. No published data were available relating to health outcomes of the unstructured post hospital discharge care among women in regional Australia.

The major aim of this study was to assess health outcomes of unstructured home follow-up visits provided by midwives or nurses to women following the birth of their infants at two regional hospitals in Queensland, Australia. Specific objectives of this study were to describe and compare characteristics of mothers who gave birth at the study hospitals and to assess the relationship between the number of home follow-up visits and the following four outcomes: 1) postpartum depression; 2) confidence to undertake maternal roles; 3) breastfeeding; and, 4) satisfaction with postpartum care. The study hospitals were specifically selected for their different unstructured follow-up programs which reflected the actual postpartum services provided by many Australian hospitals. The first hospital, Hospital A, had midwives

visit all women at their homes located within 15 kilometre radius while the second hospital, Hospital B had selective criteria in the provision of services. The study hospitals and their home visit services will be briefly described in the following section.

Study hospitals and home follow-up visits

Two major Queensland regional hospitals served the dispersed population in more than 126,000 square kilometres (Queensland, The Office of Economic and Statistical Research 2002). Some women traveled more than 100 kilometres to use services at these hospitals.

The annual number of births in each hospital was approximately 1000. Prior to the questionnaire design, the authors held discussions with six nurses and midwives working at the study hospitals and relevant health organisations in order to explore postpartum home visit protocols, specific services and anticipated outcomes of home visits provided by each study hospital.

At Hospital A, home visits were offered and provided to all postpartum women who lived within a 15 kilometre radius. Midwives would make the initial visit within five days after the hospital discharge. If needed, subsequent visits were also made.

Women or their infants with long term health problems or severe illness were referred to other health professionals such as general practitioners, community health nurses, social workers or paediatricians for appropriate care.

Other women who lived outside the 15 kilometre radius might or might not receive home visits depending on the policy of the women's nearest health centre. At Hospital B, the home visits were only provided by midwives to women or infants with social, physical or psychological health problems. These included drug users and women in domestic violence relationships. Midwives at Hospital B would decide who would require a home visit. Both Hospital A and B did not have a formulated protocol of services during each visit to achieve anticipated outcomes by nurses or midwives who visited women who gave birth. No fixed number of visits were provided by visiting midwives.

RESEARCH METHOD

Postpartum women who gave birth at the study hospitals between August and December 2001 were invited to participate in the study. Ethics committees of relevant organisations approved the study. Two hundred and ten women (Hospital A = 102, Hospital B = 108) were approached and invited to participate in the study. Of these 172 (81.9%) agreed to participate (Hospital A = 76, 74.5%, Hospital B = 96, 88.9%) and later were followed-up by telephone interviews within four weeks after hospital discharge. These participating rates at Hospitals A and B were significantly different.

Reasons for non-participation were that they did not perceive the benefits of the study and they did not have time.

More than 80% of the women (143 women of 172, 83.1%) were contacted after four to 10 telephone calls (average five calls) and took part in the study. Each woman was contacted at various times of the day including weekends. A minimum of four telephone calls were made to each woman and up to 10 calls in total. Three research assistants, who were registered nurses, were trained by the first author to conduct telephone interviews. A manual was also developed to be used by the research assistants, and this described the purpose of the study and the questions included in the questionnaire. A telephone interview ranged between 15 and 45 minutes (median 20 minutes).

The results of the discussions between the first author and the nurses and the midwives and various studies were used as a guide to select outcomes of home visits and design the questionnaire comprising open-ended and closed-ended questions. The following information was gathered from each participating woman: sociodemographic characteristics, number of follow-up home visits, postpartum depression, confidence to undertake maternal roles, frequency of breastfeeding and satisfaction with postpartum care.

Information relating to obstetrics during pregnancy, delivery and postpartum period of the participants was based on the hospital records. A form was designed to collect the recorded perinatal data of both the woman and her infant. The information was transcribed by research assistants. These perinatal data included gestational age, type of delivery, presentation of the infant, plurality, and, the presence of infant congenital anomaly at birth.

