DEVELOPMENT OF AN EDUCATIONAL TOOL REGARDING PRENATAL SCREENING TESTS

BY

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A Practicum Project

Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements
for the Degree of

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Abstract

Prenatal care is intended to promote and maintain the well being of both mother and fetus through regular surveillance and screening for a variety of conditions. This is a time when most women have increased access to health care providers who are in the position to promote a healthy pregnancy and address the educational needs of the expectant woman. The goal of this practicum project was to develop an educational tool in the form of a handout regarding the "routine" prenatal screening tests for the purpose of providing information in a concise format to pregnant women. A handout was developed based on the current practice recommendations of the Society of Obstetricians and Gynaecologists of Canada (1998), the Canadian Task Force on the Periodic Health Examination (1994), and the Manitoba Prenatal Record. The handout was designed in consideration of the principles of adult learning, cognitive learning theory perspectives, and in a manner to promote ease of readability. The handout draft was reviewed by health care providers and several pregnant women at the River Avenue Community Health Clinic for informal feedback on the validity and appropriateness of the content. A proposed evaluation framework was developed but not carried out as a part of this practicum project due to time constraints. It is hoped that the handout will be used in clinical practice by health care providers for the benefit of all prenatal clients.

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Dedication

In memory of my mother Joanne,

and my grandmother Julia,

whose lives have inspired me more than

they will ever know.

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Chapter One

Introduction

Few periods in a woman's life rival the rich experience of pregnancy and childbirth (Fry, 2000). This is a time when most women have increased access to health care providers who are in the position to promote a healthy pregnancy and address the educational needs of the expectant woman.

Generally, pregnancy is considered a healthy state; however some women may experience particular medical conditions which alter the course of their pregnancy. Thus, prenatal care is intended to promote and maintain the well being of both the woman and fetus through regular surveillance and screening for a variety of conditions. Infant and maternal mortality rates often are used as an indicator of a country's state of health development and thus, may reflect the quality of prenatal care available.

Canadian Infant and Maternal Mortality Rates

Over the past 30 years, there has been a dramatic decrease in the infant mortality rate in Canada. For example, in 1995, the rate was 6.1 per 1000 live births compared to 27.3 per 1000 live births in the year 1960 (Statistics Canada, 1994). This decrease likely is due to advances in technology and improvements in perinatal care.

The leading causes of neonatal death include congenital anomalies and conditions that arise in the perinatal period (Health Canada, 2003). In 1995 in Canada, of the 2321 infants who died prior to their first birthday, 1584 (68%) of deaths were attributed to conditions that occurred in the neonatal period (Health Canada, 2003). Thus, much of prenatal care is directed at the prevention of conditions that may contribute to infant mortality.

The reported maternal mortality rate has also been declining over the years, with rates dropping from approximately 500 maternal deaths per 100,000 live births in the early 1920's to less than 5 per 100,000 live births in the 1990's (Statistics Canada, 1994). The leading causes of maternal death prior to 1935 included puerperal infection with *B haemolytic streptococcus*, septic abortion, hypertensive disorders of pregnancy, eclampsia, and hemorrhage (McCarthy & Hunter, 2003). Factors that contributed to the decline of deaths include; availability of antibiotics, blood transfusion services, and overall improvements in health care. Canadian women are fortunate to have universal access to health care which no doubt has contributed to the increased safety of pregnancy and childbirth.

Overview of Prenatal Care

Between the years 2001-2002, the birth rate in Manitoba was 12.1 per 1,000 population with a recorded 13,940 live births (Statistics Canada, 2003). This birth rate reflects a significant need for prenatal care. In Manitoba, depending on the geographical location, a woman may have some choice in prenatal care provider. For example, in the city of Winnipeg, a woman may choose a family physician, obstetrician, midwife, or a relatively new option, a nurse practitioner. If the pregnancy is without complications, many women may receive the majority of prenatal care from their primary care provider until approximately 36 weeks gestation. After such time the woman is referred to an obstetrician until delivery, unless under the care of a midwife, or family physician who delivers.

Any time within the first trimester is considered optimal for the initiation of prenatal care (Society of Obstetricians and Gynaecologists of Canada [SOGC], 1998).

As much of the care is dependent upon timing of screening tests in relation to gestational age, an early presentation will ensure access to these tests. The introduction of care often begins with the gathering of data (e.g. family, medical, obstetrical history, physical examination, and laboratory tests) to complete the prenatal record. This information forms a database which then serves as a working document (record) of care throughout pregnancy. Please refer to Appendix A for a copy of the Manitoba Prenatal Record.

Since there is a great deal of baseline information to collect, it is often beneficial to both the client and health care provider to do so in two or three visits so as not to overwhelm the client. Prenatal visits are scheduled every 4-6 weeks until 30 weeks gestation, every 2-3 weeks until 36 weeks gestation, and finally every 1-2 weeks until delivery (SOGC, 1998). However, the frequency of visits is determined by the individual needs of the woman and assessment of risks.

Screening healthy populations for disease and risk of disease has become a part of the increasing workload of all health professionals (Marteau, Slack, Kidd, & Shaw, 1992). This is especially so in the antenatal period where both mother and fetus are subject to a vast array of screening tests.

Statement of the Problem

With advancing technology, pregnant women increasingly are exposed to screening tests which have the potential to influence their lives profoundly. The manner in which pregnant women are informed (by health care providers) regarding the screening tests considered "routine" and the concept of women's knowledge and experience with these tests is an area that has not been studied.

In the last decade, most of the studies done on the topic of prenatal screening have focused on two distinct tests; maternal serum screening (MSS) and human immunodeficiency virus (HIV). The fact that these two tests screen for incurable conditions, and require a formal process of consent may account for the intense study. However, one may argue that it is equally important for the pregnant woman to understand what the "routine" tests are and why they are done. Many of these "routine" tests identify conditions that if not recognized early and managed properly, also may pose certain risks to the woman and fetus (e.g. untreated Chlamydia may lead to pelvic inflammatory disease and preterm labor). Perhaps the lack of attention to the "routine" tests may be attributed to the fact that they mostly identify treatable conditions.

Studies reveal that there is insufficient information provided to women concerning the tests that require a formal consent; the assumption can be made that information is also lacking regarding the "routine" tests. Thus, it is proposed that an educational tool in the form of a client handout, be developed regarding the "routine" prenatal screening tests for use in primary care practice. This handout will be based on current practice recommendations to ensure accuracy and developed in a manner that best suits the needs of pregnant women.

The development of an educational handout may provide a succinct, organized approach to explaining/discussing the various tests that are done throughout pregnancy. This handout will focus only on those tests considered "routine" in pregnancy. This handout may be given to the client at the initial visit, providing an overview of the tests expected for the duration of pregnancy. Thus, the goal of this project is to develop a

concise handout that will provide information and anticipatory guidance to pregnant women and be useful in clinical practice.

Summary

During pregnancy, women have increased access to health care providers who are in the position to provide education. Much of prenatal care is based on the prevention of complications by screening for various conditions however one must not lose sight of the educational needs of these women.

Many prenatal clients simply "go along" with prenatal screening tests, not necessarily having an understanding of what exactly is being done. This is not acceptable. Pregnant women should at least have the opportunity to increase their knowledge regarding what tests they are being subjected to and why. It is hoped that the development of a handout will provide a simple means of communication regarding the "routine" prenatal screening tests and facilitate informed decision making by the client.

Chapter Two

Literature Review

Introduction

A literature search was conducted through the electronic data-bases MEDLINE, CINAHL and ERIC using the keywords; prenatal screening tests, prenatal care, educational tools, information processing, client education, and prenatal clinical practice guidelines. Research based articles between the years 1990 - 2003 were chosen to form the foundation of this review and discussion to follow. In addition, a number of government websites were explored for current statistical information and relevant documents. Several books related to the topic of this project were included to construct a theoretical framework and provide background information.

Screening Tests

Rationale. Prior to discussing the tests particular to pregnancy, it is essential to consider the basic rationale of screening tests. The use of laboratory tests to screen asymptomatic clients is a unique kind of diagnostic procedure. As with all medical procedures, one must weigh both the beneficial and harmful effects associated with testing. Primarily, screening tests serve the purpose of detecting those diseases whose morbidity and mortality may be reduced by early detection and treatment. Another potential benefit of such detection efforts is the reassurance they give to those clients found free of the disease (Black, Bordley, Tape, & Panzer, 1999).

Potential harmful effects of screening include the anxiety that may be induced either while waiting for results, or by receiving unanticipated abnormal results. Anxiety may also occur when faced with false positive or false negative results as no test is

completely accurate. This inaccuracy may be related to the many variables that influence test results (e.g. skill level of practitioner and technician, equipment, quality of sample).

There is often a lack of empirical evidence available on which to base the decision to apply a screening test to an asymptomatic client. However, the following may provide some basis for the selection of appropriate clients and tests for early disease detection. Preferably, the disease in question should be: 1) common enough to justify the attempt to detect it, 2) have considerable morbidity and mortality if not treated, 3) amenable to effective treatment that will alter the natural history of the disease, and 4) detectable and treatable in the pre-symptomatic state, which should result in benefits beyond those obtained through treatment during the early symptomatic state (Black et al., 1999).

Sensitivity and specificity. Two central features of screening tests are sensitivity and specificity. Sensitivity measures the proportion of positive abnormal results in clients with disease, while specificity measures the percentage of negative normal results in clients without disease (Black et al., 1999). An ideal screening test is one whose characteristics are such that its results are abnormal in almost all persons with the disease, that is, it has high sensitivity (Black et al., 1999). A highly sensitive test may reassure health care providers that the client is disease free when the results are normal.

Specificity is also important when screening for disease because of the number of false positive results obtained when a test that is not highly specific is applied to a population composed mainly of persons without disease (Black et al., 1999). Thus, when tests are used for screening or to rule out disease, the test with the highest sensitivity is favored.

Implementation. In contrast to the amount of dollars devoted to developing new screening tests, very little is allocated to determining the best way to implement these tests into clinical practice. Furthermore, health care providers rarely are trained how to present screening tests to clients (Marteau et al., 1992). Despite a multitude of guidelines available to assist health care providers in decision making surrounding the selection of screening tests for the client, these guidelines must be applied in context of the individual client's life.

According to Marteau et al. (1992), presenting screening tests to healthy people requires a change in the roles of both health care providers and clients. The focus becomes more on prevention versus illness, with the client becoming a more active participant. In addition to a change in role, the health care provider also faces the dilemma of how to present population-based screening tests with low probability but serious events, in a way that does not alarm clients unduly, or provide false reassurance (Marteau et al., 1992).

In relation to prenatal screening tests, women's knowledge is frequently inadequate (Marteau et al., 1992). Knowledge may be poor due to various reasons: no information is given; information is given, but not understood; information is given and understood but not remembered; or the information given may be incorrect or misleading. Thus, the health care provider who orders a screening test is a vital source of information. Both the nature of the information and the way in which the test itself is presented will influence whether screening is undergone (Marteau et al., 1992).

Role of nurse practitioner. In Manitoba, since the development of the advanced practice nursing program (recently renamed nurse practitioner program) at the University

of Manitoba, nurse practitioners (NPs) are becoming more widespread in the primary care setting. NPs prepared at the Masters level develop a foundation of knowledge and skills that permits them to function in various roles in the delivery of direct care to clients. According to Hamric, Spross, and Hanson (2000) expert guidance and coaching are core components of the NP's role in providing direct care to clients. Because one of the central roles of NPs is that of an educator, they are in a unique position to assist pregnant women identify and meet their learning needs.

Informed consent. Informed consent is defined as " providing a client with sufficient information about a proposed treatment (test) and its reasonable alternatives to allow the client to make a knowing, intelligent, and unequivocal decision regarding whether to accept or reject the proposed treatment (test)" (Scott, 2000, p.189). Ideally the client gains adequate information about the topic and is able to make an informed decision regarding consent for the treatment (test).

Within the context of prenatal screening, the issue of informed consent varies according to what type of test is offered to the pregnant woman. Variation also exists in the process of obtaining consent. For example, a formal consent usually involves a process of providing particular information before and after the test, a written document, and the client's signature (e.g. HIV test), versus an informal, verbal, or expressed consent for which there may not be any specific document but the client has agreed to the test or procedure (e.g. client goes to the lab for bloodwork). Where the implications of a positive result are recognized as being serious or life threatening, the significance of informed consent is more strongly emphasized (Marteau et al., 1992).

Page (2000) points out that because many tests and procedures are considered "routine" in pregnancy, it is taken for granted that they are done automatically and are therefore not viewed as falling within the scope of informed consent. It is suggested by Page (2000) that the concept of informed choice (consent) be viewed as the precursor to all decisions within the course of prenatal care. This would imply that pregnant women are active participants in their care, and thus should be given sufficient information regarding all aspects of their pregnancy and be provided with the opportunity to make decisions based on this information.

Routine Prenatal Screening Tests

The purpose of screening tests in pregnancy is to allow for the early identification of many treatable conditions, which aids in subsequent risk reduction and prevention of complications to both mother and fetus. These conditions may be transmitted to the fetus via various routes; transplacental, intrapartum (during delivery), or post partum (e.g. breastmilk). As well, many conditions are considered communicable (e.g. Hepatitis B Virus (HBV), HIV, Syphilis), and thus also have significant implications for the woman's partner(s).

Each test will be described briefly, in relation to the appropriate trimester in which it is performed, with reference to the rationale, current statistics (where available) and practice recommendations. Most of the screening tests are recommended based on expert opinion or consensus. There is a great deal of information available regarding each condition tested for, however a comprehensive discussion of each is beyond the scope of this paper, thus an overview is presented.

