

Comparison of Selected Outcomes of CenteringPregnancy Versus Traditional Prenatal Care

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The purpose of this study was to assess the effect of traditional prenatal care versus a group model of care, CenteringPregnancy, on maternal knowledge of pregnancy, social support, health locus of control, and satisfaction. The CenteringPregnancy model of care gives patients extended time with the provider in a group setting. The study used a two-group, pretest/posttest design of pregnant women who elected either the traditional approach to prenatal care (n = 48) or the Centering approach (n = 50). The results of this study showed statistically significant differences between the groups on posttest in knowledge of pregnancy. For social support and health locus of control, the high scores at pretest contributed to a ceiling effect, which limited the potential for change. Additional research is needed to assess health status outcomes among women electing alternative approaches to prenatal care. *J Midwifery Womens Health* 2006;51:266–272 © 2006 by the American College of Nurse-Midwives.

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INTRODUCTION

The vast majority of pregnant women receive prenatal care via a traditional model, with care being given one-on-one by a provider in a private examination room in an office or clinic setting. An alternative, innovative approach to prenatal care, called CenteringPregnancy, is offered today in more than 100 sites around the country. This model of prenatal care involves exchanging the individual examination room for a group setting, which includes self-monitoring and extended time with the provider.¹ CenteringPregnancy incorporates the three components of prenatal care—education, risk assessment, and supportive care—into one entity, and encourages women to take responsibility for their own health.

After their initial prenatal visit, women who choose CenteringPregnancy are placed into groups based on similar due dates. This placement usually occurs at approximately 12 to 16 weeks of pregnancy. Each group consists of 8 to 10 women who meet approximately 8 to 10 times during the pregnancy for 90 to 120 minutes per session.² Standard risk assessment, including review of interim history and a physical examination to determine fundal height and fetal heart tones, is performed individually but in a group setting. The CenteringPregnancy program includes a self-monitoring component; women are taught to take their own blood pressures, to check their weight and urine, and to record these findings with gestational age in their individual charts. After completion of each woman's physical examination, performed at the beginning of each visit, group discussion is facilitated by the health care provider. This discussion provides women opportunities to share their experiences in a climate of support and helps to empower them to respond

proactively to changes occurring as a result of pregnancy.²

The purpose of this study was to compare and contrast selected outcomes of women who received prenatal care via CenteringPregnancy versus traditional prenatal care. Knowledge, social support, perception of health locus of control, and perceptions of participation and satisfaction with care were assessed.

BACKGROUND

Prior to the 20th century, most health care providers did not recognize prenatal care as a concept or a practice.³ According to Brown, prenatal care is “an inexact constellation of procedures and interactions”⁴ that encompasses a specific number of visits on a well-defined schedule and an array of educational, social, and nutritional components provided in a culturally appropriate, flexible fashion. Other definitions refer to prenatal care as the services provided between conception and birth for the purpose of monitoring the health of the pregnant woman and providing information and health promotion activities that foster optimal health, encourage good dietary habits and hygiene, and provide psychological and social support.⁵ The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists describe antepartum care as a “plan of care that should include medical, nutritional, psychosocial, and educational needs of the patient and her family, and should be revised and reevaluated periodically in relation to the progress of pregnancy.”⁶

Very little is known about how the interactions between health care providers and pregnant women during the prenatal care visits actually affect the mother and her fetus.^{3,7} Many agree that prenatal care probably does have an overall beneficial effect for some women.⁴ Most experts also agree that prenatal care is good and that some is better than none, early entry is better than late, and more is better than less.⁵ Some studies have linked

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adequate prenatal care with lowering the incidence of low birth weight⁸⁻¹⁰; however, according to Alexander and Kotelchuck, “the relationship between prenatal care and adoption of healthy behaviors has received relatively scant investigation.”¹¹ The American College of Obstetricians and Gynecologists states that women who have early and regular prenatal care are more likely to have healthier infants.⁶ Studies have shown that certain components of prenatal care are somewhat beneficial to the mother and her fetus; for example, smoking cessation programs to reduce the incidence of intrauterine growth retardation¹²; the use of dietary folate, both preconceptionally and in early pregnancy to prevent neural tube defects^{13,14}; and universal screening for gestational diabetes.¹⁵