Variables and their measurements

The independent variable was home follow-up visits measured by the women's reported number of home visits provided by nurses or midwives within four weeks after their hospital discharge. Maternal psychological health was assessed by using the standardised Edinburgh postpartum depression scale (Eberhard-Gran et al 2001). The possible score ranged from zero (no depression) to 30 (high depression).

The studies by Ransjo-Arvidson et al (1998), Fraser et al (2000) and Kendrick et al (2000) were used as a guide to design five question items to assess confidence to undertake maternal roles. This study assessed the woman's reported confidence to care for her baby relating to bathing, feeding, dealing with the baby's waking at night, the baby's crying non-stop for more than one hour and having fever. These tasks were later ranked as the most difficult (baby cried non-stop for more than one hour and having fever) and to the least difficult (bathing) by gaining the opinion of five midwives and four postpartum mothers. The women responded by using a five point Likert scale from no confidence (one score) to

very confidence (four score) and unsure (zero score) to each question item. The possible score of the confidence to undertake maternal roles ranged from zero (unsure) to 20 (most confidence).

The studies by Jirojwong (1995), Lieu et al (2000) and De Konick et al (2001) were used as a guide to design a single question item to assess the women's overall satisfaction with postpartum care. Studies by Johnson et al (1999) and Sikorski et al (2003) were used to design a question item to assess breastfeeding by the self-reported regularity of breastfeeding in the past seven days. The regularity of breastfeeding was used to categorise a woman into one of four groups: exclusively breastfeeding (no bottle feeding), predominantly breastfeeding, predominantly bottle feeding and exclusively bottle feeding (no breastfeeding).

A short hospital length of stay after birth was defined as postpartum hospital stay for not more than two days for women who had vaginal delivery and not more than four days for women who had caesarean delivery (Grullon and Grimes 1997).

Cronbach's alpha was computed to assess internal reliability of two measurements: the Edinburgh postpartum depression scale (0.83) and the confidence in maternal roles (0.63). This internal reliability was computed based on the data of all 143 women in the study. This was a satisfactory level of internal consistency (Nunnally 1978).

Descriptive and analytical data analysis methods were used. Number, percentage, range, mean, standard deviations, median and inter-quartile were used to analyse and present descriptive data. In order to assess group differences, a chi-square test for categorical variables and the student's t-test for continuous variables were used. As the number of home visits was not normally distributed, non-parametric methods were used to assess its relationship with the study outcomes. The non-parametric Kruskal-Wallis test was used to compare two or more groups and the Spearman Rank correlation was used to assess a relationship between two continuous variables (Daniel 1995). The minimum statistical significance level of 0.05 ($p=0.05$) was used as a criterion for rejecting a null hypothesis.

RESULTS

The women

The details of social, demographic and obstetric characteristics of the women who gave birth at Hospital A and Hospital B are shown in table 1. Information relating to home visit after postpartum hospital discharge is also included in table 1. The average age of women was 28 years, more than 50% of the women completed high school education, 40% lived in a family where the main income earners were manual workers, 40% lived in a family where the main income earners were professional workers, 87% were married or in a de facto relationship, 13% had private health insurance and 28% were first time mothers. The average length of hospital stay after delivery at both hospitals was approximately three days. There was no significant difference between the following characteristics of the women who gave birth at Hospital A and the women who gave birth at Hospital B: age, the highest level of education, occupation of main family income earner, marital status, the type of health insurance, being a first time mother, and the length of hospital stay after birth.

Compared with the percentage of women who gave birth at Hospital B, a significantly higher percentage of women who gave birth at Hospital A had an assisted delivery including caesarean section, forceps assisted delivery or vacuum assisted delivery. However, a lower percentage of the women who gave birth at Hospital A had recorded complications during their perinatal period compared with the percentage of women who had such complications at Hospital B. These contradictory findings were unexpected. The average length of hospital stay after delivery at Hospital A and Hospital B were 3.4 days and 3.7 days, respectively. This difference was not statistically significant.