Please refer to Appendix B for a summary of the prenatal screening tests in terms of the sensitivity and specificity rates (where available), the level and classification of evidence and practice recommendations. Please refer to Appendix C for a guide to interpreting evidence.

First Trimester (0-13 weeks)

The initial prenatal visit may seem overwhelming for the client, especially for a primagravida woman, as this is the time when the majority of screening tests are done. These tests include obtaining serology, cervical and urine samples to screen for such conditions as anemia, cervical dysplasia, sexually transmitted diseases (STDs) and asymptomatic bacteriuria.

Serology

Several tests are performed via serology samples which screen for anemia and the presence of particular antigens and antibodies, which may be indicative of susceptibility to or presence of infection or STDs. These tests are outlined as follows.

Hemoglobin & platelets. A blood sample is taken to assess the hemoglobin (hgb) level. In pregnancy, this test is done primarily to detect anemia. A hgb level of less than 10 g/dL defines anemia in pregnant women (Scoggin & Morgan, 1997). Iron deficiency anemia is the most common form, accounting for approximately 95% of pregnancy related anemia (Scoggin & Morgan, 1997).

A platelet count provides an indication of the coagulation ability of the client's blood. It is important to have a baseline value, as this count has clinical significance in the event of prenatal complications such as preeclampsia and postpartum hemorrhage (Corbett, 2000). These levels are checked initially and again at 28 weeks (SOGC, 1998).

Rhesus factor. Because some degree of fetal-maternal transplacental hemorrhage occurs in up to 75% of all pregnancies, screening is done for rhesus (Rh) factor or Rh(D) antigen (Beaulieu,1994). Transplacental hemorrhage does not pose a threat to the fetus unless there is incompatability between the mother and the fetus with respect to the Rh antigen of the red blood cell.

Rh incompatability exists when an Rh negative woman is pregnant with an Rh positive fetus, and may occur in 9-10% of all pregnancies (Beaulieu, 1994). If not treated with an anti-D immunoglobulin at 28 weeks, isoimmunization against the Rh antigen may occur resulting in hemolytic disease in the fetus and newborn (Enkin et al., 2000). Women are screened during the initial exam and if found to be Rh negative, a repeat screen at 28 weeks is done to assess for the presence of antibodies (SOGC, 1998).

Rubella. This condition, also known as German measles, is a self-limited, although highly communicable disease that is spread via close contact or airborne droplets (Cline, Bailey-Dorton, & Cayelli, 2000). Generally, the disease poses minimal risk to the woman, however the effects on the fetus may be severe. These effects may include; spontaneous abortion, stillbirth and congenital anomalies. If infection occurs within the first two months of pregnancy, the risk for congenital rubella syndrome is 85%, if at 20 weeks gestation the risk is 20 - 25%, and if after 20 weeks gestation, the occurrence is rare (Cline et al., 2000).

Since 1969, the live rubella vaccine has become widely available, resulting in a significantly decreased incidence of congenital rubella (Cline et al., 2000). In Canada fewer than 30 cases of rubella were reported in the last 2 years, and only 1 - 2 cases of

congenital rubella syndrome per year were reported from 1996 to 2000 (Health Canada, 2002).

Pregnant women are screened for the presence of rubella antibodies which signify immunity. If these antibodies are absent or insufficient, a vaccination postpartum is recommended (SOGC, 1998).

Hepatitis B. The hepatitis B virus (HBV) is transmitted in blood and body fluids via the parenteral route and sexual contact. Between 50 - 70% of all adults affected with HBV are asymptomatic, or their symptoms mimic a variety of flu like symptoms (Communicable Disease Control Unit [CDCU] 2001). In Manitoba, between the years of 1996 and 2000, there were 162 reported cases of HBV, of which greater than 40% were acquired sexually (CDCU, 2001).

In pregnant women with acute HBV, the frequency of transplacental transmission depends on the time during gestation that maternal infection occurs. In a first trimester infection, as many as 10 % of neonates are affected, versus a third trimester infection where 80 – 90% of neonates are affected (Cline et al., 2000). Thus, pregnant women are routinely screened for the presence of Hepatitis B surface antigen (HepBsAg) at the first visit, which if positive indicates infection and the possibility of transmission to the fetus (SOGC, 1998).

Infants who are infected with HBV have a 90 - 95% risk of becoming a chronic carrier of the disease (Cline et al., 2000). Thus, preventing HBV in infants is a priority. If a mother is HBV positive at the time of delivery, the infant should receive both the HBV immunoglobulin and the first Hep B vaccination within 12 hours of delivery (SOGC, 1998).

Varicella. Varicella-zoster is the virus that causes chickenpox and zoster. Chickenpox is most common in childhood, occurring in less than 10% of people between the ages of 14 - 45 (Cline et al., 2000). Despite this relatively low prevalence in adults, the number of cases of chickenpox in pregnant women is approximately 3000 cases per year (Cline et al., 2000). This has significance for the developing fetus, as congenital anomalies such as limb hypoplasia, muscle atrophy, and microcephaly may occur if a woman is infected with varicella during pregnancy (Cline et al., 2000). Thus, if a woman is uncertain if she has had chickenpox in the past, a blood test for varicella antibodies is included in the initial screening tests.

Venereal disease research laboratory. A venereal disease research laboratory (VDRL) test is performed on all pregnant women to identify syphilis. Syphilis is a systemic infection caused by the spirochete *Treponema pallidum* which has been associated with stillbirth, premature labor, and congenital infection of the newborn (Cline et al., 2000). It is considered a STD and thus requires identification and treatment of sexual contacts.

The prevalence of syphilis had been declining until a recent resurgence. In Manitoba, up until January 2003, the incidence of infectious syphilis had been less than 1 case per 100,000 (Winnipeg Regional Health Authority [WRHA] & Manitoba Health, 2003). However, in Winnipeg, between mid January – April 2003, 15 cases of primary and secondary infectious syphilis were identified in heterosexual individuals between the ages of 30 - 60 (WRHA & Manitoba Health, 2003). The VDRL test is done initially and may be repeated at 28 weeks in those women who are considered high risk (e.g. history of STDs, multiple partners) (SOGC, 1998).

Human immunodeficiency virus. In recent years there has been a dramatic increase in the occurrence of HIV among the heterosexual population. This has resulted in a larger number of women of childbearing age becoming HIV positive. Between the years 1985 - 1997, 649 new cases of HIV infections were reported in Manitoba, 78 of which were female (CDCU, 2001). As of June 2002, 18,124 AIDS cases among adults were reported to the Center for Infectious Disease Prevention and Control in Canada, of which 1,152 were among women of childbearing age (Health Canada, 2002). It is thus imperative that the issue of HIV be addressed in the pregnant population.

At the national level, within the past decade, the number of infants born to HIV infected mothers has risen from 56 in 1991 to 138 in 2001 (Health Canada, 2002). With the early use of antiretroviral medications, elective cesarean section and the use of formula feedings, the rate of mother to infant HIV transmission may be reduced from approximately 25% to less than 1% (Watts, 2002). The ability of these methods to significantly reduce the transmission rates to the fetus, has been the driving force for the inclusion of HIV testing in pregnancy.

Currently there are two approaches to prenatal HIV screening, the "opt in" or "opt out" method. In all Canadian provinces, prenatal HIV testing remains a decision of the woman, however how this decision is determined varies. In the "opt in" approach, the woman is told the test is offered routinely to all pregnant women, and a discussion takes place about the test in order for an informed decision to be made. The woman then decides to "opt in" and have the test or declines.

Alternatively, the test is ordered for all pregnant women unless the woman specifically requests not to have it done. In this situation, the woman may not be given

an opportunity to discuss the test or make an informed decision as the onus is on her to specifically ask that the test not be done. In Manitoba, the current policy is to offer the test to all as a part of routine testing, with the inclusion of pretest counseling, emphasizing that the test is voluntary and based on an informed decision (Health Canada, 2002).

The HIV test identifies HIV antibodies that indicate infection. This test is offered at the initial visit and may be offered again in six months if the woman is considered high risk (e.g. multiple sexual partners, intravenous drug use, STDs) (SOGC, 1998).

Cervical

Samples are obtained from the cervix to detect dysplasia and sexually transmitted diseases (STDs). Cervical cancer is the second most common human malignancy with a worldwide incidence of greater than 450,000 cases identified each year (Melnikow & Nuovo, 1997). This condition follows a continuum of change that begins with cellular intraepithelial neoplasia typically detected in women from their teens through to their 30's, to invasive cancer which is more commonly seen in women 45 years of age or older (Melnikow & Nuovo, 1997). Due to this relatively long latency period, an opportunity for early detection and intervention is paramount. Therefore, it is important to sample the asymptomatic woman who has a clinically normal appearing cervix.

The two most common STDs are chlamydia and gonnorhea. In Manitoba, with a population of approximately 1.1 million, there are 3,000 laboratory confirmed cases of chlamydial infections and approximately 600 laboratory confirmed cases of gonnorhea reported each year (Moses & Elliott, 2002). These infections have important

implications, as the partner(s) must also be treated. An additional 2000 sexual contacts are identified and treated annually in Manitoba (Moses & Elliott, 2002).

Papanicolaou smear. A papanicolaou smear (pap smear) is a screening test for cervical squamous dysplasia and early invasive squamous cancer of the cervix. Data analysis from large screening programs indicate that annual screening decreases the probability of a woman developing invasive cervical cancer by 93.3% and that screening every three years decreases the probability by 91.2%, therefore pap smear screening remains the single best method for early detection of cervical intraepithelial neoplasia (Melnikow & Nuovo, 1997). In Manitoba, it is recommended that all women over the age of 18 or who have been sexually active have an annual pap smear for three years, and if consecutively normal, the frequency may decrease to every two years (Cancer Care Manitoba, 2000).

If a pap smear has not been done in the previous 6 - 12 months, one is done at the first visit, as recommended by the SOGC (1998). As this is the time for a pelvic examination and collection of swabs for STDs, it is an opportune occasion to also acquire a pap smear.

Chlamydia. In 1998, compared to the rest of Canada, Manitoba had the highest rate of reported chlamydia infection among women of childbearing age and the second highest rate among men (Moses & Elliott, 2002). The *Chlamydia trachomatis* organism is isolated in 25% of sexually active non-pregnant women and in 5% of pregnant women (Cline et al., 2000). Because the prevalence of asymptomatic individuals is greater than 10%, all pregnant women should be tested, especially those considered high risk (age less than 25, multiple partners) (Cline, et al., 2000). The intrapartum transmission rate ranges

between 15 - 25% for neonatal conjunctivitis and between 5 - 15% for neonatal pneumonitis (Cline et al., 2000).

Gonorrhea. In Canada, the reported rate of gonorrhea has risen greater than 40% over the past five years with Manitoba again having the highest national rate of 54.2 reported cases per 100,000 (Health Canada, 2003, CDCU, 2001). In pregnancy, infection with the organism *Neisseria gonorrhea* has been associated with cervicitis, endometritis, and systemic illness (Cline et al., 2000). It also has been linked with septic abortion, neonatal ophthalmic infections, and abscesses of the Bartholin and Skene's glands (Cline et al., 2000).

Left untreated, these infections pose serious threat to both the mother and fetus. A cervical swab is obtained for culture of these STDs at the initial visit and repeated in the third trimester in women at high risk of reinfection (SOCG, 1998, Cline et al., 2000).

Urine

Midstream urinalysis and culture. A culture and colony count of a midstream voided urine specimen is considered the best method of screening for asymtomatic bacteriuria (Enkin et al., 2000, Nicolle, 1994). Women without symptoms of a urinary tract infection who grow greater than 25,000 organisms/ml of urine are considered to have asymptomatic bacteriuria (Cline et al., 2000). This condition occurs in 2 - 7% of pregnancies and places the woman at increased risk (up to 28%) of further developing pyelonephritis (Cline et al., 2000). Undiagnosed and untreated urinary tract infections may also place the woman at increased risk of pre-term labour (Enkin et al., 2000).

Because one third of pregnant women will have persistent/recurrent asymptomatic bacteriuria, it is recommended that all pregnant women be screened with a urine culture at the first visit and periodically throughout the pregnancy as necessary (SOGC, 1998).

Second Trimester (14- 26 weeks)

The second trimester is often an exciting time for women as they begin to feel better, morning sickness subsides, the pregnancy begins to show, and the first fetal movements are noticed. During this time, two distinct serology tests are offered as a screen for congenital anomalies and gestational diabetes. An ultrasound, although not considered routine, may also be performed during this trimester.

Maternal serum screening. The maternal serum screening (MSS) test or triple test detects levels of maternal serum alpha fetal protein (AFP), human chorionic gonadotropin (HCG), and unconjugated estriol (uE3) which collectively screen for the presence of open neural tube defects (NTD) (e.g. spina bifida) and Down Syndrome (DS). The ideal time for this test is between 16 -18 weeks gestation. Screening is offered to all women under the age of 35, as well as to those over 35 years of age as an alternative to chorionic villis sampling (CVS) or amniocentesis (Dick, 1996).

As of June 18, 2003 the Cadham Provincial Laboratory (CPL) has been using a new software program that provides a more client specific interpretation of risk. The results are separated into two categories; AFP results and the Triple Test results. Elevations of AFP may be associated with spina bifida, while low levels may be associated with DS (Marteau et al., 1992).

It is expected that 2% of women who are screened will have elevated AFP levels, with a detection rate of spina bifida of 80% (CPL, 2003). Please refer to Appendix D - I

for a diagram that depicts the outcomes (estimated chance of having a baby with spina bifida) for AFP screening of 10,000 women. The numbers reflect the anticipated results of 10,000 screened women based on the assumption of a spina bifida birth frequency of 1/1000 (CPL, 2003). This translates into the average woman with an elevated AFP, having a chance of having a baby with spina bifida of 8:200 or 1:25 (CPL, 2003).

