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Home Care of High Risk Pregnant Women by Advanced Practice Nurses: Nurse Time Consumed

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Abstract

This study examined the time spent by advanced practice nurses (APNs) in providing prenatal care to women with high risk pregnancies. The results indicate that the overall mean APN time spent in providing prenatal care was 51.3 hours per woman. The greatest amount of time was spent in the clinic and women with pregestational diabetes consumed the most APN time and required the most contacts. Historically, home care services have been measured by number of visits or contacts. This study assists home care nurses and administrators to consider additional measurements including time spent.

National strategies to control healthcare costs have resulted in decreased use of hospitalization and increased use of home care services for many high risk patient groups. Women at high risk of delivering low birthweight (LBW) infants represent such a group. LBW infants have high mortality and morbidity rates and healthcare costs among the highest of any patient group, stressing families financially and functionally (Guyer, Martin, Anderson & Strobino, 1997). Preventing birth of LBW infants is a national healthcare priority (Centers for Disease Control, 1990).

Understanding of the basic causes of LBW (preterm labor and intrauterine growth retardation) remains limited (Mittendorf, Williams, Hibbard, Moawad, & Lee, 1994). However, a number of associated factors are known.

These include:

- previous preterm birth;
- genital infection;
- abruptio placenta;
- placenta previa; and
- preeclampsia and multiple pregnancy.

Through careful monitoring and early treatment of problems, gestation can be prolonged in women at high risk of preterm delivery.

Nurse home visiting has been identified as one strategy to conduct such monitoring and maintain women with high risk pregnancies at home. Nurse home visiting is currently being

conducted by a variety of providers including visiting nurse associations, independent home care agencies, and hospital based home care agencies.

However, there are wide variations in home care services including the number, type, and length of the services. Although most home care services include home visits and telephone contacts, the number of home visits and telephone contacts patients receive are most often dictated by reimbursement plans, rather than provider judgment and patient need.

Currently, there are limited reported data on nurse time required by various patient groups in need of discharge planning and home care services. Nurse time includes:

- inpatient time spent in discharge planning;
- total hours spent in the home;
- the number of contacts (home visits and telephone calls); and
- time per contact.

In a recent study (Brooten, Knapp, Borucki, Jacobsen, Finkler, Arnold, & Mennuti, 1996) the mean advanced practice nurse (APN) inpatient time spent in discharge planning with women who delivered via an unplanned cesarean was 121 minutes. This was almost identical to the 124 minute mean reported by Naylor (1990) in a study of comprehensive discharge planning of elderly patients conducted by APNs. In work reporting on APN follow-up of low socioeconomic mothers of term infants, Norr, Nacion, & Abramson (1989) reported a mean of 1.6 hours of inpatient APN time consumed in this program. Work reported by Damato and colleagues (Damato, Dill, Gennaro, Brown, York, & Brooten, 1993) on APN early discharge and home follow-up of very low birthweight infants demonstrated a mean of 6.5 hours of APN time consumed during the inpatient portion of the program.

There is limited information on the hours of care needed in the home. Payne and colleagues (1996) reported on home health nursing resource use in 12 nonproprietary home health agencies in Massachusetts. These investigators reporting on patients with AIDS, mothers and children (MCH), and medical surgical (MS) clients found differences in hours of total nurse time per completed episode of care. Patients with AIDS consumed an average of 27.4 hours of nurse time, MCH patients an average of 13 hours, and MS patients an average of 14.2 hours.

In examining the number of visits per episode of care, Payne and colleagues (1996) reported patients with AIDS received an average of 33.3 visits, MCH patients an average of 25.1 visits, and MS patients an average of 8.1 visits. Again, these were dictated by reimbursement plan, not provider judgment and patient need. Maternal and child health visits included any visit to a child less than 18 years of age or to a woman for prenatal or postpartum services. No further breakdown of type of visit was reported.

In the study by Payne and colleagues (1996), home visits to MS patients had a median length of 30 minutes while visits to patients with AIDS had a median length of 40 minutes. Length of MCH visits was not reported. Home health resource use for patients with AIDS was estimated to be 685 hours of nurse time per episode of care, twice that of either MCH or MS patients.

Norr et al., working with mothers of term infants, reported a mean of 1.6 hours of total postdischarge time including one home visit and a clinic visit. One-hour postpartum home visits to women with term infants were reported in a study by Gagnon and colleagues (1997). Brooten and colleagues reported a mean of 189 minutes of APN time providing

postdischarge home visits to women with unplanned cesarean birth. More than half of the women in the study required more than two post-discharge postpartum home visits. Mean time of home visits was 1 hour.