In response to a 1985 Institute of Medicine report,¹⁶ the Public Health Service convened an expert panel of 19 health care professionals in 1989 to study the scientific basis of prenatal care.¹⁷ This panel examined what was generally known about prenatal care, identified major concepts and assumptions, and critiqued available research.¹⁸ The final report, “Caring for Our Future: The Content of Prenatal Care,” is still considered the quintessential document regarding guidelines for prenatal care in the United States. Briefly, the panel concluded that the objectives of prenatal care are to promote the health and well-being of the pregnant woman and her fetus and to provide for a close interaction between the pregnant woman and her health care provider(s), thus offering a unique opportunity for preventive health care.¹⁸ They determined that the components of prenatal care should include early and continual risk assessment of the mother and her fetus; education and health promotion; and medical and psychosocial intervention, support, and follow-up. Furthermore, these components should be available in a timely fashion and accessible to all women. Included in their recommendations were the following: 1) family members should be involved with the prenatal care, 2) women should be partners in their care, and 3) pregnancy planning should begin well before an intended pregnancy.¹⁸

Others have examined prenatal care and have concluded that the components of prenatal care should include home visitation, coordination of prenatal care visits, and smoking cessation programs, and that the total number of visits can be reduced if the content of visits is enriched.^{5,19}

The CenteringPregnancy Model “centers” the three components of prenatal care—education, risk assessment, and supportive care—into a whole, and helps a woman to “center herself as she moves through preg-

nancy” (Rising, personal communication, June 5, 2000). This model is an outgrowth of the Childbearing/Childrearing Center, a health care delivery model at the University of Minnesota. Under the direction of Sharon Rising, CNM, MSN, the Childbearing/Childrearing nursing model was established as an alternative to the medical illness model of pregnancy. It used certified nurse-midwives and other nurse practitioners to provide complete maternity, pediatric, and well woman care in an outreach, ambulatory setting, to essentially healthy women and their children. This type of holistic and comprehensive care was created as a consequence of consumer demand for greater input and control of their health care, dissatisfaction with current care, and a realization that maternity patients needed comprehensive, culturally sensitive care based on a wellness model.²⁰

On the basis of experiences with the Childbearing/Childrearing program, Rising determined that more group interaction, more peer support, and less scheduled individual time would allow both the care provider and clients to identify pregnancy needs and to develop plans to address those needs.^{1,20} CenteringPregnancy groups “include learning from others, community building, attitude change and insight development, mutual support, and problem-solving skill development.”¹ More effective use also can be made of institutional resources, such as social workers, nutritionists, physical therapists, and financial counselors. Rising’s rationale for developing this model can be found in previously published articles.^{1,2,20}

To date, very little research has been done to compare traditional care with the CenteringPregnancy model. Of the few studies that have been done about CenteringPregnancy, it has been found that participants in CenteringPregnancy had fewer visits to the emergency room during third trimester¹; have higher birth weight infants, both preterm and term²¹; and a high degree of satisfaction with the model.^{21,22} The purpose of this study was to compare and contrast the outcomes of CenteringPregnancy with traditional prenatal care in relation to other outcomes, including the pregnant women’s knowledge, social support, perception of health locus of control, and perceptions of participation and satisfaction with care. Although satisfaction with CenteringPregnancy has been studied,^{21,22} the concepts of knowledge, social support, and health locus of control had not been studied. These variables were chosen because Rising had already begun looking at these issues with her groups, tools were readily available to measure them, and because these variables interfaced with recommendations put forth by both the expert panel¹⁸ and previous summary literature reviews of prenatal care.⁵ The hypotheses for this study were that participation in the CenteringPregnancy program would result in greater 1) knowledge of pregnancy; 2) perceived social support from one’s significant other,

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midwife, and other pregnant women; 3) health locus of control; 4) perception of participation; and 5) satisfaction.