Down Syndrome is the most common chromosomal cause of mental retardation and occurs in approximately 1/700 live births (CPL, 2003). The chance of having an affected baby increases with maternal age. Please refer to Appendix D - II for an illustration of the risk of DS according to maternal age.

In the event of abnormal results, MSS may be repeated and the woman may be referred for either an amniocentesis or chorionic villis sampling, both of which are invasive procedures associated with their own risks (e.g. abortion).

MSS is an optional test, and thus should not be done without prior discussion and consent from the woman. The limitations, potential risks/harms associated with a diagnosis and second trimester abortion (if chosen), and consideration of the psychological implications of screening must be discussed with the woman in order to ensure that she is able to make an informed decision (SOGC,1998).

Oral glucose challenge test. An oral glucose challenge test (OGCT) is used to screen for gestational diabetes mellitus (GDM). A 50 gram glucose drink is given to the client and within an hour the plasma glucose level is determined. A fasting blood glucose has been proposed as an alternative to the OGCT, however to date there is a lack of conclusive evidence to support this method (Beaulieu, 1994).

GDM is defined as carbohydrate intolerance of varying severity, with onset or first recognition occurring during pregnancy (Hanna & Peters, 2002). GDM occurs in 2 - 4% of all pregnancies in Canada, with a higher incidence reported in the Aboriginal, Hispanic, Asian and African American/Canadian ethnic groups (Meltzer et al., 1998).

Potential consequences of GDM are thought to include: prenatal hypertension, subsequent development of Type 2 diabetes, macrosomia (birth weight greater than the 90th percentile for gestational age and sex), shoulder dystocia, brachial plexus injury, and an increased frequency of caesarean sections (Brody, Harris, & Lohr, 2003). Although most of these consequences are not well substantiated in the literature, Type 2 diabetes has been reported in up to 50% of women at 10 years postpartum (Hanna & Peters, 2002).

To date, there is a lack of consensus surrounding the issue of universal versus selective GDM screening, largely due to the lack of quality evidence to support one or the other. Generally, women are assessed for having risk factors for GDM (e.g. age, ethnic group, past history of GDM, family history of DM, obesity, previous macrosomia) and are tested earlier in pregnancy. If there are no risk factors, it is up to the health care provider to determine the need for screening, or routinely screen all pregnant women between 24-28 weeks gestation (SOGC, 1998).

Despite the fact that GDM has been recognized for decades, the potential significance of this condition, as well as the criteria for screening and diagnosis remain controversial. Randomized control trials fail to show conclusively that the diagnosis and treatment of glucose intolerance reduce the immediate and long term effects of GDM on

the mother and infant (Berger, Crane, Farine, & the Maternal-Fetal Medicine Committee, 2002).

Ultrasonography. The greatest controversy regarding the obstetrical ultrasound (US) has been whether its use should be extended from specific indications to routine screening of all pregnant women. Ultrasonography has proven value when used selectively, (e.g. determining whether the fetus is alive, gestational age, placenta location, fetal size, growth and position, amount of amniotic fluid and confirming a multiple pregnancy) however, its routine use in all pregnancies remains unclear (Enkin et al., 2000, SOGC, 1999).

In Canada, an US is not considered routine for all pregnancies, unless caring for pregnant women in Northern communities. Although the rationale is not clear, in this situation an US is ordered for most women, perhaps due to the fact that there is limited access to physicians and the remoteness of the location. For example, if complications arise and the woman needs to be medivaced from the community or in the situation of a delivery in the nursing station, information obtained from the US may provide knowledge that may be helpful in planning care and preventing further complications.

The optimal timing for an US is considered between 18 - 20 weeks gestation as this time frame is late enough in the pregnancy to identify as many anomalies as possible yet early enough to permit choices regarding continuation of the pregnancy (Enkin et al., 2000, SOGC, 1999).

Third Trimester (27- 40 weeks)

As the woman approaches her delivery date, it is crucial to ensure that new or unresolved conditions or infections do not exist which may increase the risk of preterm

delivery, compromise the well being of the fetus and ultimately affect the pregnancy outcome. At this point in time, depending on earlier results, certain previous tests may need to be repeated. For example, if the woman was formerly positive for Chlamydia, a cervical swab is repeated, or if she was anemic, a hgb is done.

In addition to repeating prior tests, a swab for Group B Streptococcus (GBS) may be obtained. However, the routine use of this test is contentious.

Group B Streptoccocus. Approximately 10 - 30% of pregnant women are colonized in the genital or rectal area with the GBS pathogen, with 1 - 2% of their infants developing early onset invasive disease (i.e. within the first 7 days of life) that can present as pneumonia, meningitis or sepsis (Cline et al., 2000). Prior to the early recognition of this pathogen and availability of antibiotics, GBS was a major cause of neonatal death. This gram positive coccus may also affect the woman, causing chorioamnionitis, urinary tract infections, and postpartum endometritis (Cline et al., 2000). Unfortunately, there is a lack of Canadian data on the incidence of this condition (SOGC, 1997).

Currently there are two approaches to screening: 1) routinely screen all women between 35 - 37 weeks with a vaginal/rectal swab and if positive, treat (with prophylactic antibiotics) at the onset of labour, or 2) not test anyone and only treat with prophylactic antibiotics according to risk factors (preterm labour less than 37 weeks, term labour with prolonged rupture of membranes, previous delivery of an infant with GBS disease, previous documentation of GBS bacteriuria, or maternal fever greater than 38 degrees Celcius) (SOGC, 1998).

According to Enkin et al. (2000) there is sufficient evidence to support treating all high risk colonized women, but not enough to recommend routine screening of all women. Thus, the use of this test is determined by the health care provider.

Womens' Perspective Regarding Prenatal Screening Tests

Much of the knowledge regarding womens' perspective of prenatal screening has been drawn from studies of MSS and HIV testing. Although the majority of studies have been questionnaire based with relatively small samples, the fact that in general women do not receive enough information regarding screening tests is apparent. Thus, the central theme in the literature is that womens' knowledge level regarding prenatal screening tests is relatively low.

This lack of knowledge is thought to be related to several factors such as: the process of information giving and variation in testing practices among health care providers. These factors may influence how women make decisions and ultimately which screening tests they receive.

As health care providers, one may regard prenatal screening tests as "routine" and downplay their significance however to the pregnant woman prenatal screening tests are anything but "routine". Therefore, one must not neglect the extra attention, reassurance, and information that these women often need.

Presentation of prenatal screening tests. Clients' knowledge of the screening tests for which they are eligible and which they have undergone is frequently low (Marteau et al., 1992). Studies have been performed in an effort to determine the extent to which this lack of knowledge is due to how a test is offered and explained.

Marteau et al. (1992) examined the practices of midwives, obstetricians, and family physicians, comparing how they offer MSS. Consultations between these health care providers and pregnant women were tape recorded to assess the presentation of the MSS test. In over half of the consultations, the test was presented as "routine", and an opportunity to make a decision about the test was frequently omitted.

There were several gaps in the information provided. Basic details in relation to the timing of the test (15 - 18weeks), what it screens for (Spina bifida), and what is involved (a sample of blood) were mostly given, however the test was described as a general test for unspecified abnormalities. The risk of having a baby with either of the two conditions screened for (DS and NTD) was not discussed or stated. Details such as when and how the results would be provided and interpreted were not discussed. The attitudes of women towards termination of an affected fetus were seldom sought. These results clearly demonstrate an inadequate provision of information.

Carroll, Brown, Reid, and Pugh (2000) conducted a qualitative, retrospective study with women who had previously given birth to explore their experience with MSS. The study was conducted in various communities in Ontario (Northern – suburban) using a focus group technique with a total of 60 participants (10 per focus group). One of the central themes that emerged from the study was that women wanted to make informed choices, in particular they wanted to be active participants in the decision making process. Many women reported that they did not consider this test to be "routine" and did not think it should be presented in such a way (Carroll et al., 2000).

In terms of MSS, women have definite opinions as to what they want to know, who they want to obtain the information from and when they would like to be told about

this test. Women want to know specific details such as the purpose of the test, its risks and benefits, as well as the potential outcomes and options available as early as possible in the pregnancy (e.g. the first or second visit), with the physician (primary care provider) seen as the key source of information (Carroll, et al., 2000).

Several factors are suggested as having a possible influence on the presentation of MSS. These include: a limited amount of time available for consultation, lack of health care provider knowledge and skills, attitudes, and behavior of women (Marteau et al., 1992). Another potential factor may be that physicians (health care providers) often underestimate clients' need for and their ability to understand medical information (Marteau, 1995).

The fear of providing too much information and thus provoking anxiety in clients, combined with insufficient training of medical professionals regarding how to present information on screening tests, creates a dilemma for both the client and the health care provider. The client herself may play a role in how the information is given. For example, the woman's own fears may prevent her from seeking an informative discussion surrounding the tests.

This lack of knowledge is also apparent in relation to HIV testing. Depending on the province in which one is practicing, policies vary as to how the test is administered ("opt in" versus "opt out"), which may influence the manner in which the test is presented. It is suggested that testing aimed only at women considered "high risk" should not be recommended because this approach fails to identify a significant proportion of positive women (Walmsley, 2003). Thus, an approach that offers an opportunity for testing to all women is considered best.

The quality and quantity of counseling before and after the HIV test has been shown to be correlated with test acceptance rates and level of satisfaction (Walmsley, 2003). The test may be refused by some women due to a lack of perceived risk, a previous negative test, or lack of endorsement by the health care provider (Walmsley, 2003).

Leonard and Shap (1999) found that a prenatal HIV test conveyed as mandatory or routine often was done without adequate information given to the client. This practice could be considered unethical, as serious consequences may arise if the test is positive, and the woman had not been made aware of the implications of the test.

Early identification of HIV gives the woman an opportunity to gather information regarding the available interventions to reduce the risks of transmission to the fetus and partner(s) and to make an informed choice about continuing the pregnancy. The associated stigmatization of a positive test emphasizes the importance of a discussion regarding the risks and benefits and the fact that the woman must understand that she has a right to decline the test.

Testing practices. Comparative studies have evaluated the practice of midwives, obstetricians, and family physicians in relation to the content and process of offering prenatal screening tests. Despite existing guidelines regarding these tests, there is much variation in practice.

In a questionnaire based study, Yankowitz, Howser, and Ely (1996) found significant differences in MSS practice between obstetricians and family physicians. Obstetricians were more likely to offer and recommend MSS to all, while family physicians were more likely to offer only the AFP test selectively. Family physicians

were more likely to discourage testing in clients who had no intention of terminating the pregnancy in the event of an abnormal finding, believing it was not necessary to even offer the test (Yankowitz et al., 1996). Thus, women were not even given the option of a test. It is not stated how physicians concluded that certain women were unlikely to terminate pregnancy in the event of abnormal results, and the issue of physician's personal bias is not addressed.

Early prenatal diagnosis of HIV and STDs are critical for maternal and infant health. Mills, Martin, Bertrand, and Belongia (1998) surveyed self reported screening practices of 96 obstetricians and 99 family practitioners in Minnesota. They found that most physicians determined the need for a screening test (HIV and STDs) based on individual risk factors, despite the fact that most agreed with the concept of universal HIV screening. This practice may be considered prudent as long the purpose and implications of these tests, as well as the possible risks associated with a missed diagnosis are made clear to the client. It was not stated in the study who perceived the risk as being low, the physician or the client, and on what basis that decision was made.

Studies have suggested that HIV screening targeted only at high risk groups, fails to identify many infected women. Studies from the US and UK report that 21 - 75% of women who test HIV positive are not known to have any risk factors at the time of screening (Guenther, Carroll, Kaczorowski, & Sellors, 2003). These rates emphasize the importance of at least offering the test to all pregnant women.

Possible reasons suggested as to why practices vary with HIV screening include the sensitive nature of the topic, as many physicians may not be comfortable with discussing issues related to sexuality and reproductive health (Mills et al., 1998). Health

care providers' attitudes may play a significant role with which these topics are dealt. There may be an underlying bias present, influencing who is offered the test or not (Mills et al., 1998).

The nature of these tests imply certain negative behaviors that, depending on the rapport between the client and health care provider, to which the woman may not feel comfortable admitting (e.g. multiple sex partners, injection drug use). Thus, there is the risk of missing a positive case by not offering these tests with an explanation of implications.

Jayaraman, Preiksaitis, and Larke (2003) compared testing rates before and after the implementation of mandatory disclosure (of positive HIV results) to the provincial public health registry and the "opt out" prenatal screening program in Alberta. They found that the rates of testing did not decline with mandatory disclosure and interestingly, the rates of screening in pregnant women rose dramatically. Similar trends are noted in the UK and US where rates of testing in pregnant women rose from 33 - 74% to 81 - 88% after the implementation of the "opt out" program (Stringer, Stringer, Cliver, Goldenberg, & Goepfert, 2001). An explanation for these findings is unclear, however one may wonder what effect pre-test counseling had on testing rates.

Guenther et al. (2003) suggest making the HIV test more routine with a less complex consent process, and providing further education for both health care providers and clients regarding the nature of HIV testing. Thus, an ideal way to provide counseling and testing is perhaps yet to be determined.

Psychological factors. Due to the inherent nature of screening tests, there is always the possibility of false positive and false negative results which, in the case of

MSS, may have a significant impact on the lives of women. If women are not adequately informed of this possibility, a misinterpretation of results may cause great distress. The potential psychological effects of misleading MSS test results provide insight into women's experiences with screening tests and offer suggestions as to what health care providers' may do to enhance clients' knowledge.

