PAMR

Pregnancy-Associated Mortality Review

Florida Department of Health

Pregnancy-Related Deaths during the Postpartum Period, 1999-2011

Pregnancy-related complications can occur in the postpartum period beginning immediately after birth and up to one year. Postpartum disorders can lead to physical discomfort, psychological distress, and even maternal death. Early identification and treatment through the provision of quality postpartum care is important in the prevention of maternal deaths[1]. This brief presents information about pregnancy-related postpartum deaths that occurred in Florida between 1999 and 2011.

Florida's Pregnancy-Associated Mortality Review (PAMR) is an ongoing system of surveillance that collects and analyzes information related to maternal deaths in order to promote system improvements through evidence-based actions aimed to prevent future untimely deaths[2]. During 1999-2011, the PAMR review team classified 509 cases as pregnancy-related deaths[2]. Figure 1 shows the distribution of these 509 deaths during the prenatal (before delivery), labor/delivery, and postpartum periods. The majority of the deaths, 398 (78%), occurred during the postpartum period.

The early postpartum period (0-42 days) is most critical to maternal survival. The American Academy of Pediatrics, American Congress of Obstetricians and Gynecologists, and the American College of Nurse Midwives recommend that every postpartum woman should follow-up with her physician within 4-6 weeks after delivery or within 7-14 days after a cesarean delivery or complicated delivery[3].

Between 1999 and 2011, 330 (85%) maternal deaths occurred early in the postpartum period and 56 (15%) occurred later (43-365 days) in the postpartum period (See Figure 2).

Many women are discharged home with the standard instruction to return in 6 weeks for a follow-up visit. However, for some women this may be too late, as 62% (241) of postpartum deaths occurred during the first 2 weeks. Of the postpartum deaths that occurred during the first 2 weeks after a live birth or fetal demise, 24% died after hospital discharge and 76% died before hospital discharge.

Figure 2. Postpartum Time Distribution of Pregnancy Related Deaths, 1999-2011 (n=398)

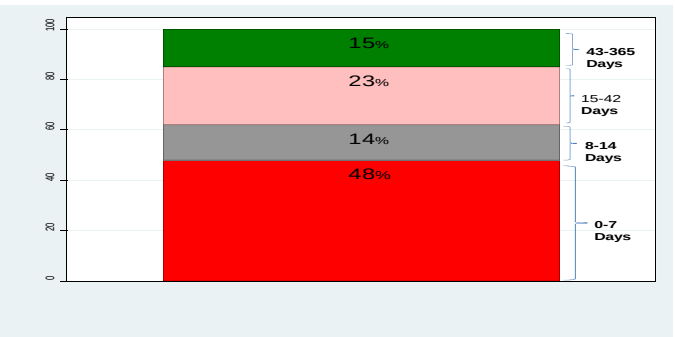
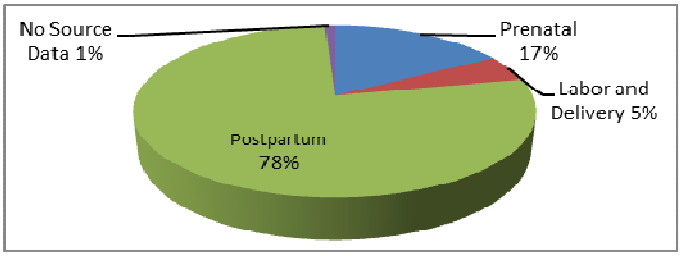


Figure 1. Time Distribution of Pregnancy Related Deaths, 1999-2011 (n=509)



For women who died after discharge from the hospital, the leading causes of death were infection and cardiomyopathy. For those who died before hospital discharge, the leading causes of death were hypertension and hemorrhage (see Table 1).

Table 1. Pregnancy-Related Causes of Deaths within 2 Weeks of the Live Birth or Fetal Death, 1999-2011 (n=241)

	Before Discharge		After Discharge	
Cause of Death	Number	Percent	Number	Percent
Hypertension	42	23%	8	14%
Hemorrhage	35	19%	0	0%
Amniotic fluid embolism	22	12%	0	0%
Infection	18	10%	13	23%
Thrombotic embolism	13	7%	6	11%
Other cardiovascular problems	11	6%	10	18%
Cardiomyopathy	5	3%	12	21%
Intracerebral hemorrhage	4	2%	5	9%
Anesthesia	3	2%	0	0%
Other	19	10%	2	4%
Uknow n	10	5%	1	2%
Total	182	100%	57	100%

Table 2 shows that women who had a body mass index (BMI) of 40 or greater had seven times the risk of dying during the postpartum period than women who were at normal weight.

Women who initiated prenatal care during the third trimester or who did not have prenatal care had four times the risk of dying during the postpartum period than women who received prenatal care in the first trimester.