In the Brooten et al. study of women with unplanned cesarean birth, women also received telephone follow-up. Mean telephone time was 13 minutes. In this same study, women with unplanned cesarean birth who experienced infections required a mean of 20 minutes more APN time during hospital visits and a mean of 40 more minutes of APN time during home visits when compared to women without infections. Damato et al. reported a mean of 20.88 hours of APN time postdischarge including one pre-discharge and 5 postdischarge home visits as well as a series of telephone calls and clinic visits.

The literature on nurse time in home healthcare is sparse and uses various definitions for measurement of time, which makes comparisons between studies difficult at best. In addition, many of these studies relied on home care as dictated by the reimbursement plan versus patient need and provider judgment. It is not clear how differently home care would be provided without the constraints of the reimbursement plan. However, one way to evaluate this is to examine home care provided in the course of a research study, where the home care costs are subsumed under the study.

Therefore, the purpose of this study was to examine the time APNs spent in providing care during home visits, telephone calls, and hospital visits to women with medically high-risk pregnancies when the number and type of contacts was determined by patient need and provider judgment rather than reimbursement plan.

Methods

The secondary analysis was part of a randomized clinical trial involving women at high risk of delivering LBW infants. Study subjects included women with gestational diabetes, pregestational diabetes, diagnosed preterm labor, and those at high risk of preterm labor and chronic hypertension. In the trial, one group of women ($n = 86$) received routine prenatal and postpartum care while a second group ($n = 85$) had one half of their prenatal care normally delivered by physicians in the office or clinic substituted with prenatal care delivered in their home by masters prepared APNs. After delivery, the intervention group received APN follow-up care to 6 weeks postdischarge. Women in both groups were followed, for collection of outcome data, from the time of diagnosis of their high risk pregnancy to 12 months postdelivery. The secondary analysis consisted of data from the intervention group of women followed by the APNs only.

During the antenatal period, women in the intervention group had one half of their prenatal care delivered by APNs in each woman's home. Care was alternated by visit or by week. For example, if the woman was to be seen routinely by the physician every other week, every other prenatal care visit was done by the APN in the woman's home. Additionally, throughout the study, women in the intervention group could call the APNs from daily from 8 a.m. to 10 p.m. and from 8 a.m. to noon on Saturday and Sunday to have their questions answered and concerns addressed. During home visits the APNs assessed maternal physical status including vital signs, fetal heart rate, and uterine and fetal activity using electronic monitoring. Maternal health risk behaviors, activity level, emotional status and coping, support systems, and basic environmental support was assessed and appropriate interventions carried out.

Following delivery, the APNs made a minimum of one home visit during the first week postdischarge and weekly telephone calls to 6 weeks postpartum. APN activities during the home visits included:

- a physical assessment of the mother and infant;
- an evaluation of the mother's emotional status as well as her coping with convalescence and parenting;
- determining the mother's support systems
- assessing the family's adjustment to the infant; and
- basic services in the home including heat, electricity, etc.

Previous teaching was reinforced, plans for medical follow-up were reviewed, and appointments were confirmed.

The APNs also contacted the family weekly for 6 weeks postpartum. During the telephone calls the APNs monitored maternal and newborn physical status, maternal emotional status, and family coping. Mothers' questions were answered and mothers were given feedback on their own care as well as their infant's care. Additionally, the APNs could provide extra care if the mother or child required it. For example, if the mother had concerns from prior contacts or if she had a specific concern, the APN could make additional phone calls or home visits to the mother.

All APN interactions with the women and their families during pregnancy, hospitalization for delivery, and throughout the 6 week follow-up period were recorded in chart logs maintained for each family. The direct and indirect care-time spent providing care to each woman and her family was recorded. Direct care-time included:

- teaching;
- counseling;
- providing physical care;
- telephone communication;
- making referrals; and
- time spent with families during home visits and hospital visits.

Indirect time included time spent charting, filing, and completing forms as well as other administrative functions. All time was recorded in minutes.

Sample

Characteristics of the sample ($n = 85$) are presented in Table 1. The sample was drawn from women delivering at a large urban tertiary referral center. Most women were unmarried (88%), had at least a high school education (64%), and had Medicaid health insurance (84%). Ninety-four percent of the women were African American. Women were enrolled in the study when they were diagnosed as having a high risk pregnancy. The mean time of enrollment for women with pregestational diabetes ($n = 8$) was 17 weeks of pregnancy. For women with gestational diabetes ($n = 11$); diagnosed preterm labor ($n = 25$); at high risk of preterm labor ($n = 23$); and chronic hypertension ($n = 18$); mean weeks of pregnancy at enrollment was 28, 28, 20, and 19, respectively.