Approximately one-third (n=52, 36.4% of 143 women) had home visits by midwives, ranging from zero to seven visits. Of all 63 women who gave birth at Hospital A, 46 (73%) received at least one postpartum home visit. The average number of visits was 2.2. Among 80 women who gave birth at Hospital B, only six women (7.5%) who met the criteria of having home visit (see 'Study hospital' and 'Home follow-up visits' section) received at least one home visit. The number of home visits ranged from zero to two with the average number of home visits being 0.1. As expected, the numbers of home visits provided to women who gave birth at both hospitals were statistically significantly different.

The number of home visits and the characteristics of women

Table 2 shows the number of home visits categorised by different social, demographic and obstetric characteristics of women. Women who were single, widowed or divorced received a significantly higher number of home visits than the number of home visits provided to married women or women who were in a de facto relationship. Women who did not have complications during the perinatal period received a significantly higher number of home visits than the number of home visits provided to women who had perinatal complications. These findings did not differ after taking into account women who had perinatal complications and gave birth at each hospital. This was an unexpected finding.

Thirteen of the 19 women at Hospital A who experienced perinatal complications received home visits. Of 51 women at Hospital B who experienced perinatal complications, only three received home visits. The length of hospital stay after birth among those who had

Table 1: Social, demographic and obstetrics characteristics of postpartum women who gave births at two study hospitals (a)

Characteristic	Hospital A	Hospital B	Total (b)	
Maternal Age (year)				
Number of women	62	79	141	
Range	17-39	15-40	15-40	
Mean (SD)	27.56 (5.5)	28.7 (5.7)	28.2 (5.6)	
t (df)				-1.23 (139)
p				p = 0.22
	Number (%)	**Number (%)**	**Number (%)**	
Mother's highest level of education				
Lower than high school	17 (27.0)	21 (26.3)	38 (26.6)	
High school or equivalent	34 (54.0)	51 (63.7)	85 (59.4)	
University undergraduate education or equivalent	12 (19.0)	8 (10.0)	20 (14.0)	
Chi-square (df)				2.63 (2)
p				p = 0.27
Occupation of main family income earner				
Unemployed or student	13 (20.6)	14 (17.4)	27 (18.9)	
Manual worker	25 (39.7)	33 (41.3)	58 (40.6)	
Professional worker	25 (39.7)	33(41.3)	58 (40.6)	
Chi-square (df)				0.23 (2)
p				p = 0.89
Marital Status				
Married or de facto relationship	52 (82.5)	72 (90.0)	124 (86.7)	
Single, widowed or divorced	11 (17.5)	8 (10.0)	19 (13.3)	
Chi-square (df)				1.70 (1)
p				p = 0.19
Type of health insurance				
Public	54 (85.7)	70 (87.5)	124 (86.7)	
Private	9 (14.3)	10 (12.5)	19 (13.3)	
Chi-square (df)				0.10 (1)
p				p = 0.76
Number of pregnancy				
First	14 (22.2)	26 (32.5)	40 (28.0)	
Second and higher	49 (77.8)	54 (67.5)	103 (72.0)	
Chi-square (df)				1.85 (1)
p				p = 0.17
Type of delivery	28 (44.4)	52 (65.0)	80 (55.9)	
Normal delivery	35 (55.6)	28 (35.0)	63 (44.1)	
Caesarean section, forceps and vacuum delivery				
Chi-square (df)				6.04 (1)
p				p = 0.01
Complication during perinatal period				
Had complication	19 (30.2)	51 (63.8)	70 (49.0)	
No complication	44 (69.8)	29 (36.2)	73 (51.0)	
Chi-square (df)				15.92 (1)
p				p < 0.001
Length of hospital stay after delivery (day)				
Number of women	63	80	143	
Range of hospital stay	1-16	1-7	1-16	
Mean (SD)	3.41 (2.1)	3.72 (1.5)	3.59 (1.80)	
t (df)				1.03 (141)
p				p = 0.30
Postpartum home visit				
Number of women	63 (100.0)	80 (100.0)	143 (100.0)	
Number of visits				
0	17 (27.0)	74 (92.5)	91 (63.6)	
1	4 (6.3)	4 (5.0)	8 (5.6)	
2	16 (25.4)	2 (2.5)	18 (12.6)	
3	9 (14.3)	0	9 (6.3)	
4	10 (15.9)	0	10 (7.0)	
5 or higher	7 (11.1)	0	7 (4.9)	
Range of postpartum home visit	0-7	0-2	0-7	
Mean (SD)	2.2 (1.8)	0.1 (0.4)	1.04 (1.6)	
t (df)				3.0 (50)
p				p= 0.005

