The Ontario Mother & Infant Survey
Postpartum Health and Social Service Utilization:
A Five-site Ontario Study

July 2001

Wendy Sword, RN, PhD
Susan Watt, DSW, PhD
Amiram Gafni, PhD
Kyong Soon-Lee, MD, FRCPC
Paul Krueger, PhD
Jacqueline Roberts, RN, MSc
Deborah Sheehan, RN, MSc

Funding provided by:
Canadian Health Services Research Foundation
Public Health Research, Education and Development Program (PHRED), Social and Public
Health Services Division, City of Hamilton, Region of Hamilton-Wentworth,
St. Joseph’s Health Care System Research Network
System Linked Unit on Health and Social Service Utilization, McMaster University,
Funded by the Ontario Ministry of Health and Long-term Care
Contact principal investigators at:

Dr. Wendy Sword, School of Nursing
McMaster University
Hamilton, Ontario
Canada
Telephone: (905) 525-9140, ext. 22307
E-mail: sword@fhs.csu.mcmaster.ca

Dr. Susan Watt, School of Social Work
McMaster University
Hamilton, Ontario
Canada
Telephone: (905) 525-9140, ext. 23792
E-mail: wattms@mcmaster.ca

This document is available on the Canadian Health Services Research Foundation web site (www.chrsf.ca).

For more information on the Canadian Health Services Research Foundation, contact the foundation at:
11 Holland Avenue, Suite 301
Ottawa, Ontario
K1Y 4S1
E-mail: communications@chrsf.ca
Telephone: (613) 728-2238
Fax: (613) 728-3527

Ce document est disponible sur le site Web de la Fondation canadienne de la recherche sur les services de santé (www.fcrss.ca).

Pour de plus amples renseignements sur la Fondation canadienne de la recherche sur les services de santé, communiquez avec la Fondation à l’adresse suivante :
11, avenue Holland, bureau 301
Ottawa, Ontario
K1Y 4S1
Courriel: communications@fcrss.ca
Téléphone : (613) 728-2238
Télécopieur : (613) 728-3527
The Ontario Mother & Infant Survey
Postpartum Health and Social Service Utilization: A Five-site Ontario Study

Co-principal Investigators:
Wendy Sword, RN, PhD
Susan Watt, DSW, PhD

Investigators:
Amiram Gafni, PhD
Kyong Soon-Lee, MD, FRCPC
Paul Krueger, PhD
Jacqueline Roberts, RN, MSc
Deborah Sheehan, RN, MSW

1 School of Nursing, Faculty of Health Sciences, McMaster University
2 PHRED Program, Social and Public Health Services Division, City of Hamilton, Region of Hamilton-Wentworth
3 School of Social Work, McMaster University
4 Centre for Health Economics and Policy Analysis, McMaster University
5 Department of Epidemiology and Biostatistics, McMaster University
6 St. Joseph’s Health Care System Research Network
7 Social and Public Health Services Division, City of Hamilton, Region of Hamilton-Wentworth
8 System Linked Unit on Health and Social Service Utilization, McMaster University
9 St. Joseph’s Hospital, Hamilton, Ontario
10 Hamilton Health Sciences Corporation
11 Department of Paediatrics, McMaster University
12 Career Scientist, Ontario Ministry of Health and Long-term Care

Acknowledgements

Sponsors:
This research was funded by the Canadian Health Services Research Foundation. Co-sponsors are:
Public Health Research, Education and Development Program (PHRED), Social and Public Health Services
Division, City of Hamilton, Region of Hamilton-Wentworth,
St. Joseph’s Health Care System Research Network
System Linked Unit on Health and Social Service Utilization, McMaster University, Funded by the Ontario
Ministry of Health and Long-term Care

The research team wishes to acknowledge the support of our five hospital partners who will continue to remain anonymous.

While sponsors are sources of financial support for this project and for investigators, the results and conclusions are
those of the authors, and no official endorsement by any sponsor is intended or should be inferred.

A sincere thanks to the mothers who participated in TOMIS. We hope that your voices will be heard and heeded.
Key Implications for Decision Makers

These findings have implications for policy makers, program managers, service delivery personnel and the public. They can be used to guide the development of practice and policy recommendations that are client-focused and evidence-based. They also have the potential to reduce costs to the system through appropriate and timely service delivery.

Most healthy mothers and healthy newborn infants stay in hospital 48 hours or less and don’t want to stay longer. Lengths of stay are site variable and dependent upon the characteristics of mothers, newborn infants, and institutional practices.

- Policies need to be flexible and take into account the varying characteristics of mothers and newborn infants.

Short stays are not harmful to mother or baby health. Readmission should not necessarily be seen as a negative outcome of postpartum short stay practices.

- Increasing length of stay is unlikely to decrease readmission rates. Increased community care might prevent some readmissions.
- Readmission may be useful in providing quality care to mothers and newborn infants depending upon access to alternative services.

Community services, other than routine medical services, are not widely used by healthy mothers and newborn infants.

- Few mothers report difficulties in accessing community medical care, but don’t know about other services in their communities. They want more information about community-based services to meet the needs of their newborn infants and themselves.

Qualified professionals see most newborn infants within the time suggested in follow-up guidelines for good practice, with the exception of the guidelines for newborn infants discharged within 48 hours.

- Availability of family physicians appears to influence the extent to which targets are achieved.
- Implementation of practice recommendations should be adapted to the needs and resources of particular communities.

Costs of care for healthy mothers and newborn infants are variable depending upon site and newborn infant readmission practices.

- Community-based care is less costly than inpatient care, with no discernable difference in health status outcomes.
- Readmission policies substantially influence the cost of care for mothers and newborn infants. Readmission is a significant factor in increasing care costs.