Roelofsen, Kamerbeek, Tymstra, Beekhuis, and Mantingh (1993) examined the opinions of 105 women regarding the offer and use of MSS. The need for reassurance was the most often cited reason for choosing testing, however greater than half the women were unaware of the drawbacks of testing (e.g. the possibility of a positive result) and the subsequent consequences were not discussed. Some women thus found themselves unexpectedly confronted with the increased risks of fetal abnormalities when their test results were not "normal" (Roelofsen et al., 1993).

Approximately 5% of clients will receive a result outside the normal range. This does not, however, mean they are all truly positive for congenital anomalies (Marteau, et al., 1992). Factors such as maternal diabetes, incorrect gestational age at the time of testing, and twins may influence the accuracy of MSS results causing great anxiety among women (Marteau, et al., 1992).

It has been argued that the increased levels of anxiety associated with prenatal screening in part is a reflection of the failure of the screening service to provide adequate information for the intensive counseling needs created by an abnormal result. This anxiety may decrease with counseling, and support after the results of the test are reviewed.

Ensuring appropriate understanding of the test, prior to undergoing it may also decrease the stress level. Two aspects of care that may influence the woman's response to tests are: 1) how much information is provided about a test, including the meaning of an abnormal result prior to undergoing the test, and 2) how health care providers respond to abnormal results (Marteau et al., 1992).

The false negative MSS results are also a source of great anxiety. Hall, Bobrow, and Marteau (2000) interviewed parents 2 - 6 years after the birth of a baby with DS to compare adjustment rates between parents who had false negative results, those who declined testing, and those who were not offered the test. Parents who had false negative results felt that the health care provider did not adequately prepare them for the fact that something could still be wrong, and often directed blame at the medical system for not detecting the affected child through other means (e.g. US, amniocentesis) (Hall et al., 2000). These mothers also were found to have increased levels of stress compared to those who had declined the test.

In order to improve outcomes, decrease blame, and increase adjustment, it is emphasized once again that the information given at the time of screening needs to be accurate and delivered effectively to reduce unrealistic expectations about the screening test (Hall et al., 2000).

Summary

Prenatal care is a complex issue. Over the years, technology has made substantial advances in the types of screening tests and therapies offered to pregnant women. For the most part, these advances have contributed to improving the overall health and well being of the woman and her fetus. However, it is obvious that how tests and their results are

presented to women may have a huge impact on their prenatal experience. Further research is needed to establish how to offer prenatal screening tests in a manner that facilitates women's comprehension, yet minimizes distress and ultimately promotes quality care.

Within the literature, it is clear that women want more information and the lack of preparation for screening tests may have potential long term consequences. Suggestions are made as to the reasons why adequate information is not provided, but little is offered in terms of how to improve the service to women.

Significant knowledge gaps exist for both the client and health care provider. The development of an educational tool may help bridge this gap, increase client satisfaction with prenatal screening, and ultimately contribute to the well being of the expectant woman and fetus.

Chapter Three

Methodology

Introduction

Prenatal care should entail much more than a series of physical examinations and laboratory tests. With each prenatal visit, health care providers are given an opportunity to educate clients. Health care providers have a responsibility to assist clients by providing them with the knowledge needed to make decisions.

Traditionally, the goal of client education is to provide sufficient information to enable clients and their families to cope with the aspects and implications of a disease, and to encourage responsibility for their health (Serxner, 2000). In the context of prenatal screening tests, the goal of education is to provide adequate information to increase clients' understanding of what tests are being done and why, as well as providing anticipatory guidance.

Despite the fact that a vast array of pamphlets and booklets about pregnancy have been developed and are available through various means (e.g. medical offices, the Internet), studies are lacking regarding their usefulness as educational tools. This is especially so in the area of prenatal screening tests.

Prior to developing an educational tool, it is necessary to have an understanding of the process and theoretical concepts of learning. These concepts provide a theoretical framework for the construction and use of educational tools. The way in which learning is defined and conceptualized has implications for the teaching process. Learning involves the attainment and adaptation of knowledge, skills, beliefs, strategies, behaviors,

and attitudes (Schunk, 2000). How this process occurs is complex, involving the development of new actions or modification of existing ones.

Several theories are available to provide a framework for understanding learning. However, a detailed discussion of the various theories is beyond the scope of this paper. Thus, a brief overview will be provided highlighting the concepts most applicable to this project, followed by a discussion of how these concepts were applied to the development of the handout. As well, factors that influence the readability and validity of printed materials are also discussed.

Cognitive Learning Theory

Cognitive learning theories are based on associations between thoughts and beliefs. Information processing, memory networks, student (learner) perceptions and classroom (learning environment) form the central principles of cognitive learning theories (Schunk, 2000). These principles are used to describe how learners receive, process, store and retrieve information in memory. The focus is less on what learners do (behavioral theories) and more on what learners know and how they have come to gain this knowledge.

According to Schunk (2000), teaching is most effective when one determines the best theoretical perspectives for the type of learning hoped to be achieved and subsequently incorporates these perspectives into the teaching process. For the purpose of this project the most relevant theoretical perspective is information processing.

Information Processing

The term information processing is broadly applied to theoretical perspectives that focus on the sequence and execution of cognitive events (Schunk, 2000). Theories on

information processing are centered on *how* people attend to environmental events, encode information to be learned, relate it to existing knowledge in memory, and how this new knowledge is stored and retrieved as it is needed (Schunk, 2000). Attention, perception, short term (working) memory (STM), and long term memory (LTM) are the key components of cognitive information processing.

Within the two- store memory model, once a stimulus (new information) is attended to and perceived, the input (incoming information) is transferred to working STM (our immediate consciousness), and stored for a short period of time (Schunk, 2000). This information is then acted upon by either rehearsal or relation to information activated in the LTM (prior knowledge) (Schunk, 2000). If not acted upon quickly, information in STM is lost as this memory capacity is quite limited (e.g. 7 items) (Shunck, 2000). This capacity may be increased by chunking or combining information in a meaningful fashion (e.g. categorizing related information).

Encoding

The process of encoding involves placing new (incoming) information into the information processing system and preparing it for storage in LTM (Schunk, 2000). This process may be enhanced by making new information meaningful and integrating it with information that is already known in the LTM (Schunk, 2000). Thus, the meaning one attaches and how one relates to new information is thought to improve learning and retention. There are several factors that may influence encoding. These factors include; organization, elaboration, and schemata.

Organization. Information that is well organized is easier to learn, recall, and classify (e.g. small pieces of information organized into chunks) (Schunk, 2000).

Memory is improved because items are linked to one another in a systematic fashion. Recall of one item prompts the recall of other related items (Schunk, 2000).

Elaboration. Elaboration is a process of expanding upon new information by adding to it or linking it to what is already known (e.g. linking past events to the present). This process facilitates encoding and retrieval because a link is formed between the "to-be-remembered" information and prior knowledge (Schunk, 2000). Thus, information that is recently learned becomes more easily accessible through this expanded memory network.

Schemata. A schemata is a structure or plan used to organize large amounts of information into a meaningful system (Schunk, 2000). The types of plans we develop and use during our learning influence encoding because they elaborate new material into a meaningful context by highlighting important information (Schunk, 2000). Any well ordered sequence can be represented as a schemata.

Thus, material to be learned should be meaningful, easily linked with prior knowledge, and organized in a manner that promotes encoding and retention.

Principles of Adult Learning

According to Freda (2002), one particular method of providing client education has not been found to be superior to any other. However, it is well documented in the literature that adults learn differently from children, and therefore should be taught in a manner appropriate for them (Freda, 2002). Thus, consideration of the principles of adult learning and direction of education towards the individual learners' needs and abilities are most important.

The principles of adult learning were developed by Knowles (1980) and are outlined as follows: 1) adults learn best in response to a perceived need, 2) teaching adults should progress from what they know already to what they do not know, 3) teaching adults should progress from simple to more complex concepts, 4) adults learn best through active participation rather than passive listening, 5) adults require opportunities to practice their new skills with the teacher, 6) reinforcement of desired behavior is important for learning enhancement, and 7) correction of misconceptions and immediate feedback increase learning.

Client Health Education

To provide information to clients effectively, it is ideal to use a combination of oral and written communication (Mayeaux et al., 1996). Several studies support the need for both oral and written information in order to increase the client's level of understanding. However, written communication should serve to reinforce or expand upon oral instructions, but not replace them. For example, when offering a client written material, it is suggested to first review it with them rather than simply handing it over. This review may entail a description of what is included in the handout, explaining how the trimesters are divided, and clarifying any information as needed. It also makes sense to explain the purpose of the material as it relates to the context of the individual's life.

Literacy Level

When considering using any written form of information, it is essential to be sensitive to the client's level of literacy skills. One's reading level can not be assumed based on the highest level of education achieved. The average adult reading level is approximately five grades lower than the last grade completed, as reading is a skill that

deteriorates with disuse (Brownson, 1998). Thus, clients with poor literacy skills can not be identified by their appearance or speech, as this problem affects individuals from all walks of life and socioeconomic groups.

It is recommended that the grade level of printed materials used by health care providers match the reading level of the target population (Glazer, Kirk, & Bosler, 1996). In an analysis of five research studies on reading levels of clients, Ott and Hardie (1995) found that the average client reads at a grade 5.0 to 6.8 level. Doak, Doak, and Root (1996) report that approximately one in five, or 20% of adults read at or below the 5th grade level.

Data from the International Adult Literacy Survey done in 1994 reports that 48% of Canadians read at Level I or II which varies from having either a few basic reading skills or decoding strategies, to the ability to read only simple materials clearly laid out. Thus, the importance of providing information that is well written and easy to understand can not be overemphasized.

Quality of Educational Materials

Frequently there is a mismatch between client reading level and the reading level of many health information handouts used for client education (Brownson, 1998). Wording, sentence complexity, and jargon (e.g., medical terminology) may affect the client's level of understanding (Maynard, 1999). As a result, many clients are unable to use the handouts as they may only partially understand the message. Therefore, when developing educational materials, not only is it important to ensure that the content is accurate, but careful consideration of the content clarity and readability are critical if they are to be of any value.

Clarity. The following techniques are recommended to improve the clarity of information: 1) define the purpose of the material, 2) use short, 8-10 word sentences, using simple words with one or two syllables, write in the active voice, using a conversational style, 3) use a style that is easy to read, using subheadings in upper and lowercase letters, and use bold type for emphasis of key information, 4) use shorter paragraphs, leaving a wider space between segments, 5) provide a question and answer page for client interaction, 6) include simple, meaningful, culturally sensitive graphics, the text should reflect the target audience's cultural beliefs and values, 7) use cues such as arrows, underlines, and bullets to help focus the reader's eyes on the most relevant information, and 8) if possible, use language in the text the client would use (National Institutes of Health, 1993). Thus, the challenge is to provide information in a way that is accurate, unbiased, detailed, yet concise, with clear concepts throughout.

Readability. The ease with which information is read is not only influenced by the words themselves, but also by the shape and size of the letters. Suggestions to improve readability include: using print in both upper and lowercase with short, simple sentences and colorful materials (Mayeaux et al., 1996). The font (or typeface style) size should be at least 12 points or more as larger text is easier to read, and a serif style (Brownson, 1998). Serif style has little bars on the tops and bottoms of the letters which are easier on the eyes and thus easier to read (e.g. Times Roman) (Freda, 2002).

Handout Development

The development of an educational tool (in the form of a handout) regarding "routine" prenatal screening tests, was conducted as the project component of a clinical practicum in the Nurse Practitioner program. This practicum took place over an 11 week

period at 385 River Avenue Community Health Center, a multi-disciplinary center. The goal of the project was to provide a handout useful to both the client and health care provider in primary care practice.

Ideally, a formal assessment of the learning needs of pregnant women would have been done prior to the development of an educational tool. However, due to the time constraints of the project, this was not possible. Thus, the need for more information regarding routine prenatal screening tests was drawn from the previous literature review, as well as from the health care providers (physicians, nurse practitioner, and primary care nurses) at the practicum setting.

A review of the available educational information was done in order to obtain an idea of what and how information is currently being presented. There are numerous written materials on hand in various forms (e.g. booklets, pamphlets, brochures). Most of these materials are directed at the general population rather than addressing the specific needs of pregnant women. For example, Hepatitis B, HIV, and STD pamphlets may mention pregnancy but are not specifically written for the pregnant woman. A pamphlet that included all of the prenatal screening tests was not found.

Many pamphlets contained a great deal of information, and used medical language/jargon that may be challenging for the average reader to understand. Despite the fact, that for the most part, information is presented in a comprehensive manner, the length of the material and size of the handout may be a deterrent to many clients. It is apparent that many educational materials are indeed written at higher reading levels than that of the average population.

Format

Suggestions regarding how to format the handout in terms of the content, presentation, and organization of material as well as writing style were drawn from the previous literature review. Issues surrounding cognitive learning theory, the principles of adult learning and factors that affect the clarity and readability of material were incorporated into the development of the handout.

To make certain that the tests included in the handout reflected current practice recommendations, guidelines of the Society of Obstetricians and Gynaecologists of Canada (1998) and The Canadian Task Force on the Periodic Health Examination (1994) were reviewed, as well as the Manitoba Prenatal Record. This information was then used as a guide to organize the structure of the handout (e.g. tests according to trimesters) and formed the basis of the handout. The content was further organized in a manner that was consistent with the theoretical framework to promote ease of readability and retention of material.

From the literature on cognitive learning theory, it is known that new "to be learned" information is stored in the limited capacity of short term memory. This information, if not acted upon or used quickly, soon becomes lost or forgotten. Therefore, it is suggested that the method of "chunking" or organization of information into meaningful pieces that belong together, may increase the storage capacity (Schunk, 2000). This concept was applied to the handout, as information was "chunked" into sections that belong together, such as trimesters, and the type of test that is done.