METHODS

This study used a nonequivalent control group, pretest/posttest design, and was conducted at three sites, each in a different geographic region of the United States (i.e., Northeast, Midwest, and South). All sites offered CenteringPregnancy programs and traditional care, had a sufficient volume of pregnant women in care, and a team of midwives who agreed to participate in the study. Both types of care were presented to the patients by the midwife who performed the first prenatal visit, and patients were given the choice as to which type of care they preferred. Potential participants for either group had to be healthy pregnant women, without medical or obstetric complications of pregnancy, between the ages 18 and 42, and English speaking. Those who did not fit these criteria were excluded. Approval for this study was obtained from the Institutional Review Boards of Teachers College, Columbia University, and the Midwestern hospital, the lead physician employer of the East Coast midwifery service, and the legal department of the southern site's county health department. The purpose of the study was explained to all potential participants by either the researcher or the midwives, and signed consents were obtained. Financial remuneration to the patients and each midwifery service was also given as an incentive for data collection.

Four instruments were used for data collection: Rising's Pregnancy Review Sheet¹; Labs and Wurtele's Fetal Health Locus of Control,²³ based on Wallston, Wallston, and De Vellis's Health Locus of Control tool²⁴; Curry, Campbell, and Christian's Prenatal Psychosocial Profile²⁵; and Littlefield and Adams' Participation and Satisfaction tool.²⁶ The validity and reliability of the latter three instruments are documented in the literature for similar populations.^{22,25,26} Reliability statistics are unpublished for the knowledge questionnaire; however, content validity was established by nurse researchers¹ (Rising, personal communication, 2003). An investigator-constructed instrument was used to collect demographic data.

Rising's knowledge questionnaire, or Pregnancy Review Sheet, is a 35-item questionnaire using a true/false format. Items on this questionnaire address a number of maternity issues and seek to elicit basic knowledge about such issues as nutrition, growth and development of the fetus, family planning, breastfeeding, physical and emotional changes of pregnancy, smoking and drug use, sexuality, etc.¹ A Kuder-Richardson 20 reliability analysis was done on this questionnaire, and the reliability at pretest was .66, and at posttest was .35. Because the reliability was low, an item analysis was done on each of

the 35 items of this tool; 12 items were identified, which resulted in a pretest reliability of .69 and a posttest reliability of .68. These items were used in the analysis.

A fetal health locus of control questionnaire was used in this study to measure a pregnant woman's perceived control of the health of her unborn child. This tool is an 18-item, 6-point Likert scale, ranging from strongly disagree to strongly agree, and uses three 6-item subscales, characterized as "internal," "powerful others," and "chance."²³ The Cronbach alpha for the combined Traditional and CenteringPregnancy internal fetal health locus of control was .65 at pretesting and .60 at posttesting. Reliability analysis for the combined groups for chance was .81 at pretesting, and .83 at posttesting. The subscale for powerful others had an alpha of .76 at pretesting, and .66 at posttesting.

The tool chosen to measure social support in pregnancy was adapted from the Prenatal Psychosocial Profile by Curry, Campbell, and Christian.²⁵ This tool measures stress, social support, and self-esteem. This study only used the social support portion of this questionnaire, which was based on a shortened version of Brown's Support Behaviors Inventory,²⁷ which measures a broad level of perceived support in pregnancy. The original tool, as designed by Curry et al., is an 11-item questionnaire using a 6-point Likert scale ranging from 1 equaling very dissatisfied to 6 equaling very satisfied, asking about perceptions of support from partners and others. This researcher modified this tool to also include the participants' perceptions of social support from their significant other, from other pregnant women, and from their health care provider. Reliability analysis was conducted for all three sections of this tool, and the Cronbach alpha for each subset was as follows: at pretest for both groups, alpha was .96 for significant other; .92 for midwives' subscale; and .95 for other pregnant women. At posttesting, the alpha for the combined groups for significant others was .95, midwives at .91; and other pregnant women at .92.

The last questionnaire, the Patient Participation and Satisfaction questionnaire, was developed by Littlefield and Adams.²⁶ It has a 5-point Likert scale ranging from very satisfied to very dissatisfied and measures satisfaction with the health care provider and perception of participation in prenatal care by the patient. This tool has 23 items: 8 concerning participation and 15 concerning satisfaction. This tool was given only at posttesting, and the combined alphas for both groups were .91 for participation and .94 for satisfaction.