Most mothers attempt breastfeeding in hospital and those who stop breastfeeding are likely to do so in the first two weeks following hospital discharge.

- Services both in hospitals and in the community are required to improve breastfeeding continuation rates.

Clinical depression is found in 10% of mothers four weeks after postpartum discharge.

- Provincial antenatal and postnatal programs need to include mental health information and services.
- Attention needs to be given to the mental health needs of mothers even if they do not identify a mental health problem.

Mothers want more information about their own health and about newborn infant health needs.
Executive Summary

This study found that postpartum lengths of stay in hospitals vary according to site and depend on the characteristics of mothers, newborn infants, and institutional practices. Readmission should not necessarily be seen as a negative outcome of postpartum short stay practices.

The Context

A postpartum length of stay of 48 hours or less for women and their newborn infants following vaginal delivery is common practice in Ontario, despite the absence of key outcome information. At the time of the study, there was lack of standardized postpartum community-based programming in the province. There was some evidence that a reduction in hospital stay was associated with increased infant readmission for jaundice and dehydration, and of cost shifting from hospitals to community. Policy statements in support of a flexible length of stay also argued for careful assessment, preparation and community follow-up.

The specific research questions of TOMIS were:

1. What health and social services do postpartum women and their newborn infants use in the first four weeks post-hospital discharge?

2. What are the costs of care for postpartum women and their newborn infants, and who carries these costs?

The Findings

Findings of the study include:

- Lengths of stay are site variable and dependent upon the characteristics of mothers, newborn infants and institutional practices.

- Readmission should not be seen as a negative outcome of postpartum short stay.
• Community services other than routine medical services are not widely used by healthy mothers and newborn infants.

• Follow-up timelines recommended by professionals for newborn infants are being followed more often but the targets are still not being met

• Costs of care vary, depending on site and readmission practices.

• Breastfeeding initiation is high. Up to one in four women discontinue breastfeeding in the first four weeks following hospital discharge.

• Up to 16% of mothers are clinically depressed four weeks after discharge.

These findings have implications for policy makers, program managers, service delivery personnel and the public. They can be used to guide the development of practice and policy recommendations that are client-focused and evidence-based. They also have the potential to reduce costs to the system through appropriate and timely service delivery.

The Approach

The study drew subjects from five acute care hospitals in mid and southern Ontario. The design was a cross-sectional survey of mothers who gave birth in hospital with follow-up at four weeks after discharge from hospital.

The sample for the study included the first 250 eligible, consenting subjects from each site for a total of 1250 subjects. Women were eligible to take part in the study if they: (1) had given birth vaginally to a single live infant; (2) were being discharged from hospital at the same time as their infant; (3) were assuming care of their infant at the time of discharge; and (4) were competent to give consent to participate.
Sources of data included a self-administered questionnaire prior to discharge and a structured telephone interview at four weeks after discharge. Both instruments were available in English, French, Spanish, Italian, Portuguese, Cantonese and Farsi. Overall completion rate for the follow-up telephone interview was 70%.

The Results

*What health and social services do postpartum women and their newborn infants use in the first four weeks post-hospital discharge?*

- Healthy mothers and newborn infants rely mainly on primary medical care and community nursing services during the first four weeks post discharge from hospital.
- The patterns of use (who they use, how often, under what circumstances, for what reasons) are variable from site to site and depend upon the characteristics of the mothers, the newborn infant, and provider practice patterns.

*What are the costs of care for postpartum women and their newborn infants, and who carries these costs?*

- Costs of care in the four-week period following postpartum discharge vary, with readmission being the single largest influence on per capita expenditures.
- Out of pocket expenses in the same period are minimal.
CONTEXT OF THE RESEARCH

By 1998, a postpartum length of stay of 48 hours or less for women and their newborn infants following vaginal delivery had become common practice in Ontario. Hospital and community professionals in many areas had collaborated in an attempt to provide safe, integrated and cost-effective care locally, but were doing so in the absence of key information. There was lack of standardized postpartum programming in the province.\(^1\) Patterns of postpartum health and social service utilization across Ontario were unknown, as were the costs of care for mothers and newborn infants. Therefore, it was important to obtain information about utilization and costs, particularly in relation to maternal and infant health outcomes, to inform evidence-based service planning and policy development.

There was evidence that a reduction in hospital stay was associated with increased infant readmission for jaundice and dehydration.\(^2\) As well, there was evidence of cost shifting from hospitals to community as manifested by increased billings by family physicians for outpatient newborn infant services.\(^3\) The Canadian Paediatric Society and the Society of Obstetricians and Gynecologists of Canada had issued policy statements in support of a flexible length of stay with careful assessment, preparation and community follow-up.\(^4\) However, findings of a pilot study in Hamilton-Wentworth raised concerns about adherence to recommended follow-up guidelines and high use of non-routine care.\(^5\)

The Ontario Mother and Infant Survey (TOMIS) provided information about patterns of health and social services utilization and, hence, expenditures for postpartum women and newborn infants with varying characteristics and living in communities with differing characteristics. The specific research questions were:
3. What health and social services do postpartum women and their newborn infants use in the first four weeks post-hospital discharge?

4. What are the costs of care for postpartum women and their newborn infants, and who carries these costs?

**IMPLICATIONS**

This study gave a voice to postpartum women in determining to what extent their needs were being addressed by current services, with what outcomes and at what costs. The study findings can be used to guide the development of practice and policy recommendations that not only are client-focused and evidence-based, but that also have the potential to reduce costs to the system through appropriate and timely service delivery. Health care planners in the five communities that participated in the study can use the site-specific data to inform local service needs and guide planning to address gaps in service for postpartum women and their infants. Policy makers in both institutional and community sectors also can use the study findings to identify subgroups that may benefit from modifications to current service policies, including targeted outreach for women and infants at risk for poor health outcomes.