The encoding process relates to how new information may then be stored in long term memory. It is suggested that this process may be enhanced by relating new

information to what is already known (Schunk, 2000). Due to the volume of tests that needed to be included in the handout, it was not possible to provide a great deal of detail for each test. In terms of expanding upon the information given, it was not realistic to do this in the written form, therefore, one may consider this process in the discussion that would accompany the handout. For example, when reviewing the handout with the woman, depending on her experience (e.g. multi gravida), one may ask questions related to her previous pregnancy and experience with screening tests. This questioning may serve as a means of "jogging" her memory and potentially increase the significance of the tests in relation to her experience. For example, if the woman was anemic in a previous pregnancy, she would likely have an increased familiarity with the hemoglobin screening test and its importance.

The principles of adult learning were also applied to the development of the handout. Simple concepts are presented first (e.g. broad definition of what prenatal screening tests are), once the client has grasped this information, more complex details are presented (e.g. definition of each specific test).

The handout may be thought of as a "stepping stone" to further discussion. A simplified overview of the various tests is presented, allowing opportunities for questions and clarification of misconceptions, which promotes active participation of the client. To further promote this participation, the handout may be individualized for each woman. Blank lines are available to insert the woman's name, due date, the health care provider's name, contact number, and the approximate dates that each test is due, so that the client may know what to expect at subsequent visits. This provides anticipatory guidance and may prompt questions, as the woman is aware of approximate test dates.

The handout was designed in consideration of the suggestions made for readable materials as previously outlined. For example, the text is written using a 12 point, serif (Times Roman) font, with colored subheadings, cues, and graphics where available. The information written on each of the tests is provided in short, simple sentences. Please refer to Appendix E for the handout draft.

Content Validity

When developing any material for the purpose of client health education, the assurance of content validity is essential. In order to assess the validity of the content and potential usefulness the handout, a draft was reviewed by several health care providers (physicians, nurse practitioner, primary care nurses, public health nurses and midwives). Obstetricians were not included in this review as the intention of the handout was for use by health care providers in primary care. Furthermore, by the time most women have transferred care to an obstetrician, the majority of screening tests already have been done. In addition, several women who were either pregnant or had previously given birth were asked to review the draft.

Informal feedback obtained from health care providers and clients validated the content and offered suggestions on how to clarify and improve the material. Where appropriate, the content was altered to reflect these recommendations. These alterations are discussed in Chapter Four.

Readability Formula

There are various methods available for assessing the reading level of educational material. Most methods use a mathematical formula to measure combinations of sentence length and frequency of multisyllabic words (Freda, 2002). These methods include: the

SMOG formula, the Fry formula, or a computer based word processing program such as Microsoft Word or Corel's Word Perfect. These methods all have been researched and proven to correlate with each other in terms of accuracy (Meade & Smith, 1991).

The Microsoft Word 2002 method was used for this project. This method analyzes the complete document as it is typed on the computer, and upon completion of a spelling and grammar check, the readability statistics and the Flesch-Kincaid readability score is displayed (Freda, 2002).

The Flesch-Knicaid grade level calculates readability based on the length of sentences and words and is useful for grades 5 through college (London, 1999). For example, a score of 10.2 indicates a person needs 10.2 years of education to successfully read the text. A Flesch reading ease score rates the text on a 100 point scale based on the average sentence length and number of syllables per word (Doak et al., 1996). The higher the score, the easier the text is to understand.

The readability of the handout was compared to a pamphlet distributed by the Cadham Provincial Laboratory in 1998 regarding Maternal Serum Screening. The CPL pamphlet (1998) was selected for comparison as it was the only relevant one available. The readability statistics of both the handout and the CPL pamphlet (1998) are discussed in Chapter Four.

Proposed Evaluation

Because grade level is only one factor that influences the readability of written materials, Doak et al. (1996) developed a suitability assessment of materials (SAM) tool for evaluation of the format of educational materials. Factors that affect the quality of the material and the ease with which it is read and understood are examined with the SAM

method. Please refer to Appendix F for the SAM scoring sheet and Appendix G for the SAM evaluation criteria that outlines how to assign the scores.

It is proposed that this SAM method of evaluation would be used for assessment of the final draft of the handout. Much of the SAM criteria examines the ability of material to influence a change in behavior and therefore does not apply to this project. The primary goal of the handout is to increase womens' knowledge not change their behavior. However, this method is still considered useful as it provides an objective measure of the quality of the written material.

As a quick method of determining the appropriateness of client educational materials, a 17 item checklist that examines factors such as the organization, writing style, appearance, and appeal of written material was used to compare the project handout and the CPL pamphlet (1998) (Doak et al., 1996). Please refer to Appendix H for this checklist. The higher the score is out of 17, the more readable the material is (Doak et al., 1996).

Summary

The previous discussion highlights the essential elements in providing quality health education to clients. The gathering of relevant material is simply the first step in the process of developing educational material. What is done with the information in terms of organization and presentation involves consideration of the broader concepts of learning. The challenge is to construct the information in a manner that has both relevancy and meaning within the context of the individual client's life.

Chapter Four

Results

Introduction

A four page handout (in the form of a booklet) was developed to reflect the "routine" screening tests as recommended by the current practice guidelines of the Society of Obstetricians and Gynaecologists of Canada (1998) and The Canadian Task Force on the Periodic Health Examination (1994), as well as the Manitoba Prenatal Record. A draft form of the handout was reviewed by health care providers as well as pregnant women, and alterations were made as appropriate. A comparison was made between the developed handout and the CPL pamphlet (1998) in order to assess the variation in ease of readability and literacy level.

Draft Review

Informal feedback from health care providers indicated a need to clarify certain information (e.g. Rh factor testing) and offered validation of the content. Among the physicians, there was variation in terms of what tests they considered to be "routine". For example, some physicians routinely order an oral glucose challenge test and Group B Streptococcus test on all pregnant women and were surprised that in the handout these tests were identified as being done according to risk factors. It was explained that all of the tests included in the handout were drawn from current practice recommendations which recognize both "routine" and risk factor based screening as being acceptable. The midwives were in support of the handout, but consider all prenatal tests "optional" and do not routinely check the woman's urine, weight and blood pressure at each visit.

Some health care providers (primary care nurses and physicians) suggested adding more information regarding the complications that may occur to mother and fetus with abnormal results/conditions. It was emphasized that the purpose of the handout was to provide an overview of the tests, not a detailed description of each. The idea was to develop a concise handout with the expectation that abnormal results would necessitate a more in depth discussion. The concept "less is more" may be applied in that it is best not to overwhelm the client with too much information, in particular with all of the negative possibilities. For example, by teaching simple concepts first, progression to the more complex may be done according to the individual learning needs of the woman which supports the principles of adult learning. In general, the health care providers thought that this tool would be something they would find useful in their practice.

Generally, the women who reviewed the draft were in favor of the idea of a handout that summarizes the tests. It was thought that the handout would be especially useful to someone who had not previously had a baby and for teenagers. Some women who had a baby, admitted to not knowing what all the tests were about and stated they would have appreciated something similar to this handout in their first pregnancy. A request was made for additional information such as: the frequency of prenatal appointments and the tests that are done at each visit (e.g. urinalysis, blood pressure, weight). As well, women seemed more familiar with the term Triple Test when referring to MSS, thus the handout was revised to reflect this.

All of the feedback was considered and where appropriate, alterations were made. The draft was then reviewed twice more by health care providers to ensure that the content was accurate and clear.

Readability Comparison

In order to determine the usefulness of the project handout, the readability was assessed and the checklist for appropriateness of material (as in Appendix H) reviewed. The comparison made between the project handout and the CPL pamphlet (1998) illustrates the importance of considering more than just grade level when developing client educational materials. Please refer to Appendix I for a copy of the CPL pamphlet (1998). Please refer to Appendix J for the readability statistics of the CPL pamphlet (1998) and the project handout.

Despite the fact that the CPL pamphlet (1998) and the project handout contain almost the same number of words and sentences, there is great variation in how these words and sentences are organized and formatted into paragraphs. For example, there are 134 paragraphs in the project handout versus a mere 25 in the CPL pamphlet (1998). As well, the CPL pamphlet (1998) contains an average of 12.7 words per sentence versus 5.4 words per sentence in the project handout. The use of longer sentences and less paragraphs does not support the strategies to promote clear and readable educational material.

There is also great variation in the ease of readability (Flesch reading ease) and use of passive sentences between the project handout and the CPL pamphlet (1998). The project handout has a reading ease of 70.1 and a 9% use of passive sentences while the CPL pamphlet (1998) has a reading ease of only 59.7 and a 16% use of passive sentences. This comparison illustrates the importance of incorporating the perspective of information processing (e.g. chunking information) and techniques to enhance readability

(e.g. short, simple sentences, use of active voice) into the development of written educational materials.

The anticipated grade level of the project handout was 5 - 8 based on the Canadian literacy rates previously mentioned. The readability of the handout was found to be at a grade level of 4.8. Although this level is lower than what was planned, in speaking to the experts at the Manitoba Literacy Counsel, it was advised that this reading level is preferred. Studies have shown that the majority of people are not offended by educational material that is presented in a simplified manner (Doak et al., 1996).

The project handout scored a 13/17 on the checklist for appropriateness of print material. The items not met include; a lack of ample white space between the sentences. Although illustrations are included, they are not simple line drawings, and a question and answer format is not used. As well, a summary that emphasizes "what to do" is not included. This particular item may be considered not applicable as the purpose of the handout is not focused on client behavior.

The readability of the CPL pamphlet (1998) was found to be at a grade level of 8. Although this may be an acceptable grade level, a score of 7/17 on the checklist for appropriateness of print material is not. There are several deficiencies in this pamphlet. For example, the cover does not draw attention to a particular audience, the text presents 4-6 points per section, there is a great deal of medical jargon used, and the text is in black print with some key concepts highlighted in grey, with little contrast between the print and the page. The text is mostly blocked and graphics are not used at all. Although the material is appropriate for women, it may be difficult for a teenager to grasp the content.

On the last page of the CPL pamphlet (1998) a list of definitions are provided. However, the definition for the term amniocentesis is incomplete. This error was found in the same pamphlet from two different sites (River Avenue Community Health Center and Womens' Health Clinic). In 1998 these pamphlets were mass copied (10,000) and distributed prior to the recognition of a page omission (Manitoba Maternal Serum Screening Program, personal communication). There had been a photocopying error. However, due to the expense of mass production, the pamphlets were left in circulation. It would be interesting to know how many health care providers have given this pamphlet to their clients unaware of this omission. An updated version of the pamphlet is available on the Internet. However, the question remains as to why the updated version is not on the clinic shelves?

Summary

In terms of the feedback obtained from health care providers regarding the handout, there were differences in what each considered most important. For example, the physicians seemed to focus on the accuracy of the test descriptions and whether or not the test was routinely done, while the nurses requested more information on each test. Although midwives thought this would be a useful handout in their practice, they consider all prenatal tests to be "optional". Even though all of these professions are based on the foundation of providing optimal and safe care to clients, this variation in focus may perhaps be a reflection of the unique philosophies among each profession. For example, physicians' practice is based on a medical model, while nursing is focused on a holistic and client centered approach, and midwifery is based on feminist perspectives, promoting autonomy for women.

The comparison made between the project handout and the CPL pamphlet (1998) illustrates the need to think beyond content and reading level when developing educational materials for clients.

Chapter Five

Discussion

Introduction

Health care providers are in a key position to educate clients. The structure of prenatal care (regular surveillance in relation to trimesters) permits numerous educational opportunities. However, the manner in which information is provided varies among health care providers. It has been identified in the literature that women want more information regarding the screening tests they are subjected to throughout pregnancy, and health care providers often have not been adequately trained how to present such information.

Thus, the goal of this practicum project was to develop an educational tool in the form of a handout regarding the "routine" prenatal screening tests for use in primary care practice. The primary purpose of developing this handout was twofold; 1) to increase the knowledge level of women regarding routine prenatal screening tests and 2) to provide a useful educational tool in primary care practice.

Based on the informal feedback obtained from a small number of health care providers and women, one might say that the goal of this practicum project was met. A concise handout regarding "routine" prenatal screening tests was developed in accordance with the current clinical practice guidelines. A succinct, organized approach was used to explain the various tests, to promote understanding of the information among women of various ages and reading ability.

Many suggestions were made to improve the content of the handout. However, in order to try and maintain a concise handout, not all suggestions were included in the

revised handout. Thus, the challenge was to create a tool that would be useful to the majority of clients and health care providers.

Whether or not the goals of this project will be achieved in practice, is yet to be determined. However, it is hoped that the utilization of this handout will foster health teaching among health care providers for the benefit of all prenatal clients.

Limitations

Due to time constraints of the project, it was not possible to first identify the learning needs of the target audience. This information would have been useful prior to constructing the handout, so as to ensure that particular needs were met. In trying to develop a concise handout, many details had to be omitted regarding the tests and consequences of various results. This requires the health care provider to include supplementary verbal information as necessary. An inquiry into what details, and how information is verbally presented was not done. This information would be hard to ascertain without a formal process of research.

Due to the lack of available handouts specific to prenatal screening tests, it was not possible to compare the handout to more than one (the CPL pamphlet). Thus, a broader view of what and how information is currently presented was not obtained.

Recommendations

The handout was designed for pregnant women, thus they should have final approval on the product developed. In order to gain this approval, it is strongly recommended that the handout be pilot tested on several women (e.g. 10-15) in the clinical setting. This must be done prior to the final printing of the handout and its acceptance into general practice. Women's opinions on the format, ease of readability,

ability to understand the material presented, acceptability of length, and adequacy of content will aid in insuring that the handout best suits the needs of pregnant women. This information could be obtained through the use of a brief questionnaire, for example: 1) What did you like/not like about this handout ?, 2) If a section was difficult to understand, please circle it., and 3) If you were able to make this handout better, how would you change it ?.