Note: a) Pearson Chi-square test was used to assess a relationship between two categorical variables and the student t-test was used to assess a relationship between the difference of two means. b) Total number may not be equal to 143 due to missing data.

Table 2: Relationship between social, demographic and obstetrics characteristics of postpartum women and the number of home visits after hospital postpartum discharge (c)

Characteristic	Number of women (%) b	Number of home visits		p
		Range	Median (inter-quartile)	
Maternal age (year) Range Mean (SD) Correlation Coefficient (r), p	141 (100.0) 15-40 28.2 (5.6)	0-7	-	 -0.15, 0.68
Mother's highest level of education Lower than high school High school or equivalent University undergraduate education or equivalent Chi-square (df) p	 38 (26.6) 85 (59.4) 20 (14.0)	 0-7 0-6 0-6	 0 (0.2) 0 (0.2) 0 (0.3)	 1.30 (2) 0.52
Occupation of family main income earner Unemployed or student Manual worker Professional worker Chi-square (df) p	 27 (18.9) 58 (40.6) 58 (40.6)	 0-7 0-6 0-6	 0 (0.2) 0 (0.2) 0 (0.2)	 1.33 (2) 0.52
Marital Status Married or de facto relationship Single, widowed or divorced Chi-square (df) p	 124 (86.7) 19 (13.3)	 0-6 0-7	 0 (0.2) 2 (0.3)	 5.48(1) 0.02
Type of health insurance Public Private Chi-square (df) p	 124 (86.7) 19 (13.3)	 0-7 0-5	 0 (0.2) 0 (0.3)	 0.14 (1) 0.7
Number of pregnancy First Second and higher Chi-square (df) p	 40 (28.0) 103 (72.0)	 0-6 0-7	 0 (0.2) 0 (0.2)	 0.02(1) 0.89
Type of delivery Normal delivery Caesarean section, forceps and vacuum delivery Chi-square (df) p	 80 (55.9) 63 (44.1)	 0-7 0-6	 0 (0.2) 0 (0.2)	 2.81 (1) 0.09
Complication during perinatal period Had complication No complication Chi-square (df) p	 70 (49.0) 73 (51.0)	 0-5 0-7	 0 (0, 0.25) 0 (0.3)	 9.24 (1) 0.002
Length of hospital stay after delivery (day) Correlation Coefficient (r), p	143 (100.0)	0-7	-	 -0.05, 0.6

Note (b) Total number may not be equal to 143 due to missing data.
(c) The Kruskall-Wallis non-parametric test used to assess a relationship between the number of home visits and categorical variables and the Spearman rank correlation was used to assess a relationship between the number of home visits and continuous variables.

complications at both hospitals (average 4.2 days, SD=2.1 days) was significantly longer that the length of hospital stay among women who did not (average 3 days, SD=1.2 days). The data are not shown in the table.

Results also showed that no statistically significant difference occurred between the number of home visits and the women's level of education, occupation of main family income earner, type of health insurance, being a first time mother or the type of delivery. There was no correlation between the number of home visits and the women's age and their length of hospital stay after delivery.