Results

APN Time Per Patient

Overall, an average total time of 3077.4 minutes ($SD = 159.43$) or 51.3 hours was spent by the APNs in direct and indirect time (Table 2). Total mean direct time was 2015.4 minutes

($SD = 1017.42$) or 33.59 hours while total mean indirect time was 1062.0 minutes ($SD = 456.7$) or 18.42 hours. Indirect time contained in Table 2 includes only charting and travel time.

In comparing APN time consumed per setting, the greatest mean time was spent in the clinic (957.1 minutes or 16.0 hours) followed by charting (772.2 minutes or 12.9 hours), home visits (548.6 minutes or 9.1 hours), telephone time (332.8 or 5.6 hours), travel time (289.8 minutes or 4.8 hours) and hospital visit time (176.9 minutes or 2.9 hours). Clinic visits often lasted in excess of 2 hours. This time was spent by the APNs meeting patient educational needs, answering questions and concerns, functioning as patient advocates, and attempting to move patients through the system. Charting time included patient charting and completing detailed patient logs for research purposes. These patient logs documented verbatim nurse interaction with patients and other providers.

Of the five high risk groups, women with pregestational diabetes consumed most of APN time. Total mean time per patient was 4168.6 minutes ($SD = 1665.44$) or 69.5 hours, followed by women with chronic hypertension ($M = 3790.2$ minutes, $SD = 1361.51$, or 63.2 hours), women at risk of preterm labor ($M = 3464.5$ minutes, $SD = 1324.17$ or 57.7 hours), women with gestational diabetes ($M = 2855.3$ minutes, $SD = 1165.08$, or 47.6 hours), and women diagnosed with preterm labor ($M = 2050.5$ minutes, $SD = 947.9$, or 34.2 hours). In each diagnostic group, as with the total sample, APNs spent most time with women in the clinic setting followed by time in home visits. Time spent with women during hospital visits consumed the least APN time.

Mean Number of Contacts

Overall, the APNs had a mean of 78.0 ($SD = 35.38$) contacts with this sample of women with high risk pregnancies throughout the period of enrollment and follow-up. Women with pregestational diabetes required the highest number of contacts ($M = 109.8$, $SD = 47.86$) followed by women with chronic hypertension ($M = 99.8$, $SD = 29.65$), women at risk of preterm labor ($M = 84.5$, $SD = 33.65$), women with gestational diabetes ($M = 64.5$, $SD = 27.09$), and women diagnosed with preterm labor ($M = 54.8$, $SD = 20.99$) (See Table 3).

Telephone contacts accounted for 65.3% of the total contacts between women and the APNs. The mean number of telephone contacts was 50.9 ($SD = 27.22$). The next most frequent type of contact was home visits ($M = 10.5$, $SD = 5.05$) followed by clinic visits ($M = 10.3$, $SD = 5.57$) and hospital visits ($M = 6.3$, $SD = 4.09$).

Time per Contact

Mean time per type of contact by women's diagnosis is presented in Table 4. Time was greatest per APN contact in the clinic followed by home visits, hospital visits, and telephone contacts.

In order to control for the irregularity of antenatal time enrolled in the study across diagnostic groups, total mean APN time spent in direct and indirect care was divided by days between subject enrollment and delivery. Results are presented in Table 5. Women with gestational diabetes required the greatest amount of APN time per enrolled day while women with diagnosed preterm labor required the least.

Discussion

Currently, comparisons of the time required for home care services are limited by the lack of description of the services provided, including the type of service, length of service, and documented time for the components of the service. The data available in large regional,

state, and national datasets aggregate clients into large diagnostic groupings. Within these groupings is a diversity of patients with varying needs for home care services. Another limitation is that these databases are based on reimbursable services and do not reflect the actual needs of many patients for fewer or more services.

The in-hospital time for discharge planning (176 minutes) was longer than reported by Brooten (1996) with women undergoing unplanned cesarean section (121 minutes), Naylor (1990) with elders (124 minutes), and Norr and colleagues (1989) with term infants (1.6 hours). This is likely due to our study including both antenatal and postpartum hospital stays. However, Damato and colleagues (1993) reported much longer periods of time (6.5 hours) with VLBW infants as a result of the intensive teaching on care of the VLBW infant done in addition to the discharge planning.