TOMIS findings have implications for policy makers, program managers, service delivery personnel and the public (see Table I). However, there are limitations to the study to be noted. Because a convenience sample of women who had given birth vaginally to a live, singleton infant who was being discharged with mother from hospital was used, caution is warranted in generalizing the findings to the wider population. Moreover, the findings highlight site-to-site variability, suggesting that the needs of postpartum mothers and newborn infants living in specific communities need to be considered in planning policy and service.
<table>
<thead>
<tr>
<th>MESSAGE</th>
<th>POLICY MAKERS</th>
<th>MANAGERS</th>
<th>SERVICE PROVIDERS</th>
<th>THE PUBLIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTHS OF STAY are site variable and dependent upon the characteristics of mothers, newborn infants and institutional practices.</td>
<td>Policies need to be flexible and take into account the varying characteristics of mothers and newborn infants.</td>
<td>The site-specific characteristics of mothers and newborn infants need to be included in planning for LOS.</td>
<td>The optimal LOS for mothers and newborn infants need to be individually assessed and take into account their available social supports.</td>
<td>Short stay is not harmful to the health status of either mothers or newborn infants.</td>
</tr>
<tr>
<td>READMISSION should not be seen as a negative outcome of postpartum short stay.</td>
<td>Increasing LOS is unlikely to decrease readmission rates. Increased community care might prevent some readmissions.</td>
<td>Readmission may be useful in providing quality care to mothers and newborn infants depending upon access to alternative services.</td>
<td>Readmission should be considered as one resource available to meet the needs of mothers and newborn infants.</td>
<td>The vast majority of mothers and newborns are not readmitted to hospital. Readmissions are of short duration and cannot be predicted.</td>
</tr>
<tr>
<td>COMMUNITY SERVICES other than routine medical services are not widely used by healthy mothers and newborn infants.</td>
<td>Mothers and newborn infants do not necessarily live in close proximity to their birth hospital and cannot rely on services from this location. Few mothers report difficulties in accessing community medical care, but don’t know about other services in their communities.</td>
<td>Mothers want more information about community-based services to meet the needs of their newborn infants and themselves.</td>
<td>Community providers should address the information needs of mothers, pre- and post-discharge.</td>
<td>Mothers and newborn infants need to be supported by adequate and accessible community services.</td>
</tr>
</tbody>
</table>
### MESSAGE | POLICY MAKERS | MANAGERS | SERVICE PROVIDERS | THE PUBLIC
---|---|---|---|---
**NEWBORN INFANT FOLLOW-UP**
practices are changing but targets are not yet being met.

- Recommendations for newborn infant follow-up from professional bodies appear to be effective in changing practice. Availability of family physicians appears to influence the extent to which targets are achieved.
- Implementation of practice recommendations should be adapted to the needs and resources of particular communities.
- Physicians are not seeing many babies who are discharged within 48 hours of birth in a timely manner. Community nurses may be the only professionals seeing many of these babies.
- All newborn infants should be seen by a qualified provider within 7 days of hospital discharge or within 48 hours if discharge was within 48 hours of birth.

**COSTS OF CARE**
are variable depending on site and readmission practices.

- Community-based care is less costly for this group than inpatient care, with no discernable difference in health status outcomes.
- Readmission policies substantially influence the cost of care for mothers and newborn infants. Readmission is a significant factor in increasing care costs.
- Interventions that enhance social resources of mothers may reduce health service costs.
- The majority of costs for maternal and child health care in the postpartum period are paid for by provincial health insurance.

**BREASTFEEDING**
initiation is high. Up to one in four women discontinue breastfeeding in the 1st four weeks following hospital discharge.

- Efforts to increase breastfeeding initiation rates have been successful. Attention needs to be given to appropriate LOS and community services to support breastfeeding continuation.
- Services both in hospital and in the community are required to improve breastfeeding continuation rates.
- Mothers require adequate information and support in the immediate postpartum period to promote longer breastfeeding duration.
- Breastfeeding is a skill that requires information, practice and support for success.

**MATERNAL DEPRESSION**
Up to 16% of mothers are clinically depressed four weeks after discharge.

- Provincial antenatal and postnatal programs need to include mental health information and services.
- Attention needs to be given to the mental health needs of mothers even if they do not identify a mental health problem.
- Visits with newborn infants and mothers need to include assessment of mothers. Early onset depression needs to be identified in order to initiate appropriate intervention.
- Depression is not uncommon in the first month following delivery.
- Mothers of newborn infants can benefit from social support.
The findings presented are based primarily on analyses of association between service utilization and a variety of independent variables. As such, the analyses of service use and health outcomes completed to date (with the exception of that reported under “Additional Analyses”) does not take into account the complexity of interactions among variables. Finally, it is important to note that the data were gathered prior to the expansion of the Healthy Babies, Healthy Children Program in October 1999, providing all women the option of a 60 hour length of stay postpartum and a public health nurse telephone call within 48 hours of discharge and the offer of a home visit.

THE APPROACH

Study Setting
Ontario had a population of 11.25 million and approximately 146,310 births annually (Statistics Canada, 1997). Five sites across the province were selected to provide a cross section of mothers and newborn infants with diverse characteristics and access to varying health and social services. The sites are described in Table II.