In order to ascertain if the knowledge level of women is increased with use of the handout, a pre and post test may be administered. One may have the woman read the handout and then ask specific questions to determine if the handout was useful or not. For example, prior knowledge level may be assessed by asking what anemia means before and after reading the handout.

As well, it would be necessary to obtain feedback from the health care providers who are pilot testing the handout. Opinions on the ease of use, and identification of "trouble spots" needing further clarification would provide invaluable information for "fine tuning" the handout. Finally, ongoing consultation with the health care providers involved in the use of this handout is recommended to ensure that there is agreement upon the final version.

Implications for Practice

Ideally once the handout has gained final approval from pregnant women it can be implemented into practice. Since the handout was developed during a practicum at the River Avenue Community Health Center and most of the feedback was obtained from the staff there, it would be a suitable pilot site for the handout. The staff could try using the handout for one to two months and then an evaluation could be done.

From the previous literature review it is known that variation exists in how and what information is provided by health care providers regarding prenatal screening tests and also suggested that health care providers lack training in how to present screening tests. Thus, prior to use of the handout in practice a staff meeting should be held to provide an opportunity for health care providers to share their knowledge and experience, and discuss implementation of the handout. In order to promote consistency in how the handout is used, it is important to clarify how the tests will be explained to the client, as well as the interpretation of results, in particular the implications of an abnormal result. Obviously it is impossible to ensure that the exact same message is delivered by everyone, as each health care provider has their own unique perspective and experience to offer. However, if there is agreement among health care providers regarding the content and presentation of information to be provided, it is more likely that a consistent message will be delivered to clients.

Conclusion

The complexity of developing an educational tool that deals with a broad topic such as prenatal screening tests is revealed in the process of trying to create a tool that is simple yet accurate, concise yet detailed. Perhaps the most challenging task is to condense all of the "nice to know" information into an understandable "need to know" form. Through the process of developing the handout it quickly became clear that although the content forms the basis of any educational tool, it is how one constructs the content that determines whether or not the material will be of any value. The literacy level, design, organization, and use of graphics are just as important as the content as they influence how easily the written material is to understand.

It is hoped that the use of this project handout will facilitate health care providers to teach pregnant women regarding the screening tests done throughout pregnancy. By acknowledging the educational needs of women during pregnancy it is possible to foster informed decision making and active participation in their own care. Ultimately this may contribute to the provision of quality prenatal care.

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Appendix A

Manitoba Prenatal Record

MANITOBA PRENATAL RECORD — Part 1

MB Health # PHIN

Name	Date of Birth (D / M / Y)	Age
Address	Postal Code	
Phone # (Home) (Work)		S / M / CL (Circle)
Education ≤8 9 10 11 12 >12 (circle highest grade completed)	Occupation	
Father's Full Name	Occupation	Age
Anticipated Site of Delivery		

DATE

WARD

FULL NAME

YEAR OF BIRTH

HOSPITAL NUMBER

PHYSICIAN / MIDWIFE

Attending Physician / Midwife	Referring Physician / Midwife	Consultant	Physician / Midwife for Baby

INFORMED CONSENT: I understand that providing this information is necessary to assist the physician / midwife in planning my care throughout pregnancy, childbirth and postpartum. My personal information will be kept private, but may be shared with other professionals directly involved in my care except_____. This information, with all my personal identifiers removed, may be used in health care research. I understand that I can withdraw or revoke this consent at anytime in writing.

Mother's Signature Witness Date

OBSTETRICAL HISTORY

Grav	Para	Term	Preterm	Alive	SB	NND	T.Abort	S.Abort	Mult	Ectop

Year	Place	Delivered By	Gestation Weeks	Duration of Labour	Type of Delivery	Anaesth	Sex	Birth Weight	Present Health	Complications / Comments

FAMILY HISTORY

	YES	NO	COMMENTS
Congenital Abnormalities	☐	☐	
Genetic Disease (see over)	☐	☐	
Diabetes	☐	☐	
Hypertension	☐	☐	
Bleeding Disorders	☐	☐	
Twins	☐	☐	
Anaesth. Problems	☐	☐	
Mental Illness	☐	☐	
Depression	☐	☐	
Other	☐	☐	

SIGNIFICANT MEDICAL ILLNESSES

	YES	NO	COMMENTS
Cardiovascular	☐	☐	
Hypertension	☐	☐	
Diabetes	☐	☐	
Renal / Bladder	☐	☐	
Infections (e.g. herpes)	☐	☐	
Varicella	☐	☐	
T.B. / Exposure	☐	☐	
Infertility	☐	☐	
Epilepsy	☐	☐	
Thyroid Dysfunction	☐	☐	
Asthma	☐	☐	
Bleeding Disorders	☐	☐	
Transfusions	☐	☐	
Thrombosis / Phlebitis	☐	☐	
Mental Illness	☐	☐	
Depression	☐	☐	
Other	☐	☐	

SIGNIFICANT SURGICAL ILLNESSES

	YES	NO	COMMENTS
Cone Biopsy CX	☐	☐	
Pelvic Surgery	☐	☐	
Abdominal Surgery	☐	☐	
Fractured Pelvis	☐	☐	
Spinal Surgery	☐	☐	
Anaesth. Problems	☐	☐	
Other	☐	☐	

Current Medications	Allergies

PREGNANCY DATING

Contraception Type_____

Pregnancy test positive Date_____ Type_____

LMP D / M / Y

INITIAL EDD D / M / Y

Cycle _____(Days)

Uterine size at first visit Weeks Expected ____ Weeks Actual ____

Certain Yes ☐ No ☐

Ultrasound Yes ☐ No ☐

Normal Yes ☐ No ☐

Pill Withdrawal Yes ☐ No ☐

REVISED EDD D / M / Y

HISTORY AT FIRST VISIT

	YES	COMMENTS
Bleeding	☐	
Nausea / Vomiting	☐	
Abdominal Pain	☐	
Infection / STD	☐	
Other	☐	

PHYSICAL EXAMINATION

D M Y

Height ____ Pre-Preg. wt. _____ Pres. wt._____ B.P. ____

Check (✓) if normal

Heent	☐	Nipples	☐	Vulva	☐
Thyroid	☐	Breasts	☐	Vagina	☐
Teeth/gums	☐	Abdomen	☐	Cervix	☐
Chest	☐	Back / Ext.	☐	Uterus	☐
Heart	☐	Pelvic Adequacy	☐	Adnexae	☐

COMMENTS (Detail abnormal Findings)

LIFESTYLE & SOCIAL HISTORY

NUTRITIONAL CONCERNS Yes ☐ No ☐

- pre-conceptional folic acid Yes ☐ No ☐
- post-conceptional vitamins / folic acid Yes ☐ No ☐

SOCIAL ISSUES: See questionnaire

- stress score _____
- home situation concerns Yes ☐ No ☐
- support systems adequate Yes ☐ No ☐
- other (e.g. financial)
- C & FS involvement Yes ☐ No ☐

SMOKING Yes ☐ No ☐ If yes,

cigs/day _____

quit date _____ (D / M / Y)

second-hand smoke Yes ☐ No ☐

ALCOHOL USE Yes ☐ No ☐ If yes, see algorithm (over)

days/wk _____

drinks/day _____

quit date _____ (D / M / Y)

T-ACE score ____

STREET DRUG USE Yes ☐ No ☐ If yes,

Past ☐ Current ☐ Dependent ☐

type _____

quit date _____ (D / M / Y)

Referred to:

MANITOBA PRENATAL RECORD Part 2

Name | Date of Birth (D / M / Y) | EDD: | Allergies:

INFECTION SCREENING

	RESULTS	DECLINED
SEROLOGY		
Hepatitis B		☐
HIV		☐
(D / M / Y)		
• prev. test		
• if declined, why?		
Rubella		☐
Varicella (if history is negative)		☐
VDRL		☐
Other (e.g. Hepatitis C, Toxo)		
CERVIX		
Chlamydia		☐
Gonorrhea		☐
Other		
VAGINA / RECTUM		
Group B Strep		☐
• gestation done		
Other (e.g. Bacterial vaginosis)		
MSU		☐

PAP SMEAR: (Date)

Rh Mother: Lab No.: Rh Father:

	Initial	28wks	
Antibodies:		Rhlg:	Date (D / M / Y)
Maternal Serum Screening (MSS)	Accepted ☐	Declined ☐	Results:
Amniocentesis / CVS:	Accepted ☐	Declined ☐	Results:

	Initial	28 wks
Hgb		
Platelets		
Blood Sugar (50 g)	28 wks	Other
GTT (75 g)	Fast	1 hr. 2 hr.

RISK FACTORS

Age ☐ Parity ☐

PAST OBSTETRIC HISTORY

- PPH / Manual removal ☐
- Baby > 9 lbs (4082 gm) ☐
- Baby < 5 1/2 lbs (2500 gm) ☐
- Hypertension in Pregnancy ☐
- Previous Caesarean ☐
- Stillbirth or Neonatal Death ☐
- Gestational diabetes ☐
- Incompetent cervix ☐

ASSOCIATED CONDITIONS

- Previous gynaecological surgery ☐
- Chronic renal disease ☐
- Diabetes mellitus ☐
- Cardiac disease ☐
- Other medical disorders ☐
- Depression ☐

LIFESTYLE / SOCIAL ISSUES

- Nutrition ☐
- Smoking ☐
- Alcohol ☐
- Street drugs ☐
- Stress ☐
- Home situation ☐

PRESENT PREGNANCY
(e.g. twins, breech, diabetes)

ULTRASOUND / FETAL ASSESSMENT

Date	G.A.	% ile	BPS	Comment / Placental location

MISCELLANEOUS

PRENATAL EDUCATION
Previous ☐ This pregnancy ☐ None ☐

DATE D / M / Y	WT	BP SITTING	URINE P / S	GA WEEKS	FUNDUS CM.	PRES.	FH	FM	COMMENTS / LAB

DISCUSSION TOPICS

- Nutrition / Vitamins ☐
- Weight Gain ☐
- Dental Care ☐
- Smoking ☐
- Drugs (pres, OTC, street) ☐
- Alcohol ☐
- Activity ☐
- Work ☐
- Breastfeeding ☐
- Fetal Movement ☐
- Bowel / Bladder ☐
- Back ☐
- Sexual Activity ☐
- Labour ☐
- Birth plan ☐
- Coverage ☐
- Circumcision ☐
- Postpartum Support ☐
- Parenting ☐
- Contraception ☐
- Tubal Ligation ☐

Appendix B

Summary of Prenatal Screening Tests

Test	Sensitivity and Specificity of Screening Tests	Level & Class of Evidence for Test	Practice Recommendation
Hgb & Platelets	▪ Not available.	▪ III, B	▪ Screen at initial visit & at 28 wks.
Rh factor	▪ The reagent anti- D test determines what the factor is. Sensitivity & specificity rates are not applicable (CPL, 2003).	▪ I, A ▪ II-1, B	▪ Screen at initial visit. ▪ Repeat at 28 wks if Rh negative. ▪ Give immune-globulin at 28wks, & post partum.
Rubella antibodies	▪ Sensitivity = 98%, specificity = 99% (CPL, 2003).	▪ III, B	▪ Screen at initial visit. ▪ Vaccinate post-partum if not immune.
Hepatitis B	▪ Sensitivity = a range of 0.17 – 0.60 ng/ml, specificity = 99.95% (CPL, 2003).	▪ III, B	▪ Screen at initial visit.
Varicella antibodies	▪ IgG antibodies to Varicella - Zoster virus: Sensitivity = 99.3% , specificity = 100%. ▪ IgM antibodies to Varicella-Zoster virus: Sensitivity = 98.5%, specificity = 100% (CPL, 2003).	▪ III, B	▪ Screen at initial visit if history of Chicken Pox is uncertain.

VDRL	▪ Sensitivity = 90%, specificity = 100% (CPL, 2003). *Sensitivity varies according to the stage of syphilis: primary = 75%, secondary = 99 - 100%, latent = 75%, and late = 75% .* Specificity may be diminished in HIV positive clients (Desai & Pratt, 2002).	▪ III, B	▪ Screen at initial visit.
HIV	▪ Sensitivity = 100%, specificity = 99.94% (CPL, 2003).	▪ II-2, C (in pregnant women). ▪ I, A (in high risk asympto-matic population).	▪ Offer at initial visit. ▪ Repeat in 6 mos in seronegative, high risk clients (e.g. STDs, multiple partners, IV drug use).
Pap smear	▪ High false negative rates of up to 25% depending on the quality of the sample, and laboratory.	▪ II-2, B (for general female population).	▪ Screen at initial visit if not done in the past 6-12 mos.
Chlamydia **&** **Gonorrhea**	▪ Cervical swab for chlamdial culture has an estimated sensitivity of 75- 95%, and a specificity of 100%. ▪ In women, single endocervical cultures have an estimated sensitivity of 80-95%, and a specificity of 95- 100%.	▪ III, B for general population). ▪ III, A (for high risk population).	▪ Screen at initial visit & as necessary according to risk factors.
Midstream urinalysis & culture	▪ Identifies 80% of women with asymptomatic bacteriuria when done at ideal time between 12-26 wks.	▪ I, II -1, A	▪ Screen at initial visit & as necessary.