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Overall, characteristics of women at increased risk of postpartum pregnancy-related death during 1999-2011 were:

- Non-Hispanic Black
- Older than 35 years of age
- High school education
- Late or no prenatal care (third trimester or none)
- Had cesarean delivery
- Underweight (BMI <20), overweight (BMI 25.0-29.9), or obese (BMI 30 +)

Table 2. Postpartum Pregnancy-Related Mortality Ratios and Unadjusted Relative Ratios, 1999-2011 (n=398)

Characteristics	Total Deaths	Births	Pregnancy-Related Mortality Ratios**	Relative Ratios	95% CI
Race and Ethnicity					
Non-Hispanic White	130	1,334,755	9.7	Ref.	-
Non-Hispanic Black*	192	615,912	31.2	3.2	2.6-4.0
Hispanic	65	752,460	8.6	0.9	0.6-1.1
Age groups					
19 or less	26	306,309	8.5	0.7	0.5-1.1
20-24	86	721,551	11.9	Ref.	-
25-34	170	1,389,308	12.2	1.0	0.8-1.3
35 or greater*	116	408,242	28.4	2.4	1.8-3.1
Education					
< High School*	34	558,737	6.1	0.6	0.4-0.8
High School*	214	912,706	23.4	2.1	1.7-2.6
> High School	147	1,335,700	11.0	Ref.	-
Marital Status					
Married	231	1,591,976	14.5	Ref.	-
Never married	165	1,232,162	13.4	0.9	0.8-1.1
Prenatal Care Initiation					
1st Trimester	187	2,119,846	8.8	Ref.	-
2nd Trimester*	70	390,026	17.9	2.0	1.5-2.7
3rd Trimester or none*	41	115,760	35.4	4.0	2.8-5.6
Mode of Delivery					
Vaginal	119	1,881,921	6.3	Ref.	-
Cesarean delivery[1]*	242	939,562	25.8	4.1	3.3-5.1
Body Mass Index (BMI) Categories					
Underweight (BMI<20)*	18	132,674	13.6	1.8	1.1-2.9
Healthy Weight (BMI 20-24.9)	99	1,301,065	7.6	Ref.	-
Overweight (BMI 25-29.9)*	87	631,654	13.8	1.8	1.4-2.4
Obese I (BMI 30-34.9)*	72	303,636	23.7	3.1	2.3-4.2
Obese II (BMI 35-39.9)*	34	131,175	25.9	3.4	2.3-5.0
Obese III (BMI of 40+)*	44	85,129	51.7	6.8	4.8-9.7

1/ Excluded 15 emergencies cesarean deliveries . * Statistically Significant

References:

1. Zainur R. (2006). Postpartum Morbidity-What We Can Do. Medical Journal Malaysia Vol 61No 5.
2. Burch, D., Noell, D., Washington, H., Delke, I. (2012). Pregnancy-Associated Mortality Review: The Florida Experience. Seminars in Perinatology. 36(1):31-6.
3. Guidelines for Perinatal Care, Seventh Edition, 2012. American Academy of Pediatrics and the American Congress of Obstetricians and Gynecologists, page 207.

Florida PAMR Committee Postpartum Recommendations:

Self Empowerment - Systems must be in place to ensure the health needs of postpartum women are being met. Women and their families must be aware of the "warning signs" of postpartum complications, and know how and when to access healthcare services.

Discharge Teaching - Postpartum instructions must be thorough, specific, and education-level appropriate. Teaching should include information on the importance of seeking care for prolonged headache, shortness of breath, persistent swelling, unusual fatigue, redness, warmth, and/or pain in lower extremities, chest pain, palpitations, and syncope.

Providers – Improve risk screening of postpartum women prior to discharge. Women with complex medical problems or identified risks during pregnancy and delivery need to be carefully evaluated prior to discharge, and may need longer hospital stays or more immediate and frequent follow-up visits after discharge. Appropriate treatment plans should be in place and women should be medically stable prior to discharge. Women with identified risks should have care coordination which links to local resources and specialists to address individual medical and psychosocial risks.

Systems– Health care providers should ensure protocols and clinical policies are in place for suspected high risk deliveries. Hemorrhage and trauma team protocols should be implemented to improve quality of care and patient safety.

Emergency Personnel Training – Be aware of the potential cardio-respiratory complications in all postpartum women presenting to an emergency facility and provide comprehensive evaluations and linkage to an obstetrician. Emergency personnel should receive continual training on signs, symptoms, and appropriate interventions for preeclampsia, eclampsia, cardiomyopathy, infection, and embolus in postpartum women.

Interconception Counseling - All women should receive risk screening, education, counseling and interventions aimed at optimizing health outcomes at every medical encounter. Areas to address include reproductive life planning, baby spacing, management of chronic illness, nutrition, exercise, and promotion of healthy weight and lifestyle habits.

PAMR's ongoing surveillance, has identified that a woman's risk of pregnancy-related complications does not end at delivery. Implementing accurate risk assessment, appropriate treatment interventions, improved communication, and timely care coordination can protect postpartum women from pregnancy-related complications and premature death.

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