Data were collected by the researcher or the midwives employed at each health care facility. After signing the consent form, each participant completed the knowledge of pregnancy, fetal health locus of control, social support, and demographic information questionnaires. In general, this occurred at approximately 12 to 16 weeks' gestation. Participants selecting traditional prenatal care saw their

Table 1. Selected Characteristics of the Study Population

Demographic Variable	Traditional Care Group (n = 48) mean (SD)	Centering Pregnancy Group (n = 50) mean (SD)
Age, y	25.48 (5.65)	26.10 (5.54)
Parity	1.77 (1.00)	1.46 (.89)
Yearly income \$/y	34,010 (26,386)	29,284 (26,036)
Number in family	3.04 (1.27)	2.76 (1.10)
Education, y	13.19 (2.19)	13.18 (2.19)
Gestation, wk	13.60 (2.67)	16.70 (3.09)
Site	n (%)	n (%)
Midwest	14 (29.2)	16 (32.0)
South	17 (35.4)	23 (46.0)
Northeast	17 (35.4)	11 (22.0)
Insurance		
Public	19 (39.6)	23 (48.9)
Private	29 (60.4)	27 (51.1)
Race		
White	38 (79.2)	39 (78.0)
Nonwhite	10 (20.8)	11 (22.0)

health care provider according to agreed upon appointment schedules. After the 32nd week of pregnancy, they completed the knowledge of pregnancy, fetal health locus of control, and social support instruments as well as Littlefield and Adams' Participation and Satisfaction with prenatal care tool.²⁶ Participants selecting the CenteringPregnancy approach attended group meetings with women who were at a similar point in their pregnancy. At the group meeting just prior to their expected delivery date, at approximately 38 to 40 weeks, these participants completed the same set of posttest questionnaires. The researcher taught the protocol to midwives at each site, who then administered the questionnaires to all participants. The time needed to fill out the first set of pretest questionnaires at enrollment was approximately 10 to 12 minutes; with the addition of another questionnaire at the final visit, the time needed to complete the posttest instruments was approximately 15 to 19 minutes. Documentation of study participation was placed in each participant's chart, and reminders were sent to study site personnel to encourage administration of the posttest questionnaires at the appropriate time.

Descriptive statistics were generated for all survey items and scale scores, and χ^2 , analysis of variance, and analysis of covariance, using pretest measures as the covariate, were used to analyze the data.

RESULTS

A total of 124 participants between the ages of 18 and 32 were recruited between May and October 2002, and of these, 98 were retained. Participants selecting traditional prenatal care were assigned to the control group (n = 48); those selecting CenteringPregnancy were assigned to the experimental group (n = 50).

Demographic information is provided in Table 1. Of the 124 women recruited for this study, 98 (79%) answered the posttest questionnaires. Attrition (n = 26) was attributed to the following: 2 (2%) miscarried, 4 (3%) moved away, and 20 (16%) were lost to follow-up as a result of participant discontinuation of prenatal care at the study site, or the posttest was not administered by study site personnel. There were no significant differences between those retained in the study (n = 98) and those who dropped out (n = 26), with respect to race or health insurance. However, a greater percentage of CenteringPregnancy patients remained in the study compared to traditional patients ($P = .01$). Analysis of variance revealed no significant differences between the women who continued in the study and those who dropped out with regard to age, parity, family size, years in school, weeks of pregnancy, or pretest values for the dependant variables. For those providing income data (n = 77 [62%]), there was a difference in average income levels comparing those who dropped out with those remaining, but missing data preclude drawing firm conclusions.

The hypothesis that knowledge about pregnancy would be greater in the CenteringPregnancy group was supported when the 12-item questionnaire was used, with mean scores at pretest of 10.48 for the traditional group and 10.88 at posttest, and the CenteringPregnancy mean scores of 10.4 at pretest, and 11.38 at posttest ($P = .03$). See Appendix A for a list of the 12 items.

The hypotheses that the CenteringPregnancy program would result in greater perceived social support from the midwife, one's significant other, or other pregnant women were not supported. There was a nonsignificant trend toward higher scores for perception of support from one's significant other among CenteringPregnancy participants than participants in traditional care ($P = .07$).

The effect of the CenteringPregnancy program on fetal health locus of control was not significant. There were no differences between women in either group with regard to the subscales of "internal locus of control" or "powerful others" at posttesting. However, the CenteringPregnancy group's posttest mean scores for the subscale related to "chance" increased compared with the traditional group's scores.