Outcomes of home visit

Tables 3a and 3b show the median, inter-quartile and range of home visits provided to women who gave birth at both study hospitals and were categorised according to their health outcomes: 1) postpartum depression; 2) confidence to undertake maternal roles; 3) breastfeeding;

Table 3a: Relationships between the health outcomes of postpartum women and the number of home follow-up visits (c)

Health Outcomes	Hospital A	Hospital B	Total
Postpartum depression (score)			
Number of women	63	80	143
Range of score	0-23	0-19	0-23
Median (Inter-quartile)	5 (1,8)	3.5 (1, 8.75)	4 (1.8)
Correlation Coefficient (r), p	0.13, 0.30	0.23, 0.04*	0.16, 0.06
Confidence of maternal roles			
Number of women	63	80	143
Range of score	10-20	12-20	10-20
Median (Inter-quartile)	15 (14, 17)	17 (16, 19)	17 (15, 18)
Correlation Coefficient (r), p	-0.10, 0.46	-0.34, 0.002**	-0.34, <0.001**

Table 3.b: Relationships between the health outcomes of postpartum women and the number of home follow-up visits (c)

Health Outcomes	Hospital A			Hospital B			Total		
	Number of Home Visit			Number of Home Visit			Number of Home Visit		
	Number of women (%)	Range	Median (Inter-quartile)	Number of women (%)	Range	Median (Inter-quartile)	Number of women (%)	Range	Median (Inter-quartile)
Breastfeeding in the last 7 days									
Exclusively breastfeeding	34 (54.0)	0-6	2 (0,3.25)	48 (60.0)	0-2	0 (0,0)	82 (57.3)	0-6	0 (0,2)
Predominantly breastfeeding	10 (15.9)	0-7	2 (0,4)	5 (6.2)	0-2	0 (0,0)	15 (10.5)	0-7	0 (0,3)
Predominantly bottle feeding	0	-	-	4 (5.0)	0-1	0 (0, 1.5)	4 (2.8)	0-2	0 (0,1.5)
Exclusively bottle feeding	19 (30.1)	0-6	2 (2,4)	23 (28.8)	0-1	0 (0,0)	42 (29.4)	0-6	0 (0,2)
Chi-square (df)	1.01 (2)			2.54 (3)			2.29 (3)		
p	0.60			0.47			0.51		
Satisfaction with postpartum care									
Very satisfied	45 (71.4)	0-7	2 (0.5, 4)	43 (53.8)	0-2	0 (0,0)	88 (61.5)	0-7	0 (0, 2.75)
Satisfied	12 (19.0)	0-6	2 (0.25,3.75)	28 (35.0)	0-2	0 (0,0)	40 (28.0)	0-6	0 (0,1)
Little satisfied	5 (8.0)	0-2	2 (0,2)	5 (6.2)	0-1	0 (0, 0.5)	10 (7.0)	0-2	0 (0,2)
Dissatisfied	1 (1.6)	0	0	4 (5.0)	0-1	0 (0, 0.75)	5 (3.5)	0-1	0 (0, 0.5)
Chi-square (df)	4.024 (3)			3.12 (3)			4.09 (3)		
p	0.26						0.25		

Note: (b) Total number may not be equal to 143 due to missing data.
(c) The Kruskall-Wallis non-parametric test used to assess a relationship between the number of home visits and categorical variables and the Spearman rank correlation was used to assess a relationship between the number of home visits and continuous variables.
* p<0.05, **p<0.005

and, 4) satisfaction with postpartum care. The results indicated that all women in the study, regardless of home visits or other characteristics, had a relatively low depression level and a high level of confidence to undertake maternal roles. We were unable to control for other confounding factors using multivariate data analyses because of a small sample size of few cells.

The majority of women (57.3% of 143 women) reported that they exclusively breastfed their babies while approximately 30% never breastfed their babies. This information was based on the self-reported regularity of breastfeeding in the past seven days. The majority of the women (n=88, 61.5% of 143 women) reported they were very satisfied with postpartum care while only 7% said they were not satisfied with the care.

There was no significant relationship between the number of home visits provided to women who gave birth at Hospital A and their health outcomes. However, there was a significant association between the number of home visits provided to women who gave birth at Hospital B and the women's postpartum depression and their confidence to undertake maternal roles. The direction of a relationship between the number of home visits and these health outcomes was contrary to the expectation of health personnel at the study hospitals. Results indicated that an increasing number of home visits were related to an increasing level of postpartum depression. The higher number of home visits was also related to a lower level of the women's confidence to undertake maternal roles among the women who gave birth at Hospital B.

