PAMR

Pregnancy-Associated Mortality Review

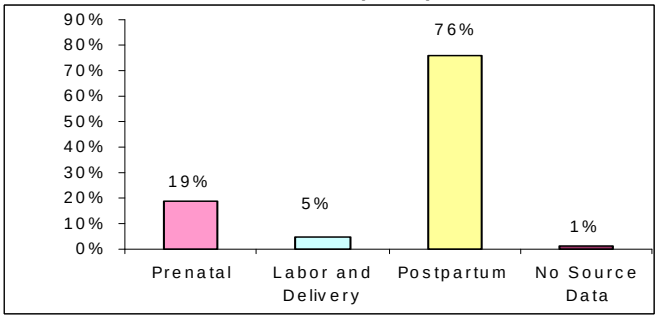
Florida Department of Health, Division of Family Health Services

Pregnancy-Related Deaths during the Postpartum Period, 1999-2010

In 1996, the Florida Department of Health initiated the Pregnancy-Associated Mortality Review (PAMR) to improve women's health through investigating and monitoring pregnancy –related mortality. A pregnancy-related death is a death resulting from 1) complications of the pregnancy itself, 2) the chain of events initiated by the pregnancy that led to death or 3) aggravation of an unrelated condition by the physiologic or pharmacologic effects of the pregnancy that subsequently caused death[1].

In Florida, the pregnancy-related mortality ratio (PRMR) fluctuated from 20.3 deaths per 100,000 live births in 1999 to a high of 26.9 in 2009 and 20.5 in 2010. The 2000 United Nations Millennium Summit Goal 5 is to decrease maternal mortality by 75% by 2015[2]. During 1999-2010, the PAMR team classified 470 cases as pregnancy-related deaths. The majority of the deaths 359 (76%) occurred during the postpartum period. Figure 1 shows the time distribution for these 470 deaths.

FIGURE 1. Time Distribution of PAMR Pregnancy-Related Deaths, 1999-2010 (n=470)

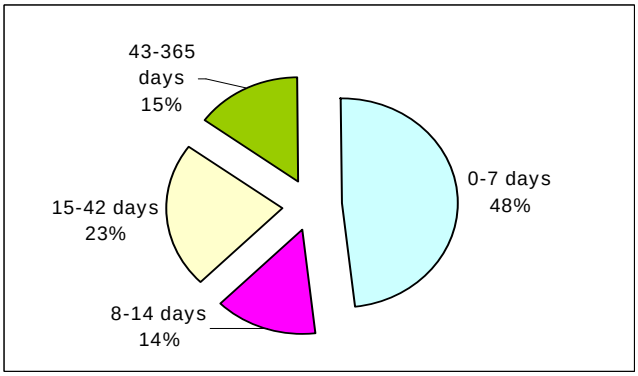


Pregnancy related complications can occur in the postpartum period or even up to 1 year after a pregnancy ends. The early postpartum period is most critical to maternal survival. The American Academy of Pediatrics, American College of Obstetricians and Gynecologists, and the American College of Nurse 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].

Many women are discharged to home with the standard instruction to return in six weeks for a follow up visit. However, for some women this may be too late as 62% (222) of postpartum deaths occurred during the first two weeks and 24% of them died after hospital discharge.

Between 1999 and 2010, 305 (85%) deaths occurred early in the postpartum period (0-42 days) and 53 (15%) occurred later (43-365 days) in the postpartum period (see figure 2).

FIGURE 2. Postpartum Time Distribution of Pregnancy-Related Deaths, 1999-2010 (n=359)



Of the 222 (62%) women dying during the first two-weeks of a live birth or fetal demise, 24% died after hospital discharge and 76% were not discharged from the hospital prior to death. The leading causes of death for those women who were discharged were cardiomyopathy and infection and for those not discharged were hypertension and hemorrhage (see Table 1).