Our findings on the number of hours of nursing care differ somewhat from Payne et al. (1996). Payne's group required 13 hours—our group required a mean of 9.1 hours. One obvious reason for this difference is that our group was restricted to women with high risk pregnancies and their postpartum care, whereas Payne's group included care to any child under 18 and/or women for prenatal or postpartum care. Thus, differences between group populations most likely resulted in differing care needs and time differences. However, even for women who were similar to those in our study, the shift from a system where determination of contacts is driven by reimbursement to one that is driven by patient need and provider judgment is a competing explanation for the differences.

The mean number of visits in the present study was 10.5. However, there were group differences within the diagnostic groups with 8.7 visits for women diagnosed with preterm labor and 12.9 for women with pregestational diabetes. Women with pregestational diabetes were enrolled earlier in the pregnancy because of the pre-existing nature of the diabetes while women with preterm labor were not diagnosed with this problem until later in the pregnancy. Earlier enrollment allowed more time for nurse visiting. These findings are dissimilar to those of the Payne group in which the maternal child group received 25.1 visits. Although this could be due to difference in makeup of the groups, it may also reflect the differences in the use of services under a system driven by patient need.

There is consistency in the mean length of the home visit. Norr et al. (1989) working with mothers of term infants reported a mean of 1.6 hours of total discharge time—this included one home visit and one clinic visit, although the time was not broken down. Gagnon and colleagues (1997) reported 1 hour postpartum visits. Brooten (1996) reported mean visit lengths of 1 hour for women following cesarean section. The mean time for all groups in the present study was 53.4 minutes, although again there were subgroup differences. Women diagnosed with preterm labor had home visits with a mean of 44.14 minutes while those with pregestational diabetes had a mean of 65.65 minutes. These subgroup differences warrant further study.

The mean length of telephone contacts has not been widely examined. In the present study, the overall mean for telephone contacts was 6.5 minutes. Subgroup differences were evident with a mean of 5.96 minutes for women diagnosed with preterm labor and a mean of 7.26 minutes for women at high risk of preterm labor in the present study. In the Brooten study, the mean telephone contact time was 13 minutes for women who had unplanned cesarean section. Differences in the length of the phone contact reflect the more frequent calls (an average of 51) to women in this study and the longer periods of time for study participation (prenatal and postpartum versus post-partum only). Continuity with the same provider decreases assessment time in subsequent phone calls and intervention and teaching could be spread over a longer period of time.

Study Limitations and Suggestions for Future Research

The limitations of this study are primarily related to the research focus where there were additional documentation requirements—specifically the log charting of the contacts—which was more extensive than the usual documentation needed in home healthcare. Study results may not be generalizable to other groups of women, such as those of higher socioeconomic status or rural women with high risk pregnancy. Further study is needed to determine if other groups of women may consume similar levels of nurse time.

Conclusions

There is currently insufficient evidence of the type, number, and length of contacts needed with various patient groups without constraints of the current reimbursement system. The current focus in home care on number of visits encourages home visits over telephone contacts when they may not be needed. More research is needed on the optimum balance between visits and telephone contacts in specific patient groups. This study provides information on the number, type, and timing of contacts for women with high risk pregnancies provided in a system free of reimbursement constraints. Home care nurses should track all patient contacts needed in the course of providing care—home visit, telephone, in-hospital—to ensure that negotiated payment reflects the diversity of the kind of contacts home care nurses make with patients.

Changes in home care reimbursement are occurring on many levels. Nursing time and contacts with many patient groups must be examined so that accurate projections of costs and charges can be made.

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Table 1

Sample Characteristics (n = 85)

Maternal Age	Mean	26.55 (<i>SD</i> = 6.34)
	Range	15 – 40
Race	African American	80 (94%)
	White	2 (2%)
	Other	3 (4%)
Education	<High School	31 (37%)
	High School Graduate	25 (29%)
	>High School	29 (34%)
Marital Status	Never Married	67 (79%)
	Married	10 (12%)
	Separated/Divorced/Widowed	8 (9%)
Annual Reported Income ¹	<\$5000	30 (37.5%)
	\$5000 – \$12,499	20 (27.5%)
	\$12,500 – \$19,999	12 (15.0%)
	\$20,000	16 (20.0%)
Type of Health Insurance ²	Public	71 (91%)
	Private	7 (9%)

¹ calculated from n = 80.

² calculated from n = 78.