The data from both hospitals indicated a positive relationship between the number of home visits and a woman's confidence to undertake maternal roles. However, there was no positive correlation between the number of home visits and the Edinburgh postpartum depression scale.

DISCUSSION AND IMPLICATIONS

Women who gave birth at both hospitals had similar social and demographic characteristics. The women in the study had a slightly longer hospital stay (3.6 days) after their birth compared with the 2000 national average (2.8 days of public hospitals) (Australian Institute of Health and Welfare 2003). Although the women in the study were similar to the women who gave birth in Queensland in relation to their age and marital status, it was unlikely they represented all women who gave birth in Queensland as there was a lower percentage of first time mothers (28%) than the percentage of first time mothers in Queensland (40.1%) (Australian Institute of Health and Welfare 2003).

As expected, the women who gave birth at Hospital A had a significantly higher number of home visits compared to the number of home visits provided to the women who gave birth at Hospital B. The length of stay after delivery at both hospitals was not significantly different. However, the results at both hospitals, after taking perinatal complications into consideration, showed that women who had complications had a longer postpartum hospital stay than women who did not.

The study results did not find that women who had short hospital stay after the birth of their babies received home visits so they could gain benefits of continuing health services. The overall results indicated that unstructured home visits to women after hospital postpartum discharge did not provide positive health outcomes. Nurses and midwives responded to a woman's circumstance and identified needs rather than using a structured protocol during a short period of home visits. The lack of positive health outcomes could probably be explained by a longer postpartum hospital stay among women who had perinatal complications. Further studies need to investigate specific services provided to women during hospital stay and compare them to the services provided during postpartum home visits.

The study data showed the number of home visits was related to a high level of depression and a low level of confidence to undertake maternal roles. Caution is needed to interpret these results as only a few women who gave birth at Hospital B during the study period received the home visits. The lack of selection criteria to provide home visits by Hospital A, self selection to receive care by the women and a perceived personal need to have home visits could be reasons for the lack of positive health outcomes found in Hospital A. However, the social and obstetric characteristics of the women who gave birth at Hospital B could contribute to the negative outcomes of the home visits by nurses or midwives. We were unable to control the extraneous factors, including marital status, due to the small number of women who gave birth at Hospital B and had home visits. It was beyond the scope of this study to explore health outcomes of home visits taking into account various confounding factors using multiple variate analyses since the number of each group would be too small to permit any meaningful pattern to emerge.

The lack of positive health outcomes needs further investigation. For example, self-selection to receive home visits and the women's expectation of services might have influenced the satisfaction level reported by the women. Other social support from family members and health personnel might have affected the decision to seek care for themselves and their infants. Also, prior intention not to breast-feed an infant may not have changed with only a few home visits.

Only one disadvantaged group, women who were single, widowed or divorced, received a higher number of home visits compared to other groups of women. Surprisingly, the women who had complications during the perinatal period had a fewer number of home visits compared to the women who did not have complications. This was probably due to their longer hospital stay. The sources of support, including general practitioners, obstetricians, family members and friends provided to women who had complications were not assessed in this study. This might be different to the sources of support to women without complications and this needs further study. There was also contradictory information between the percentage of assisted deliveries and complications during perinatal periods. We were unable to validate this information to identify whether there was any discrepancy in the information recorded by health professionals between both hospitals.

We did not explore other sources of information given to the women during their pregnancy so were unable to assess how these might influence postpartum health outcomes. The study also did not explore health education content given by midwives. The women who participated in the study were also unlikely to represent all women who gave birth in the study area. We were unable to assess the effects of the difference of response rates between both hospitals on the study results. The small number of women who gave birth at Hospital B and received home visits limited the ability to consider both social and obstetrics factors of the women during the assessment of a relationship between the number of home visits and health outcomes.

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