<table>
<thead>
<tr>
<th>Site</th>
<th>Characteristics</th>
<th>Annual Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td>Large central east suburban teaching centre, metropolitan catchment area</td>
<td>3900</td>
</tr>
<tr>
<td>Site 2</td>
<td>Small central east centre regional centre, urban and rural catchment area</td>
<td>1500</td>
</tr>
<tr>
<td>Site 3</td>
<td>Large central west regional centre, urban and rural catchment area</td>
<td>4500</td>
</tr>
<tr>
<td>Site 4</td>
<td>Large central east teaching hospital, metropolitan catchment area</td>
<td>2700</td>
</tr>
<tr>
<td>Site 5</td>
<td>Small central north regional centre, urban and rural catchment area</td>
<td>2000</td>
</tr>
</tbody>
</table>

Study Design

This study was based upon a pilot study in Hamilton-Wentworth. The design was a cross-sectional survey of mothers who gave birth in hospital with follow-up at four weeks after discharge from hospital.

Study Sample

The sample for the study included the first 250 eligible, consenting subjects from each site for a total of 1250 subjects. Women were eligible to take part in the study if they: (1) had given birth vaginally to a single live infant; (2) were being discharged from hospital at the same time as their
infant; (3) were assuming care of their infant at the time of discharge; and (4) were competent to give consent to participate. Women who were unable to speak English were included in the sample, thereby adding important information often lost in studies using only English-language questionnaires.

**Sources of Data**

Participants completed a self-administered questionnaire prior to discharge and a structured telephone interview at four weeks after discharge. The questionnaire addressed sociodemographics, use of prenatal services, medical problems since giving birth, chronic health problems, concerns at time of discharge, infant birth weight and gestation, infant feeding, infant health problems, infant’s medical care provider in hospital, services or supports mothers expected to rely on after discharge, scheduled follow-up appointments, readiness for discharge, and perceived adequacy of help available at home. The structured telephone interview incorporated questions about postpartum length of stay, satisfaction with length of stay, information needs, maternal and infant health, social support, infant feeding, type and frequency of services used post-discharge, service accessibility, satisfaction with services both in hospital and in the community, re-hospitalization, medication and lab test costs, and out-of-pocket expenditures. The interview schedule included the Edinburgh Postnatal Depression Scale as well as questions from both the 1990 Ontario Health Survey and the Health and Social Service Utilization Questionnaire. Both the self-administered questionnaire and the interview were available in seven languages: English, French, Spanish, Italian, Portuguese, Cantonese and Farsi.

**Response Rates**

Recruitment for the study began in November 1998 and was staggered across the five sites. Data collection was completed in June 1999. A total of 1250 women were recruited with 875 (70%) completing the follow-up interview. The study completion rate for each site is reported in Table III.
Table III. Study Completion Rates

<table>
<thead>
<tr>
<th></th>
<th>Site 1 (%)</th>
<th>Site 2 (%)</th>
<th>Site 3 (%)</th>
<th>Site 4 (%)</th>
<th>Site 5 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone interview completed</td>
<td>65.6</td>
<td>80.0</td>
<td>83.6</td>
<td>54.8</td>
<td>66.0</td>
</tr>
<tr>
<td>Refused interview</td>
<td>8.4</td>
<td>2.0</td>
<td>1.2</td>
<td>6.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Unable to contact</td>
<td>23.6</td>
<td>16.8</td>
<td>12.0</td>
<td>18.8</td>
<td>31.6</td>
</tr>
<tr>
<td>Language barrier</td>
<td>2.4</td>
<td>0.4</td>
<td>1.2</td>
<td>5.2</td>
<td>0</td>
</tr>
<tr>
<td>Questionnaires returned too late for follow-up</td>
<td>0</td>
<td>0.8</td>
<td>2.0</td>
<td>15.2</td>
<td>0</td>
</tr>
</tbody>
</table>

Analysis Techniques

The characteristics of women who completed the interview were compared with those of women who could not be followed up at four weeks post-hospital discharge. The data were analyzed to determine both services used by participants and maternal and infant health outcomes. Accepted techniques were used to establish relationships among participant characteristics, service utilization outcomes, and maternal and infant health outcomes. Further analyses that took into account multiple variables were conducted to determine what factors predicted particular outcomes (e.g., newborn infant readmission to hospital). Costs of care were established using a standard costing formula.9

Following preliminary data analysis, two sets of focus groups were held at each site. The purpose of the first focus group was to present site-specific data for initial feedback on the survey results for mother/infant dyads recruited through the local institution. These focus groups also assisted the research team with data interpretation. At the second set of focus groups, the data for all five sites were presented, thereby providing an opportunity for practitioners and decision makers to compare and contrast the findings specific to their site to the findings in other locales. Participants in the focus groups included hospital personnel (e.g., nurses, physicians), community care providers (e.g., public health nurses, midwives, Victorian Order of Nurses, St. Elizabeth’s Nurses) and institutional (e.g., unit administrators, chiefs of service) and local service policy makers (e.g., Healthy Babies, Healthy Children Program coordinators).
THE RESULTS

Description of Study Participants
A profile of women who took part in the interview and their infants is presented in Table IV.
The characteristics of women and infants who participated did not differ significantly from those of women and infants who were lost to follow-up.