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Table 2

Mean APN Time By Setting and Patient Diagnostic Group (n = 85)

	In Hospital <i>M (SD)</i>	In Clinic <i>M (SD)</i>	In Home <i>M (SD)</i>	Telephone <i>M (SD)</i>	Charting <i>M (SD)</i>	Total
Gestational Diabetes (<i>n</i> = 11)	168.5 (104.23)	880.8 (529.16)	554.4 (227.59)	235.9 (159.68)	702.4 (215.90)	2855.3 (1165.08)
Pregestational Diabetes (<i>n</i> = 8)	235.4 (180.55)	1284.6 (474.73)	855.4 (387.14)	504.7 (393.73)	1077.4 (439.38)	4168.6 (1655.44)
Diagnosed PTL (<i>n</i> = 25)	112.8 (94.12)	571.1 (401.19)	358.0 (180.89)	210.3 (122.92)	517.5 (223.87)	2050.5 (947.88)
Risk of PTL (<i>n</i> = 23)	207.3 (238.23)	1119.4 (481.43)	603.8 (217.61)	386.2 (233.86)	872.7 (358.96)	3464.5 (1324.17)
Chronic Hypertension (<i>n</i> = 18)	214.1 (110.46)	1237.2 (593.19)	620.1 (281.76)	438.4 (197.71)	970.8 (347.99)	3790.2 (1361.51)
Full Sample	176.9 (159.43)	957.1 (555.22)	548.6 (284.55)	332.8 (231.69)	772.2 (359.20)	3077.4 (1434.12)

Note: Time is indicated in minutes

Table 3

Mean Number of Contacts by Setting and Patient Diagnostic Group (n = 85)

	In Hospital <i>M (SD)</i>	In Clinic <i>M (SD)</i>	In Home <i>M (SD)</i>	Telephone <i>M (SD)</i>	Total <i>M (SD)</i>
Gestational Diabetes (<i>n</i> = 11)	6.33 (3.31)	8.92 (4.50)	10.42 (6.02)	38.83 (20.67)	64.50 (27.09)
Pregestational Diabetes (<i>n</i> = 8)	7.88 (7.14)	12.63 (4.31)	12.88 (4.97)	76.38 (40.96)	109.75 (47.86)
Diagnosed PTL (<i>n</i> = 25)	5.04 (3.26)	6.15 (3.35)	8.73 (5.23)	34.85 (15.11)	54.77 (20.99)
Risk of PTL (<i>n</i> = 23)	6.55 (4.69)	12.00 (5.19)	10.82 (4.07)	55.14 (26.33)	84.50 (33.65)
Chronic Hypertension (<i>n</i> = 18)	7.06 (2.86)	14.29 (5.92)	11.94 (4.85)	66.53 (21.44)	99.83 (29.65)
Full Sample	6.28 (4.09)	10.29 (5.57)	10.54 (5.05)	50.91 (27.22)	78.01 (35.58)

Table 4

Mean Time Per Contact by Setting and Patient Diagnostic Group (n = 85)

	In Hospital <i>M (SD)</i>	In Clinic <i>M (SD)</i>	In Home <i>M (SD)</i>	Telephone <i>M (SD)</i>	Total Mean <i>M (SD)</i>
Gestational Diabetes (<i>n</i> = 11)	26.73 (12.05)	103.45 (33.96)	55.70 (10.85)	6.34 (2.55)	48.05 (8.83)
Pregestational Diabetes (<i>n</i> = 8)	32.18 (13.35)	104.29 (24.98)	65.65 (14.28)	6.09 (1.34)	52.05 (8.24)
Diagnosed PTL (<i>n</i> = 25)	22.08 (11.44)	87.49 (31.82)	44.14 (10.09)	5.96 (1.95)	39.34 (8.69)
Risk of PTL (<i>n</i> = 23)	31.91 (27.22)	96.21 (20.41)	58.22 (15.15)	7.26 (3.75)	48.40 (9.12)
Chronic Hypertension (<i>n</i> = 18)	30.31 (11.23)	83.95 (32.64)	54.03 (20.61)	6.55 (1.95)	43.71 (10.65)
Total	27.87 (17.32)	92.87 (29.64)	53.42 (15.77)	6.48 (2.55)	44.99 10.00

Note: Time is indicated in minutes.

Table 5

Total Mean APN Time per Enrollment Days by Patient Diagnostic Group (n = 85)

Diagnosis	Minutes of APN Time per Enrollment Day <i>M</i> (<i>SD</i>)
Gestational Diabetes (<i>n</i> = 11)	39.3 (36.3)
Pregestational Diabetes (<i>n</i> = 8)	33.2 (14.48)
Diagnosed PTL (<i>n</i> = 25)	25.9 (14.02)
Risk of PTL (<i>n</i> = 23)	38.4 (24.56)
Chronic Hypertension (<i>n</i> = 18)	33.6 (15.5)