The hypothesis that a sense of participation in care would improve with CenteringPregnancy and that these patients would be more satisfied with this care than the traditional route was not supported. Mean scores for both pretest and posttest for both participation and satisfaction were almost identical.

DISCUSSION

This study demonstrated the expected changes in knowledge of pregnancy but did not demonstrate anticipated findings that women who attend CenteringPregnancy groups will report increased social support, fetal health

locus of control, or sense of participation and satisfaction.

Several limitations may have influenced the outcomes of this study. These include the small sample size and nonrandomization to treatment and control groups. Subjects had the opportunity to select which type of care they preferred, either CenteringPregnancy or traditional care. Having the type of care they wanted may have contributed to the lack of differences in levels of satisfaction and fetal health locus of control. In addition, high pretest scores for social support and fetal health locus of control may have produced a ceiling effect, in that there was not much room for improvement on the posttest. Low reliability for internal fetal health locus of control may have also contributed to the nonsignificant findings. Although there were significant differences in knowledge at posttesting for the CenteringPregnancy group with the 12-item questionnaire, women in both groups had high pretest and posttest scores. The women in both groups reported more than 13 years of education, and this may have contributed to these high scores. In other words, participants knew the information being asked. In addition, the original poor reliability estimates on the Kuder-Richardson 20 may be due to the fact that the items do not reflect a unidimensional construct; further assessment of the performance of the knowledge tool is warranted.

Another limitation of this study includes the fact that posttest data were not collected at a similar gestational age in the traditional and CenteringPregnancy groups. Posttesting took place for CenteringPregnancy patients at the last group meeting, which occurred at approximately 38 to 40 weeks' gestation. CenteringPregnancy patients were more readily accessible for posttesting because they were all in a group at the same time. Although patients in traditional care had charts marked and a tracking system put in place for posttesting, this often was not accomplished, and some patients were lost to follow-up. In addition, staff had difficulty remembering to administer the posttest to the women in the traditional care group; this was done anytime after 32 weeks, and varied from 32 to 39 weeks. This discrepancy in gestational age at the time of posttesting in the traditional group may have contributed to little change from pretesting to posttesting, as there may not have been enough time for changes to occur.

Replication of this study using a different or revised knowledge questionnaire, incorporating methods to further explore how social support systems influence maternal/fetal outcomes, and using a larger sample would be beneficial. Other outcomes also deserve further study. The provision of a CenteringPregnancy model of prenatal care might be very rewarding and satisfying to midwives, nurses, and physicians. CenteringPregnancy provides extended time with patients in a group setting, and providers need only to discuss or facilitate the

discussion of a topic once, not many times as in traditional one-on-one care.

The literature on health education and promotion during pregnancy has supported dissemination of knowledge and information during the prenatal period, but little has been done regarding evaluation of alternative dissemination methods.^{19,28-30} The findings in this study provide some support for the CenteringPregnancy program's knowledge dissemination model; one that uses a group intervention approach and provides for extended time with the provider. The content of the existing knowledge instrument should be evaluated and perhaps modified in content to reflect knowledge that most pregnant women do not already have and/or changed to a format other than true/false. The current content of the CenteringPregnancy sessions needs to be evaluated and compared with the content of the existing knowledge instrument to better ascertain if 20 hours with the provider does indeed increase knowledge base during the course of pregnancy. The content covered in the knowledge tool may be outdated, and other areas of prenatal education need to be examined and emphasized in a new instrument.

Perceived adequate social support in pregnancy has been shown to have a positive effect on pregnancy by providing more of a sense of control over changes in pregnancy, decreasing anxiety, and improving self-image.³¹⁻³⁷ Although not statistically significant, women in the CenteringPregnancy groups did perceive more support from their significant others than did women in the traditional groups. Observation time spent at each site indicated that most women were accompanied by their significant other at the CenteringPregnancy group meetings, whereas the presence of a significant other was not consistent in the traditional group participants. Other studies have shown that most pregnant women perceive social support in pregnancy from their significant other as the most helpful and important, followed by support from others, including other pregnant women or the provider.³⁴⁻³⁷ A recent study conducted in two university-related prenatal clinics showed that in 247 women, perception of social support accounted for a 31% variance in fetal growth. In other words, perception of prenatal social support from the baby's father was independently associated with higher birth weight when all known factors were controlled.³⁷