Maternal serum screening	▪ Expected result for overall MB population: Triple Test detection rate of 70% for DS, with a false positive rate of 8%. Women < age 35: false positive rate(DS) of 4%, detection rate of 50%. Women ≥age 35: false positive rate of 25%, detection rate of 89% (CPL,2003). 2% of women will have high AFP levels, with an 80% detection rate for Spina bifida (CPL, 2003).	▪ II-2, B	▪ Offer to all women at 15-18 wks. (In MB, new recommend-ation is between 16-18wks, CPL will interpret samples between 15- 20wks and 6 days gestation).
OGCT	▪ Sensitivity = 79-83%, specificity = 87-93% at plasma glucose cutoff points of 7.8 - 8.3 mmol/L.	▪ II-1, II-2, III, C	▪ Screen at 24-28 wks universally or according to risk factors.
Ultrasound	▪ If done prior to 20 wks, sensitivity for anomaly detection varies from 25-71%. ▪ Sensitivity and specificity are near 100% when used for NTD detection.	▪ I, B (for selective use - high risk screening for NTDs). ▪ B (for routine use).	▪ Screen selectively at 18-20 wks.
GBS	▪ A positive culture has a predictive value of GBS colonization at the time of delivery of 67%.	▪ III-B	▪ Screen at 35-37 wks universally or according to risk factors.

Reference: The Canadian Guide to Clinical Preventative Health Care. (1998). *The Canadian task force on the periodic health examination.* Health Canada.

* unless otherwise stated

(CPL = Cadham Provincial Laboratory)

Appendix C

Guide to Interpreting Evidence

Quality of Evidence

I. Evidence obtained from at least one correctly designed randomized control trial.

II-1. Evidence obtained from well-designed controlled trials lacking randomization.

II-2. Evidence obtained from well-designed cohort or case-control investigative studies, preferably from more than one research group or centre.

II-3. Evidence obtained from comparative studies with or without intervention. Significant results in uncontrolled experiments could also be included in this category.

III. Opinions of respected authorities, based on clinical expertise, and experience, descriptive studies or reports of expert committees.

Classification of Evidence

A. There is good evidence to support the recommendation that the condition be specifically considered in a periodic health examination (prenatal exam).

B. There is fair evidence to support the recommendation that the condition be specifically considered in a periodic health examination (prenatal exam).

C. There is poor evidence regarding the inclusion or exclusion of the condition in a periodic health examination (prenatal exam), but recommendations may be made on other grounds.

D. There is fair evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination (prenatal exam).

E. There is good evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination (prenatal exam).

Adapted from: The Canadian Guide to Clinical Preventive Health Care. *The Canadian task force on the periodic health examination.* (1998). Health Canada. (p. xxxvii).

Appendix D

Maternal Serum Screening

I. Expected outcomes for AFP screening of 10,000 women

10,000 pregnancies

10 Spina bifida		9990 Unaffected	
8 AFP Elevated	2 AFP Normal	200 AFP Elevated	9790 AFP Normal

- This indicates that for the average woman who has an elevated AFP, the likelihood of her having a baby with Spina bifida is 8:200 or 1:25, assuming a population frequency of 1/1000.

II. Risk of Down Syndrome according to maternal age

Maternal age at delivery	Risk for Down Syndrome
15	1/1,578
20	1/1,528
25	1/1,351
30	1/909
35	1/384
40	1/112
45	1/28

Reference: Cadham Provincial Laboratory Public Health Branch (2003). Changes to the Manitoba Maternal Serum Screening Programme MSSP). Manitoba Health.

Appendix E

Handout Draft

When should you book a prenatal visit?

- ☼ Every 4 -6 weeks until 30 weeks.
- ☼ Every 2-3 weeks from 31-36 weeks.
- ☼ Every 1 -2 weeks from 37 weeks until you deliver.

What tests will you have done at every visit?

- ☼ Urine check
- ☼ Blood pressure check
- ☼ Weight check
- ☼ Listen to the baby's heart beat (after the 12 -14th week of your pregnancy).

Prenatal Screening Tests?

Name: _____
Due Date: _____
Health Care Provider: _____
Phone Number: _____

What are prenatal screening tests?

- **Special tests** that **check for conditions** you **may have or be at risk of** getting while you are pregnant.

How are these tests done?

- Blood tests, swabs and urine samples.

Why is it important to have these tests done?

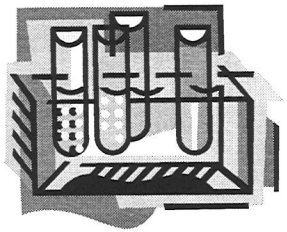
- To **make sure** that **you and your baby are healthy** and to **prevent complications**. Because you may not have symptoms for many conditions, testing allows for **early detection and treatment.**

When do I get these tests done?

- **Most tests** are **done at** your **first prenatal visit**. The rest are done at **certain times in each trimester.**

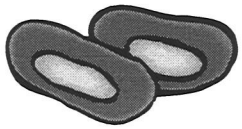
1. First Trimester (0 - 13 weeks)

Blood tests:



- At least **4 tubes of blood** are needed.

Hemoglobin & platelets ("he-mo-glo-bin"& "plate-lits")



Red Blood Cell

- **Hemoglobin** is a part of your blood that carries **oxygen** and gives you **energy**. You may be **anemic** if your hemoglobin level is **low**. This means you may not be getting enough **iron** in your diet. You will have to take **iron pills** and **eat more iron rich foods.**

- **Platelets** are a part of your blood needed for **clotting**.

- These levels are **checked again at 28 weeks (date due: _____).**

Rh factor

- Rh factor is a **protein** that **may or may not be in your blood**. You are **Rh positive** if you have this factor, or you are **Rh negative** if you don't. **If** you are **Rh negative**, there is a **chance** your blood may react against the baby's. In order to **prevent this reaction**, you are given an **injection** of an **immuno globulin** later in your pregnancy. **If** you are **Rh negative**, the **father of the baby** will also **need a blood test.**

Rubella ("roo-bell-ah")

- Rubella (**German Measles**) is spread by air droplets and close contact with an infected person. You may have had a **vaccine** to prevent Rubella when you were in school.

- **If there are antibodies** in your blood, you and your baby will be **protected. If not**, you need to **avoid contact** with anyone with this disease. You will need to be **vaccinated after the baby is born.**

Hepatitis B

- Hepatitis B is a **viral infection** of your **liver.** It is **spread by** contact with the **blood or body fluids** of an infected person (e.g. by having sex without a condom or using IV drugs). If you are Hepatitis B positive, your **baby may be protected by** a **vaccine** after he/she is born.

Chicken Pox

- Chicken Pox is spread by close contact with an infected person. If you've had Chicken Pox, there may be **antibodies** in your blood **to protect your baby** from getting it. **If** you **don't have antibodies**, you need to **avoid contact** with anyone with this disease.

Syphilis ("sif-ah-lis")

- Syphilis is a **sexually transmitted disease (STD).** If you have syphilis, there are **antibiotics** to cure it. **You and your partner** will need to be **treated.**

Human immunodeficiency virus (HIV)

- HIV is the **virus that causes AIDS.** It is spread by contact with the **blood and body fluids** of an infected person. **If** you are **HIV positive**, this means that **you are infected. Your baby and partner may also be infected.** There are **medications** available to help **prevent** your **baby from getting HIV.**

*** It is your choice if you want to have this test.**

Swabs:

Pap smear

- A pap smear **checks for early signs of cancer** in your **cervix** (opening of your womb).

- A smooth stick and a Q-tip are used to take a **sample of cells** from your cervix.

Chlamydia ("klah-mid-ee-ah") & Gonnorhea ("gone-or-ee-ah")

- These are **STDs** that you **may have and not know.** If you have an STD, there are **antibiotics** to cure it **You and your partner** will need to be **treated.**

- A Q-tip is used to take a swab from your cervix.

Urinalysis & Culture:

- Many pregnant women have **bladder infections** without symptoms. A **sample of urine** is checked for infection.

2. Second Trimester (14 - 26 weeks)

Triple Test (**At 16-18 weeks, date due: _____**)

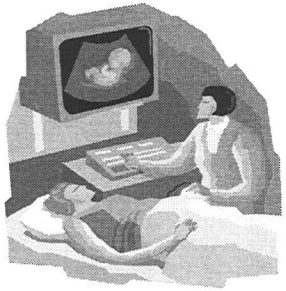
- This test measures **3 chemicals** in your blood that are found in pregnancy. It helps determine if your baby is **at risk for Down Syndrome** or **Spina Bifida**.

- **If** the result is **abnormal**, you will be **offered other special tests** (e.g. ultrasound, amniocentesis) to check the baby.

*** It is your choice if you want to have this test.**

* Some health care providers order the following tests for every pregnant woman, some do not. Your health care provider will decide if you need these tests.

Ultrasound (**At 18-20 weeks, date due: _____**)



- An ultrasound takes a **picture of the baby** to see how he/she is growing and may identify certain problems.

Glucose challenge test

(At 24-28 weeks, date due: _____)

- **Certain pregnant women are at risk** of developing a type of diabetes called **Gestational Diabetes**. If you are at risk, this test will be ordered.

- First you **drink a sweet liquid** and then an hour later your **blood sugar** is tested.

3. Third Trimester (27 - 40 weeks)

Group B Streptococcus ("strep-toe-coc-cus")(GBS)

(At 35-37 weeks, date due: _____)

- GBS is a **bacteria** that may grow in your vagina and rectal area. It usually does not make you sick but **may affect the baby after birth.** If you are **GBS positive**, you are given **antibiotics during labour** to prevent the baby from getting sick.

- A Q-tip is used to take a swab from your vagina and rectal area.

*** Talk to your health care provider if you have any questions.**

APPENDIX F

SAM Scoring Sheet

SAM Scoring Sheet

2 points for superior rating, 1 point for adequate rating,
0 points for not suitable rating, N/A if the factor does not apply to this material

Factor to be Rated	Score	Comments
I. Content		
a) Purpose is evident	_____	_____
b) Content about behaviors	_____	_____
c) Scope is limited	_____	_____
d) Summary or review included	_____	_____
II. Literacy Demand		
a) Reading grade level	_____	_____
b) Writing style, active voice	_____	_____
c) Vocabulary uses common words	_____	_____
d) Context is given first	_____	_____
e) Learning aids via "road signs"	_____	_____
III. Graphics		
a) Cover graphic shows purpose	_____	_____
b) Type of graphics	_____	_____
c) Relevance of illustrations	_____	_____
d) List, tables, etc. explained	_____	_____
e) Captions used for graphics	_____	_____
IV. Layout and Typography		
a) Layout factors	_____	_____
b) Typography	_____	_____
c) Subheads ("chunking") used	_____	_____
V. Learning Stimulation, Motivation		
a) Interaction used	_____	_____
b) Behaviors are modeled and specific	_____	_____
c) Motivation – self efficacy	_____	_____
VI. Cultural Appropriateness		
a) Match in logic, language, experience	_____	_____
b) Cultural image and examples	_____	_____

Total SAM score:_____ Total possible score:_____,
Percent score:_____%

Score interpretation: 70-90% = superior material, 40-69% = adequate material, 0-39% = not suitable material).

Adapted from: Doak, C., Doak, L., & Root, J. (1996). *Teaching patients with low literacy skills.* (2nd ed.). Philadelphia: Lippincott-Raven (page 51).

APPENDIX G

SAM Evaluation Criteria

I. Content

A) Purpose:

Superior: Purpose is explicitly stated in title, cover illustration, or introduction.

Adequate: Purpose is not explicit, it is implied, or multiple purposes are stated.

Not suitable: No purpose is stated in the title, cover illustration, or introduction.

B) Content topics:

Superior: Majority of material is application of knowledge/skills directed at desirable reader behavior rather than nonbehavior facts.

Adequate: At least 40% of content topics focus on desirable behaviors or actions.

Not suitable: Nearly all topics are focused on nonbehavior facts.

C) Scope:

Superior: Scope is limited to essential information directly related to the purpose. Experience shows it can be learned in time allowed.

Adequate: Scope is expanded beyond the purpose; no more than 40% is nonessential information. Key points can be learned in time allowed.

Not suitable: Scope is far out of proportion to the purpose and time allowed.

II. Literacy Demand

A) Reading grade level:

Superior: 5th grade level or lower (5 years of schooling level).

Adequate: 6th, 7th, or 8th grade level (6-8 years of schooling level).

Not suitable: 9th grade level and above (9 years of schooling level).

B) Writing style:

Superior: Both factors: 1) Mostly conversational style & active voice.
2) Simple sentences are used extensively; few sentences contain embedded information.

Adequate: 1) About 50% of the text uses conversational style & active voice.
2) Less than ½ the sentences have embedded information.

Not suitable: 1) Passive voice throughout.
2) Over ½ the sentences have extensive embedded information.

C) Vocabulary:

Superior: All 3 factors: 1) Common words are used nearly all of the time.
2) Technical, concept, category, value judgment (CCVJ) words are explained by examples.
3) Imagery words are used as appropriate for content.

Adequate: 1) Common words are frequently used.
2) Technical & CCVJ words are sometimes explained by examples.
3) Some jargon or math symbols are included.

Not suitable: 2 or more factors: 1) Uncommon words are frequently used instead of common words.
2) No examples are given for technical and CCJV words.
3) Extensive jargon.

D) <u>In sentence construction, the context is given before new information:</u>
Superior: Consistently provides context before presenting new information.
Adequate: Provides context before new information about 50% of the time.
Not suitable: Context is provided last or no context is provided.

E) <u>Learning enhancement by advance organizers (road signs):</u>
Superior: Nearly all topics are preceded by an advance organizer (a statement that tells what is coming next – e.g. headers or topic captions).
Adequate: About 50% of the topics are preceded by advance organizers.
Not suitable: Few or no advance organizers are used.

III. Graphics (illustrations, lists, tables, graphs, charts):

A) <u>Cover graphic:</u>
Superior: Cover graphic is 1) friendly,
2) attracts attention,
3) clearly portrays the purpose of the material to the intended audience.
Adequate: Cover graphic has one or two of the superior criteria.
Not suitable: Cover graphic has none of the superior graphic.