TABLE 1. Pregnancy-Related Postpartum Causes of Death within 2 weeks of the Live Birth or Fetal Death, 1999-2010 (n=222)

	Not Discharged		Discharged	
Cause of Death	Number	Percent	Number	Percent
Hypertension	40	24%	7	13%
Hemorrhage	31	18%	0	0%
Amniotic fluid embolism	22	13%	0	0%
Infection	16	10%	12	22%
Thrombotic embolism	11	7%	6	11%
Other cardiovascular problems	9	5%	9	17%
Cardiomyopathy	4	2%	12	22%
Intracerebral hemorrhage	4	2%	5	9%
Other	21	13%	2	4%
Unknown	10	6%	1	2%
Total	168	100%	54	100%

Table 2 in the following page shows that women who were obese class III had 7 times the risk of dying during the postpartum period than women who were normal weight.

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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.

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

- Non-Hispanic Black
- Older than 35 years of age
- Less educated
- Lacking prenatal care
- Underweight, overweight, or obese

TABLE 2. Postpartum Pregnancy-Related Mortality Ratios and Unadjusted Relative Ratios, 1999-2010 (n=359)

	Total Deaths	Pregnancy-Related Mortality Ratios	Relative Ratios	Lower CI	Upper CI	Births
Race and Ethnicity						
Non-Hispanic White/Ref	119	9.6	Ref.	-	-	1,244,214
Non-Hispanic Black*	173	29.9	3.1	2.5	3.9	579,191
Hispanic	57	8.2	0.9	0.6	1.2	693,036
Age groups						
19 or less	24	8.3	0.7	0.4	1.1	288989
20-24/Ref	80	11.9	Ref.	-	-	669,519
25-34	150	11.7	1.0	0.7	1.3	1,278,045
35 or greater*	105	28.0	2.3	1.7	3.1	375,653
Education						
< High School*	25	4.8	0.4	0.3	0.7	524,649
High School*	199	23.4	2.2	1.7	2.7	846,227
> High School/Ref	132	10.8	Ref.	-	-	1,224,140
Marital Status						
Married/Ref	205	13.9	Ref.	-	-	1,480,285
Never married	152	13.4	1.0	0.8	1.2	1,130,696
Prenatal Care Initiation						
1st Trimester/Ref	169	8.6	Ref.	-	-	1,965,552
2nd Trimester*	63	17.5	2.0	1.5	2.7	360,669
3rd Trimester or none*	41	38.2	4.4	3.2	6.3	107,217
Body Mass Index (BMI) Categories						
Underweight (BMI<20)*	17	12.5	1.8	1.1	3.1	135,541
Healthy Weight/Ref (BMI 20-24.9)	90	6.8	Ref.	-	-	1,323,641
Overweight (BMI 25-29.9)*	79	12.4	1.8	1.3	2.5	634,965
Obese I (BMI 30-34.9)*	67	22.1	3.2	2.4	4.4	303,854
Obese II (BMI 35-39.9)*	31	23.7	3.5	2.3	5.2	131,012
Obese III (BMI of 40 or +)*	38	45.6	6.7	4.6	9.8	83,391

*Statistically Significant

Florida PAMR Committee Postpartum Recommendations:

Self Empowerment - Systems must be in place to assure 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 prophylaxis treatment plans should be in place and women should be medically stable prior to discharge. Women with identified risks should receive care coordination including linking to local resources, specialists, and support systems as needed in order to promote continuity of care that addresses individual medical and psycho-social risks.

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 primary OB. 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 lifestyle habits.

Through PAMR's ongoing surveillance we realize that a woman's risk of pregnancy-related complications does not end at delivery. Implementing accurate risk assessment, appropriate treatment interventions, improved communication and care coordination may protect postpartum women from unnecessary death.

References:

1. Berg C, Danel I, Atrash H, Zane S, Barlett L. Strategies to reduce pregnancy-related deaths: from identification and review to action. Atlanta: Centers for Disease Control and Prevention; 2001.
2. United Nation Statistics. About the millennium development goals. http://www.un.org/millenniumgoals/maternal.shtml
3. Guidelines for Perinatal Care, Sixth Edition, 2007. American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, page 172.

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