Table IV. Profile of Participants (n=250 at each site)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Site 1 (%)</th>
<th>Site 2 (%)</th>
<th>Site 3 (%)</th>
<th>Site 4 (%)</th>
<th>Site 5 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>87.6</td>
<td>71.9</td>
<td>88.4</td>
<td>82.4</td>
<td>62.0</td>
</tr>
<tr>
<td>Common-law/living with partner</td>
<td>8.4</td>
<td>18.5</td>
<td>9.2</td>
<td>12.0</td>
<td>21.6</td>
</tr>
<tr>
<td>Single/widowed/separated/divorced</td>
<td>4.0</td>
<td>9.6</td>
<td>2.4</td>
<td>5.6</td>
<td>16.4</td>
</tr>
<tr>
<td>Family income before taxes¹:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$20,000</td>
<td>13.2</td>
<td>19.2</td>
<td>7.2</td>
<td>20.8</td>
<td>21.2</td>
</tr>
<tr>
<td>$20,000 to $39,999</td>
<td>18.0</td>
<td>23.7</td>
<td>10.8</td>
<td>21.2</td>
<td>20.0</td>
</tr>
<tr>
<td>$40,000 to $59,999</td>
<td>14.0</td>
<td>28.9</td>
<td>25.2</td>
<td>19.2</td>
<td>20.4</td>
</tr>
<tr>
<td>$60,000 to $79,999</td>
<td>14.4</td>
<td>12.9</td>
<td>24.8</td>
<td>16.4</td>
<td>14.8</td>
</tr>
<tr>
<td>$80,000+</td>
<td>32.4</td>
<td>11.2</td>
<td>28.8</td>
<td>13.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Cultural group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canadian</td>
<td>34.5</td>
<td>90.0</td>
<td>84.4</td>
<td>31.2</td>
<td>87.2</td>
</tr>
<tr>
<td>Other</td>
<td>65.5</td>
<td>10.0</td>
<td>15.6</td>
<td>68.8</td>
<td>12.8</td>
</tr>
<tr>
<td>Language spoken most often at home:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>62.0</td>
<td>96.8</td>
<td>96.4</td>
<td>66.0</td>
<td>88.8</td>
</tr>
<tr>
<td>French</td>
<td>0.4</td>
<td>0.4</td>
<td>0.0</td>
<td>1.2</td>
<td>10.0</td>
</tr>
<tr>
<td>Other</td>
<td>37.6</td>
<td>2.8</td>
<td>3.6</td>
<td>32.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Highest level of education:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>20.1</td>
<td>28.0</td>
<td>19.6</td>
<td>32.4</td>
<td>26.2</td>
</tr>
<tr>
<td>Completed community college or technical school</td>
<td>28.5</td>
<td>48.0</td>
<td>36.4</td>
<td>30.0</td>
<td>46.4</td>
</tr>
<tr>
<td>Some university</td>
<td>8.0</td>
<td>4.0</td>
<td>6.8</td>
<td>8.0</td>
<td>6.0</td>
</tr>
<tr>
<td>University degree</td>
<td>43.4</td>
<td>20.0</td>
<td>37.2</td>
<td>29.6</td>
<td>21.3</td>
</tr>
<tr>
<td>Maternal age:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.3</td>
<td>29.2</td>
<td>30.7</td>
<td>30.2</td>
<td>27.4</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>4.5</td>
<td>5.6</td>
<td>4.6</td>
<td>5.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Min/Max</td>
<td>17/43</td>
<td>17/43</td>
<td>18/42</td>
<td>16/44</td>
<td>16/42</td>
</tr>
<tr>
<td>Infant birth weight (grams):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3409</td>
<td>3626</td>
<td>3552</td>
<td>3418</td>
<td>3509</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>472</td>
<td>464</td>
<td>449</td>
<td>452</td>
<td>473</td>
</tr>
<tr>
<td>Min</td>
<td>2381</td>
<td>2410</td>
<td>2381</td>
<td>2200</td>
<td>2005</td>
</tr>
<tr>
<td>Max</td>
<td>4876</td>
<td>5021</td>
<td>4835</td>
<td>4700</td>
<td>4876</td>
</tr>
</tbody>
</table>
Gestation:

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Min/Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>39.5</td>
<td>1.4</td>
<td>35/42</td>
</tr>
<tr>
<td>2</td>
<td>39.9</td>
<td>1.2</td>
<td>36/42</td>
</tr>
<tr>
<td>3</td>
<td>39.8</td>
<td>1.4</td>
<td>34/42</td>
</tr>
<tr>
<td>4</td>
<td>39.4</td>
<td>1.7</td>
<td>29/42</td>
</tr>
<tr>
<td>5</td>
<td>39.6</td>
<td>1.4</td>
<td>33/42</td>
</tr>
</tbody>
</table>

1 Valid percentages reported 7.4% of total sample did not report family income
2 35.6% Chinese
3 18.0% Portuguese
4 55.8% Chinese speaking
5 22.4% Portuguese speaking, 12.9% Polish speaking, 11.8% Spanish speaking

**Health and Social Service Utilization**

There were marked differences in utilization of both hospital and community-based services across the five study sites, including: length of stay; readmission to hospital; use of emergency departments and walk-in clinics; use of specialists (obstetricians and paediatricians); routine newborn infant follow-up; community health nurse visits; and, use of other community services. Further, specific characteristics of mothers and infants were found to be associated with differences in service utilization. The characteristics selected for analyses included:

1. language spoken at home (English or French vs. other);
2. family income (<$20,000 vs. $20,000+);
3. partnered vs. non-partnered;
4. age (<21, 22-34 and 35+ years);
5. education (high school or less vs. >high school);
6. first live birth vs. second or subsequent birth;
7. mother’s assessment of readiness for discharge;
8. maternal learning needs (0-5 vs. 6+);
9. perceived adequacy of help at home;
10. postpartum depression (Edinburgh Postnatal Depression Scale score 12+ vs. <12);
11. self-reported health status;
12. infant birth weight (<2500 grams vs. 2500+ grams);
13. feeding method (breast vs. bottle); and,
14. infant health status as reported by mother.