Previous studies have confirmed the importance of health locus of control. Rotter³⁸ stated that those with higher internal locus of control tend to seek ways of improving their health status and of finding effective ways of controlling stress and that people who volunteer to participate in studies may already have a higher internal locus of control. Perhaps this was the case with the participants in this study. Conversely, Lewallen found no differences between the concept of "external powerful others" and women's health issues in a study of

health beliefs and practices.³⁹ The participant's response that luck or fate has a great influence on one's pregnancy or destiny is an unexpected finding and one that is not easily explained.

Data were collected only at sites where midwives provided both models of prenatal care, and this may have contributed to the identical mean satisfaction scores. Certified nurse-midwives are known for the style of prenatal care that they give, which includes extensive time with prenatal patients and a strong emphasis on health education and promotion. Because the same midwives provided both types of care at each site, this may explain why both groups were equally satisfied with their care.

Future studies might also include a qualitative method to obtain pregnant women's perceptions of their care. This might help to further elicit differences between CenteringPregnancy and the traditional route of prenatal care.

If knowledge is power,³⁰ and if CenteringPregnancy increases a pregnant woman's knowledge about herself concerning pregnancy and parenting issues, would CenteringPregnancy, compared with traditional care, increase the initiation and duration of breastfeeding, decrease the use of analgesia and anesthesia during childbirth, and decrease postpartum depression? Does increased knowledge during pregnancy empower women to take charge of their lives and follow through with postpartum, family planning, and pediatric visits? Would CenteringPregnancy decrease disparities in outcomes in ethnic minorities and possibly decrease the cost of prenatal care? All of these questions deserve further study.

At the moment, the CenteringPregnancy model is being evaluated at several sites across the country. At Yale University, a National Institute of Mental Health-funded study is investigating the impact of using the CenteringPregnancy model on HIV prevention in teens. Preliminary findings indicate that pregnant teens who participated in CenteringPregnancy and had preterm deliveries had pregnancies that lasted 2 weeks longer than those in traditional care and had babies that were almost 1 pound heavier.²¹ The March of Dimes has funded projects in St. Louis, where midwives are using the CenteringPregnancy model exclusively with pregnant teens, and at Albert Einstein College of Medicine in the Bronx, where they are studying the use of CenteringPregnancy with high-risk prenatal patients. In St. Louis, Grady and Bloom found that pregnant teens who participated in CenteringPregnancy had a lower rate of preterm labor and cesarean birth and higher compliance with postpartum checkups.²² Kennedy was funded by the TriService Nursing Research Program to conduct a 3-year randomized clinical trial of CenteringPregnancy model use within the military health care system.²

The CenteringPregnancy approach to prenatal care fits

particularly well with the Institute of Medicine's rules for health care design, "that care is based on continuous healing relationships; care is customized according to patient's needs and values; the patient is the source of control; knowledge is shared and information flows freely; and needs are anticipated."^{2,40} Bernstein wrote that attention should be paid to exploring different ways of offering prenatal care, such as CenteringPregnancy, which result in significantly more time with the provider and more time for education and support. "Only by taking a fresh look at the system of prenatal care that has become so entrenched can we hope to have any further impact on improving the outcome of pregnancy."⁴¹

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Appendix A. 12 Items Identified on Knowledge Tool Answered Consistently:

1. You must have intercourse frequently in order to become pregnant.
2. Heartburn is a sign that your baby has lots of hair.
3. A woman who is breastfeeding cannot become pregnant.
4. Breastfeeding helps to protect the baby from disease.
5. It is not unusual to be unhappy at times about being pregnant.
6. Douching is necessary to keep the vaginal tract clean.
7. The basis for preventing pregnancy is keeping the man’s sperm from reaching the woman’s egg.
8. It is better to eat six small meals a day when you are pregnant than three large ones.
9. It is still beneficial to stop smoking in the last month of pregnancy.
10. The effects of marijuana stay in your body for at least 2 weeks.
11. Regular contractions of the uterus before 37 weeks are not important.
12. A mother’s milk will protect her baby from some infections.