B) <u>Type of illustrations:</u>
Superior: Both factors: 1) Simple, adult-appropriate, line drawings/sketches are used.
2) Illustrations are likely to be familiar to the viewers.
Adequate: One of the superior factors is missing.
Not suitable: None of the superior factors are present.

C) <u>Relevance of illustrations</u>:
Superior: Illustrations present key messages visually so the reader/viewer can grasp the key ideas from the illustrations alone, without distractions.
Adequate: 1) Illustrations include some distractions.
2) Insufficient use of illustrations.

Not suitable: One factor: 1) Confusing or technical illustrations (nonbehavior related).
2) No illustrations, or too many illustrations.

D) <u>Graphics: lists, tables, graphs, charts, geometric forms:</u>

Superior: Step by step directions, with an example, are provided that will build comprehension and self-efficacy.

Adequate: "How to" directions are too brief for reader to understand & use the graphic without additional counseling.

Not suitable: Graphics are presented without explanation.

E) <u>Captions are used to "announce"/explain graphics:</u>

Superior: Explanatory captions with all or nearly all illustrations & graphics.

Adequate: Brief captions are used for some illustrations & graphics.

Not suitable: Captions are not used.

IV. Layout and typography:

A) <u>Layout:</u>

Superior: At least 5/8 of the following factors are present:
1) Illustrations are on the same page adjacent to the related text.
2) Layout & sequence of information are consistent, making it easy for the reader to predict the flow of information.
3) Visual cuing devices (boxes, shading, arrows) are used to direct attention to specific points or key content.
4) Adequate white space is used to reduce the appearance of clutter.
5) Use of color supports and is not distracting to the message. Readers need not learn color codes to understand and use the message.
6) Line length is 30-50 characters & spaces.
7) There is high contrast between the type & paper.
8) Paper has nongloss or low gloss surface.

Adequate: At least 3 of the superior factors are present.

Not suitable: 1) 2 or less of the superior factors are present.
2) Looks uninviting or difficult to read.

B) <u>Typography:</u>

Superior: The following 4 factors are present:
1) Text type is in uppercase and lowercase serif (best) or sans-serif.
2) Type is at least 12 point.
3) Typographic cues (size, bold, color) emphasize key points.
4) No ALL CAPS for long headers or running text.

Adequate: Two of the superior factors are present.

Not suitable: One or none of the superior factors are present. Or, 6 or more type styles and sized are used on a page.

C) Subheadings or "chunking":

Superior: 1) Lists are grouped under descriptive subheadings or "chunks".
2) No more than 5 items are presented without a subheading.
Adequate: No more than 7 items are presented without a subheading.
Not suitable: More than 7 items are presented without a subheading.

V. Learning stimulation & motivation:

A) Interaction included in text and/or graphics:

Superior: Problems or questions presented for reader responses.
Adequate: Question & answer format used to discuss problems & solutions (passive interaction).
Not suitable: No interactive learning stimulation provided.

B) Desired behavior patterns are modeled, shown in specific terms:

Superior: Instruction models specific behaviors or skills.
Adequate: Information is a mix of technical & common language that the reader may not easily interpret in terms of daily living.
Not suitable: Information is presented in nonspecific or category terms.

C) Motivation:

Superior: Complex topics are subdivided into small parts so that readers may experience small successes in understanding or problem solving, leading to self-efficacy.
Adequate: Some topics are subdivided to improve the readers' self-efficacy
Not suitable: No partitioning is provided to create opportunities for small successes.

VI. Cultural appropriateness:

A) Cultural match: logic, language, experience (LLE):

Superior: Central concepts/ideas of the material appear to be culturally similar to the LLE of the target culture.
Adequate: Significant match in LLE for 50% of the central concepts.
Not suitable: Clearly a cultural mismatch in LLE.

B) Cultural image and examples:

Superior: Images & examples present the culture in positive ways.
Adequate: Neutral presentation of cultural images or foods.
Not suitable: Negative images such as exaggerated or caricatured cultural characteristics, actions or examples.

Adapted from: Doak, C., Doak, L., & Root, J. (1996). *Teaching patients with low literacy skills.* (2nd ed.).Philadelphia: Lippincott-Raven (pages 52-58).

APPENDIX H

Checklist for Appropriateness of Print Materials

Organization

- □ Attractive cover, indicates intended audience and core content.
- □ Summaries and headers are used to provide message repetition and show organization.
- □ No more than 3 or 4 main points are presented.
- □ Emphasis is on the desired behavior changes and "need to know" information.
- □ A summary that emphasizes what to do is included.

Writing Style

- □ Conversational style, using an active voice.
- □ Little use of technical/medical jargon.
- □ Text is vivid and interesting, with a friendly tone.

Appearance

- □ Pages or sections appear uncluttered with ample white spaces.
- □ Lowercase letters are used, with capitals only where grammatically appropriate.
- □ Print size is at least 12 point, serif type and no stylized letters.
- □ Illustrations are simple - preferably line drawings.
- □ High degree of contrast between the print and the paper.
- □ Illustrations serve to amplify the text.

Appeal

- □ Material is culturally, gender and age appropriate.
- □ Material closely matches the logic, language, and experience of the intended audience.
- □ Interaction is promoted with the use of a question and answer format, suggested action.

Adapted from: Doak, C., Doak, L., & Root, J. (1996). *Teaching patients with low literacy skills.* (2nd ed.). Philadelphia: Lippincott-Raven (page 43).

APPENDIX I

Cadham Provincial Laboratory

(1998) MSS Pamphlet

WHAT DOES A NORMAL TEST MEAN?

A normal test rules out 4 out of 5 cases of spina bifida and about 3 out of 5 cases of Down syndrome or Trisomy 18. A normal test may rule out 4 out of 5 cases of Down syndrome for women who are 35 or older. A normal test does not rule out other chromosome abnormalities or birth defects.

SHOULD I HAVE A MATERNAL SERUM SCREENING TEST?

This test is voluntary and the decision whether or not to have it is a personal one. Apart from the discomfort of a blood test, there are no medical complications from this test. An abnormal test may make a woman more worried about her baby. Some women want the test to help them make decisions about their pregnancy or for reassurance. Other women would rather not know the results and therefore will choose not to have the test. You should discuss this with your doctor, but remember, the choice whether or not to have the test is entirely up to you.

This is a voluntary test. Please tell your doctor if you do not wish to have the test.

WHERE CAN I GET MORE INFORMATION?

Contact: Karen MacDonald, Co-ordinator, Manitoba Maternal Serum Screening Programme, T250-770 Bannatyne Avenue, Winnipeg, Manitoba, R3E 0W3 Phone: (204) 789-3240 (call collect)

or check out the website at:
http://www.umanitoba.ca/faculties/medicine/human_genetics/AFP.html

DEFINITIONS

Chromosomes: The carriers of the genetic information. Chromosomes come in pairs, one from the mother and one from the father. Down syndrome is due to a chromosome abnormality.

Down Syndrome: This is the most common chromosomal cause of mental disability. Children with Down syndrome have three chromosome 21s instead of the normal two. They have a characteristic facial appearance and may have certain birth defects including heart problems. This condition occurs in about 1 in 800 babies and is more common in babies born to older mothers.

Trisomy 18: A very severe chromosome abnormality. Babies with Trisomy 18 have three chromosome 18s instead of the normal two. About 1 in 8000 babies are born with Trisomy 18.

Spina Bifida: A birth defect where the spinal cord has failed to form properly. This can lead to paralysis or problems walking. About 1 in 1000 babies are born with spina bifida.

Anencephaly: A birth defect related to spina bifida. In anencephaly, the brain does not form and the baby cannot survive. About 1 in 1000 babies are born with anencephaly.

Amniocentesis: A test where a sample of fluid from around the baby is taken with a needle inserted through the wall of the abdomen into the womb or uterus. An amniocentesis allows doctors to check if

TRIPLE SCREENING IN MANITOBA

MANITOBA MATERNAL SERUM SCREENING PROGRAMME

WHAT DOES A NORMAL TEST MEAN?

A normal test rules out 4 out of 5 cases of spina bifida and about 3 out of 5 cases of Down syndrome or Trisomy 18. A normal test may rule out 4 out of 5 cases of Down syndrome for women who are 35 or older. A normal test does not rule out other chromosome abnormalities or birth defects.

SHOULD I HAVE A MATERNAL SERUM SCREENING TEST?

This test is voluntary and the decision whether or not to have it is a personal one. Apart from the discomfort of a blood test, there are no medical complications from this test. An abnormal test may make a woman more worried about her baby. Some women want the test to help them make decisions about their pregnancy or for reassurance. Other women would rather not know the results and therefore will choose not to have the test. You should discuss this with your doctor, but remember, the choice whether or not to have the test is entirely up to you.

This is a voluntary test. Please tell your doctor if you do not wish to have the test.

WHERE CAN I GET MORE INFORMATION?

Contact: Karen MacDonald, Co-ordinator, Manitoba Maternal Serum Screening Programme, T250-770 Bannatyne Avenue, Winnipeg, Manitoba, R3E 0W3 Phone: (204) 789-3240 (call collect)

or check out the website at:
http://www.umanitoba.ca/faculties/medicine/human_genetics/AFP.html

DEFINITIONS

Chromosomes: The carriers of the genetic information. Chromosomes come in pairs, one from the mother and one from the father. Down syndrome is due to a chromosome abnormality.

Down Syndrome: This is the most common chromosomal cause of mental disability. Children with Down syndrome have three chromosome 21s instead of the normal two. They have a characteristic facial appearance and may have certain birth defects including heart problems. This condition occurs in about 1 in 800 babies and is more common in babies born to older mothers.

Trisomy 18: A very severe chromosome abnormality. Babies with Trisomy 18 have three chromosome 18s instead of the normal two. About 1 in 8000 babies are born with Trisomy 18.

Spina Bifida: A birth defect where the spinal cord has failed to form properly. This can lead to paralysis or problems walking. About 1 in 1000 babies are born with spina bifida.

Anencephaly: A birth defect related to spina bifida. In anencephaly, the brain does not form and the baby cannot survive. About 1 in 1000 babies are born with anencephaly.

Amniocentesis: A test where a sample of fluid from around the baby is taken with a needle inserted through the wall of the abdomen into the womb or uterus. An amniocentesis allows doctors to check if

TRIPLE SCREENING IN MANITOBA

MANITOBA MATERNAL SERUM SCREENING PROGRAMME

What is the Maternal Serum Screen?

The Maternal Serum Screen is a blood test that is offered to all pregnant women in Manitoba. The test measures three components in the mother's blood.

The test checks for certain problems in the baby and in the pregnancy.

An abnormal result does NOT necessarily mean there is a problem with the baby. It simply means that other tests may be suggested. A normal test result is good news, but cannot guarantee that the baby will be normal.

This is a voluntary test. Some women wish to have the test. Some women would rather not have the test. You should discuss this with your doctor. The choice whether or not to have the test is entirely up to you.

WHAT DOES THIS TEST MEASURE?

The test measures three components: AFP (alpha-fetoprotein), hCG (human chronic gonadotropin) and estriol. These are made by the baby or placenta and can be found in the mother's blood. Two results are given; one for AFP alone and one for all three together. (This is called a triple test).

This is a screening test. It does not tell you if your baby is normal or not. This test only tells you if further tests should be considered.

WHEN SHOULD I BE TESTED?

The ideal time for testing is between 15 and 18 weeks of your pregnancy (counting from the first day of your last menstrual period). The triple test can be done up to 22 weeks.

Abnormal test results mean that a woman's chances of having a baby with certain problems is increased. However, most women with abnormal AFP or triple test results have normal babies and pregnancies.

WHAT KIND OF RESULTS COULD I GET?

You will get two results. One for AFP alone and one for the triple test. Results can be normal or abnormal. Abnormal results often mean that the dating of the pregnancy is wrong. For example, the woman may be further along or not as far along in the pregnancy as she thinks.

WHAT HAPPENS IF THE AFP IS ABNORMAL?

About 1 in 25 women have a high AFP level, regardless of their age. Most women with high levels have normal pregnancies and babies. Common reasons for high levels are twins (1 in 7) and wrong dates (1 in 10). One or 2 out of 50 women with a high AFP will have a baby with a birth defect such as spina bifida or anencephaly (see definitions). Low AFP levels usually mean your dates are wrong. We recommend a fetal assessment (ultrasound scan) to check the dates and to look for abnormalities in the baby.

WHAT HAPPENS IF THE TRIPLE TEST RESULT IS ABNORMAL?

The chance of having an abnormal triple test depends on the mother's age. Overall, about 1 in 20 women are abnormal on triple test. However, only 1 in 50 twenty-year-olds will have abnormal triple test results compared with 1 in 3 forty-year-olds. If you have an abnormal triple test, you will be counseled about your chances of having a baby with Down syndrome or another chromosome problem called Trisomy 18 (see definitions). An ultrasound will be done to confirm your dates. If you wish, an amniocentesis (see definitions) can be done to check that the baby's chromosomes are normal.

APPENDIX J

Readability Statistics

I. Cadham Provincial Laboratory (1998) MSS Pamphlet

Counts	
Words	961
Characters	4377
Paragraphs	25
Sentences	75

Averages	
Sentences per paragraph	3.2
Words per sentence	12.7
Characters per word	4.4

Readability	
Passive sentences	16 %
Flesch reading ease	59.7
Flesch-Kincaid grade level	8.0

II. Prenatal Screening Tests (handout draft)

Counts	
Words	968
Characters	4586
Paragraphs	134
Sentences	71

Averages	
Sentences per paragraph	1.6
Words per sentence	5.4
Characters per word	4.4

Readability	
Passive sentences	9 %
Flesch reading ease	70.1
Flesch-Kincaid grade level	4.8