In the following discussion of findings, only those characteristics found to be associated with utilization at a statistically significant level of p < 0.05 are reported.

**Length of Stay.** Although the length of postpartum hospital stay for the majority of mothers and infants was 48 hours or less in all five sites, the percentage of those who stayed more than 48 hours varied significantly (see Table V). Most women (74.8% to 87.2%) perceived that they and their infants
were ready for discharge at the time they completed the self-report questionnaire in hospital. At four weeks following hospital discharge, 59.8% to 86.0% of women reported satisfaction with their length of stay. Language spoken at home (English or French) and first live birth were associated with a length of stay greater than 48 hours as were lack of readiness for discharge and perception of inadequate help and support at home. A stay of more than 48 hours also was associated with an infant birth weight of less than 2500 grams and formula feeding at four weeks post discharge.

Table V. Postpartum Length of Stay

<table>
<thead>
<tr>
<th>Length of Stay</th>
<th>Site 1 n=164 (%)</th>
<th>Site 2 n=200 (%)</th>
<th>Site 3 n=209 (%)</th>
<th>Site 4 n=137 (%)</th>
<th>Site 5 n=165 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 24 hours</td>
<td>59.1</td>
<td>11.0</td>
<td>32.5</td>
<td>45.3</td>
<td>23.6</td>
</tr>
<tr>
<td>25-48 hours</td>
<td>39.7</td>
<td>67.5</td>
<td>59.3</td>
<td>49.9</td>
<td>40.6</td>
</tr>
<tr>
<td>&gt; 48 hours</td>
<td>1.2</td>
<td>21.5</td>
<td>8.1</td>
<td>5.8</td>
<td>35.8</td>
</tr>
</tbody>
</table>

Readmission to Hospital. Maternal readmission to hospital ranged from 0% to 2%, and was not necessarily related to complications of pregnancy or childbirth. Newborn infant readmission ranged from 1.4% to 6.7%. Maternal characteristics associated with infant readmission included: language spoken at home was other than English or French; has partner; did not feel ready for discharge; perceived inadequate of help and support available at home; and rated their own health as poor. There also was an association between readmission and infant birth weight, with babies weighing less than 2500 grams being more likely to have been readmitted in the four weeks following initial discharge despite these infants had longer lengths of stay following delivery. Maternal assessment of infant health also was associated with infant readmission. Babies who were readmitted were more likely to have been viewed by their mothers as being in good/fair or poor health as opposed to very good or excellent health. Most readmissions were for less than three days. The reasons for admission as reported by mothers are found in Table VI.
Table VI. Reasons for Newborn Infant Readmissions

<table>
<thead>
<tr>
<th>Reason</th>
<th>Site 1 (n=164)</th>
<th>Site 2 (n=200)</th>
<th>Site 3 (n=209)</th>
<th>Site 4 (n=137)</th>
<th>Site 5 (n=165)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readmissions¹</td>
<td>11 (6.7%)</td>
<td>6 (3.0%)</td>
<td>3 (1.4%)</td>
<td>6 (4.4%)</td>
<td>9 (5.5%)</td>
</tr>
<tr>
<td>Jaundice</td>
<td>63.6</td>
<td>16.7</td>
<td>33.3</td>
<td>33.3</td>
<td>16.7</td>
</tr>
<tr>
<td>Infection</td>
<td>0.0</td>
<td>33.3</td>
<td>33.3</td>
<td>16.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Respiratory problem</td>
<td>9.1</td>
<td>33.3</td>
<td>33.3</td>
<td>16.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Gastrointestinal problem</td>
<td>9.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Other²</td>
<td>18.2</td>
<td>16.7</td>
<td>0.0</td>
<td>33.3</td>
<td>0.0</td>
</tr>
</tbody>
</table>

¹Up to 2 reasons reported by mother for each readmission
²Reported as percentage of readmissions
³Examples of other reasons included colostomy, low temperature and fever

Use of Emergency Rooms and Walk-in Clinics. Use of these non-routine services for both maternal and infant health concerns differed significantly among sites. Maternal utilization ranged from 8.1% to 23.0% and was associated with a family income of less than $20,000, first live birth, perceived inadequacy of help and support at home, six or more identified learning needs and fair or poor versus good, very good or excellent self-reported health status. The use of emergency rooms and walk-in clinics for infant health reasons ranged from 3.6% to 12.7% and was associated with a length of stay of more than 48 hours. Infants seen by a physician within seven days of discharge were less likely to have used these resources but this association was not found in relation to physician visit within 48 hours of discharge. Reasons for emergency room and walk-in clinic visits for infants paralleled the reasons reported for hospital readmission.

Specialist Care. Use of specialists for both maternal and infant health needs in the first four weeks following postpartum hospital discharge varied across sites at a statistically significant level. Between 2.5% and 12.4% of women visited obstetricians whereas between 7.2% and 52.4% of infants were seen by paediatricians. During the focus groups, we learned that obstetrician and paediatrician use was related to common patterns of practice at particular sites. For example, it was much more
likely for a paediatrician to provide routine infant follow-up in the two metropolitan sites where it was
standard practice than in the three urban/rural sites (52.4% and 42.3% versus 7.2%, 7.3% and 14.0%).
specific maternal characteristics found to be associated with obstetrician use in the first four weeks
post-discharge were language spoken at home other than English or French and identification of six or
more learning needs. Maternal evaluation of infant health status was associated with visits to a
paediatrician; infants with paediatrician contact were likely to be perceived as less healthy by their
mothers. Infant visits to a paediatrician were associated with readmission to hospital with between
55.6% and 66.7% of readmitted babies having been seen by a paediatrician within four weeks of post-
delivery hospital discharge.

**Routine Newborn Infant Follow-up.** Given the recommendations of the Canadian Paediatric
Society and the Society of Obstetricians and Gynecologists of Canada, we examined the proportion of
infants seen by a physician or midwife within recommended time periods. Most infants (64.4% to
96.2%) were seen within seven days following initial hospital discharge as recommended. However,
there was significant variability depending upon site. Participants in the focus groups at some sites
identified inadequate numbers of family physicians as hindering adherence to recommendations.
Babies discharged from hospital within 48 hours and who were breastfeeding at four weeks post-
discharge were more likely to have been seen within seven days than those infants with longer lengths
of stay or who were formula fed. Between 13.9% and 46.8% of babies discharged within 48 hours of
birth were seen by a physician or midwife within 48 hours as recommended. Adherence to the
recommendation from a coroner’s inquest that breastfeeding infants be seen within seven days of age
ranged from 58.7% to 94.7%.

**Community Health Nurse Visits.** Community nurse home visits to mothers and newborn
infants were associated with site, with between 7.2% and 55.5% having received visits. A number of
maternal and infant characteristics were found to be associated with community health nurse visits:
length of stay 48 hours or less; language spoken at home other than English or French; first live birth;
postpartum depression; self-reported maternal health status fair/poor; lack of readiness for discharge; perceived inadequacy of help and support at home; six or more learning needs; and breastfeeding at four weeks. Use of the Healthy Babies, Healthy Children Program in all five sites was very low. Between 0.6% and 6.7% of mothers and infants received a visit or phone call through this program. However, this finding was not unexpected given that, at the time of data collection, the program was available only to those woman and infants determined to be at “high risk”.

Use of Other Community Services. Use of other community health and social services, such as nutritionists, lactation consultants, social workers and chiropractors, was limited in all five sites. Very few “other” services of any type were used by either mothers or newborn infants.

Cost of Care

Among the different hospital sites, there was a range in the average per person total cost of health and social service utilization excluding hospitalization readmissions ($207 to $355), and for costs including hospitalization readmissions ($327 to $665) for mother and baby in the first four weeks following postpartum hospital discharge (see Table VII). The average per person total cost was not statistically significantly different between sites. In total, slightly less than 5% of babies and 1% of mothers were re-hospitalized during the first four weeks after postpartum discharge. Although hospital costs for these mothers and babies were extensive, readmission costs to hospital ranged between $0 and $72 on average per person over the four weeks in the different sites. Further, there was wide variability (high standard deviations) in the cost of all utilization per mother/baby dyad when hospital readmission costs were included. Notable differences in readmission rates accounted for these variations.

| Table VII. Total Health and Social Service Utilization Costs for Mother and Infant |
|-------------------------------------|--------|--------|--------|--------|--------|
| Site 1 n=164 | Site 2 n=200 | Site 3 n=209 | Site 4 n=137 | Site 5 n=165 |
| Health/social service utilization cost (excluding hospitalization readmissions) | X ($) | SD | X ($) | SD | X ($) | SD | X ($) | SD | X ($) | SD |
| 298 | 206 | 207 | 232 | 285 | 213 | 355 | 244 | 286 | 228 |
There were eight variables that correlated with total health and social service utilization costs for mother and infant during the first four weeks post discharge after delivery. Overall costs were lower if the mother: (1) spoke English or French at home; (2) had a partner; (3) had a family income of > $20,000; (4) reported her health to be good or excellent; (5) reported her baby’s health to be good to excellent; (6) perceived adequate help and support available at home; (7) had a lower depression score; and, (8) had fewer learning needs. These mother and baby characteristics were entered into a stepwise forward regression analysis and five variables, in the following order, were predictive of lower costs: baby’s health; perceived adequacy of help and support at home; partnered status; number of learning needs; and, depression scores. Of interest is the fact that mothers who were depressed cost more than twice the amount for health and social services per mother compared with mothers who were not depressed ($845 versus $412) and those without partners cost almost three times the amount compared with women with partners ($1221 versus $434).

Some women indicated that they paid extra costs in the postpartum period for medical supplies and services not covered by health insurance. For example, 191 mothers reported that they paid extra for items such as upgrades to semi-private or private rooms, circumcisions, lactation consultant and physicians’ fees. However, the out of pocket expenditures for all women in the study were minimal at $21 per person on average for pre natal care, $29 for in hospital care and $21 for postpartum care during the first 4 weeks at home.
ADDITIONAL ANALYSES

In preparation of papers for publication, more detailed analyses have been completed in relation to mothers’ information needs, newborn infant readmission to hospital, postpartum depression and breastfeeding. Abstracts for these four papers are presented below.

1. Information Needs of New Mothers: Implications for Community Care Providers

A shortened postpartum hospital stay has reduced access to nursing care that traditionally focused on the identification and treatment of medical complications, health promotion and patient education. The findings of the Ontario Mother and Infant Survey regarding postpartum learning needs have implications for ensuring that these needs are adequately met. At four weeks following discharge from hospital, 875 study participants were asked if they would have liked to have learned more about specific topics generally addressed during postpartum in-hospital teaching. Topics consistently identified by women recruited from each of five study sites, and ranked highest in four sites, were: signs of illness in infant (43.1% to 72.3%); infant care and behaviour (32.5% to 56.2%); and physical changes and self care (27.3% to 56.9%). Other frequently identified topics were breastfeeding, emotional changes, and community supports and services, although mothers more variably endorsed these topics. It is important that health professionals in the community determine maternal information needs and provide appropriate resources to enhance post-discharge teaching. This is especially the case given the potential for greater maternal receptivity during this period.

2. Understanding Newborn Infant Readmission to Hospital: Findings of the Ontario Mother and Infant Survey

The Ontario Mother and Infant Survey examined health and social service utilization of postpartum women and newborn infants from five hospital sites. A cross-sectional multi-language survey design with longitudinal follow-up was used. Twelve hundred and fifty (1250) eligible, consenting women completed a
self-report questionnaire in hospital and 875 women participated in a structured telephone interview at four weeks post-discharge. Rates of newborn infant readmission ranged from 1.4% to 6.7%. The best predictors of readmission were: main source of household income was other than employment; maternal rating of own health was poor; mother anticipated inadequate help at home following discharge; mother received help from friends/neighbours following discharge; and maternal concern about infant care and behaviour. Readmission was not associated with length of postpartum hospital stay. The study findings suggest that there is a complex relationship between infant health care needs, family resources and provider practices that produces site-specific readmission patterns.

3. Early Identification of Signs of Postpartum Depression by Primary Care Providers: Implications from the Ontario Mother and Infant Survey

In a cross-sectional study of 875 Ontario mothers of newborn infants, clinical depression, as determined by a score of 12+ on the Edinburgh Postnatal Depression Scale, was found in 4.3% to 15.9% of the women in each of five sample groups at four weeks after postpartum hospital discharge. This depression was strongly associated with a lack of social resources, including affective and confidante support, and adequate income. It was not related to length of hospital stay, parity, community service utilization, including infant or maternal readmission, or mother’s own assessment of her mental health. Depressed mothers were more likely to view their own and their newborn infant’s health as less than optimal, and to endorse a range of learning needs. This was in contrast with non-depressed women who viewed their babies and themselves as healthy and identified specific, baby-focused learning needs. Mothers at risk for early postpartum depression, if given the opportunity, may convey health concerns to family physicians, paediatricians, community nurses, and midwives that seem out of proportion to the professional’s assessment of their health status. Newborn infant assessments, performed by primary care providers, afford an excellent opportunity for early identification of postpartum depression and initiation of appropriate interventions with mothers.
4. The Ontario Mother and Infant Survey: Breastfeeding Initiation and Continuation

Of the 875 women who completed the follow up interview, 777 (88.8%) attempted to breastfeed. Breastfeeding initiation rates varied from 82 - 96% in the five study sites. Within two days postpartum, 7-16% of respondents had stopped breastfeeding. There were continued rapid declines in breastfeeding with 13-24% of the women switching to formula by four weeks post discharge, the majority (42-63%) stopping within the first seven days. The majority of women who did not attempt to breastfeed identified discomfort with breastfeeding as the main reason for choosing to formula feed. Perceived inadequate milk supply, difficulty with breastfeeding techniques, and sore nipples were the main reasons that women stopped breastfeeding. Of the women who discontinued breastfeeding within the first four weeks post discharge, 26-67% identified they would have liked to have learned more about breastfeeding while in hospital. Mothers who were supplementing with formula at the time of discharge were five times more likely to have stopped breastfeeding by four weeks postpartum. Risk factors for early cessation of breastfeeding included: intention to breastfeed for less than four months; expected use of a mom's group postpartum; less than high school completion; visits to family practitioner; uncertainty about being able to breastfeed for the intended length of time; and, information provided about formula feeding. It is apparent that breastfeeding is a skill that requires information and support in the early postpartum period if it is to be successfully initiated and sustained.
ADDITIONAL RESOURCES

Publications


Presentations


Watt S, Sword W. Toronto, ON: Meeting with Representatives of the Ontario Ministry of Health and Long-Term Care, April 2000.


Sword W, Watt S. Dundas, ON: Hamilton-Wentworth Regional Postpartum Advisory Committee Meeting, October 1999.

Other information dissemination efforts

- Meeting with researchers from Ottawa and Kingston to discuss expansion of TOMIS to these sites
- Five-site Technical Reports
- Hamilton Spectator Interview
- CBC Radio Interviews
- McMaster University Press Release
- Focus groups presenting site-specific data in relation to other sites (four sites)
- Focus groups presenting preliminary site-specific data (five sites)

FURTHER RESEARCH

Further analyses of TOMIS data are planned to prepare additional focus-specific papers for publication.

These papers will address the following issues:

1. service utilization by postpartum women of low income and their infants;
2. impact of ethnicity and language on service utilization by mothers with newborn infants;
3. variability in costs and service utilization by healthy mothers and newborn infants;
   and,
4. newborn infant follow-up patterns in relation to health outcomes.

Areas for future study include:

1. comparison of local implementation of universal primary prevention strategies (Healthy Babies, Healthy Children case study);
2. the impact of the expansion of the Healthy Babies, Healthy Children Program to provide all women the option of a 60 hour postpartum length of stay as well as a public health nurse telephone call within 48 hours of discharge and offer of a home visit on service utilization and health outcomes;
3. postpartum service utilization and health outcomes for women with Caesarean section delivery and their infants;
4. depression in the postpartum period as distinct from pre-existing depression and postnatal distress in response to challenging circumstances in the absence of social support resources;

5. examination of the effectiveness of community interventions on early onset depression in postpartum women;

6. development and testing of strategies to enhance compliance with practice recommendations for newborn infant follow up;

7. the effects of social support screening and intervention on health status (including early postpartum depression), health and social service utilization and costs in the postpartum period; and,

8. the effectiveness of different strategies to meet the information needs of mothers in the postpartum period.
REFERENCES AND BIBLIOGRAPHY


ADDITIONAL READING MATERIAL