RELATIONSHIPS BETWEEN PRENATAL NUTRITIONAL INTAKE, SOCIAL SUPPORT AND PREGNANCY OUTCOME AMONG A GROUP OF HIGH RISK WOMEN

by

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ABSTRACT

The relationships between prenatal nutritional intake, social support and pregnancy outcome were examined among prenatal clients of a preventive health service. All clients were residents of a downtown area of Winnipeg that is characterized by high unemployment and low socioeconomic status. There were three groups of study participants: 12 women who completed two consecutive 24-hour recalls with the investigator, 26 women who had completed a single 24-hour recall with a paraprofessional aide and 54 women who had received home visits from a paraprofessional aide. Data on pregnancy outcome and social support were gathered from the client's hospital and nursing records.

No significant associations between energy or protein intakes and birthweight or OCSLOG ($\log_{10}$ transformation of the obstetrical complications score) were found among the first study group. Weak and insignificant associations were found between quality of nutritional intake and OCSLOG and birthweight among both the 12 women who completed two consecutive 24-hour recalls and the 26 women who completed a 24-hour recall with a paraprofessional aide. When the diet scores for the 26 women were divided into two groups, the improvements in pregnancy outcomes among the women with a higher diet level were not significant.

A consistent relationship between social support and birthweight, OCSLOG or prenatal risk score was not found among either the 26 women or the 54 women. When postnatal complications score was considered women

with a moderate need for social support may have had more favourable pregnancy outcomes than women with a high need for social support. These differences were not statistically significant. Differences in the quality of nutritional intake between three levels of social support were not found among the 26 women using single 24-hour recalls.

This study was limited by the small sample size. Repeated 24-hour recalls would have provided a better estimate of food intake. The social need score does not appear to distinguish between good and poor pregnancy outcomes. A more precise measure that identifies specific elements of social support may be more appropriate. Further work should also account for the influences of smoking habits and alcohol consumption, along with nutritional and social influences, on pregnancy outcome.

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Chapter I

INTRODUCTION

The identification of the underlying causes of perinatal death and an understanding of the impact of intervention activities upon them are prerequisites for successful intervention and improved perinatal health (Chalmers,1979). The close association of low birthweight with morbidity and mortality, immediately after birth, as well as during childhood has permitted the study of factors that could be predictive of poor pregnancy outcome (van den Berg, 1981). Past obstetric history, associated medical conditions, and events in the current pregnancy have been found to be important predictors of pregnancy outcome (Morrison and Olsen, 1979). The social and environmental background of the mother has been found to influence birthweight and perinatal mortality (Newcombe, 1981). Maternal nutrition has attracted attention because it is an environmental influence that may be modified during pregnancy.

A small deficit in mean birthweight and an increase in the incidence of low birthweight is noticeable for infants born to parents in "less favourable socioeconomic circumstances" (van den Berg, 1981). An increase in the perinatal mortality rate as one moves across social classes from the professional to the unskilled worker has been observed (Chamberlain, 1979). This differential in morbidity and mortality among the social classes has led to an interest in identifying factors that could contribute to a generalized susceptibility to poor health (Syme and Berkman, 1976).

Dietary habits and the quality of nutrition have been assumed to be causal variables underlying the "observed socioeconomic gradient in fetal growth" (van den Berg, 1981). However, the exact nature of the relationship between maternal diet and pregnancy outcome remains unclear. This has been attributed to the difficulty in distinguishing the effects of maternal nutrition from the effects of social and environmental factors. Social support has been proposed as a more general social-psychological variable that could influence health status and contribute to a generalized susceptibility to disease. It is important that the relationship between maternal nutrition and pregnancy outcome be considered within the broader context of the social and psychological environment of the mother. This study further examines this relationship by relating prenatal nutritional intake and social support to pregnancy outcome.

Chapter II

REVIEW OF LITERATURE

2.1 PREGNANCY OUTCOME

The desired outcome of every pregnancy is a healthy mother and a healthy baby. Indicators of morbidity and mortality are used to reflect pregnancy outcome. Measures of infant mortality include the number of perinatal deaths, (fetal deaths of 20 or more weeks gestation plus infant deaths under 7 days of age), and the number of stillbirths, (fetal deaths of 20 or more weeks gestation) (Winnipeg Department of Health, 1982). Infant birthweight is also used to measure pregnancy outcome. Numerical scoring systems have been developed to provide a quantitative method for assessing perinatal health and pregnancy outcome. These scoring systems are based on clinical observations of the infant and the mother. These measures of pregnancy outcome are related to the viability of the infant at birth.

2.2 NUTRITIONAL INFLUENCES ON PREGNANCY OUTCOME

2.2.1 Current Recommendations

It is accepted that maternal nutrition influences the course and outcome of pregnancy. Pregnancy imposes additional needs for nutrients to account for the growth of fetal and maternal tissues, and the increased maternal metabolism (Pitkin, 1977). The recommended daily

nutrient intakes for most nutrients are therefore increased during pregnancy (Bureau of Nutritional Sciences, 1983). The magnitude of this increase varies between nutrients (Pitkin, 1977). Studies investigating the impact on fetal growth, of the failure of the mother to meet these recommended nutrient intakes, have yielded inconsistent findings (Osofsky, 1975, Picone et al, 1982).

2.2.2 Epidemiological Studies

The strongest evidence supporting a relationship between maternal nutrition and pregnancy outcome has been obtained under conditions of war and famine, in what have been termed natural experiments. A famine occurred in Holland over the winter of 1944 to 1945 (Smith, 1947). The famine lasted for six months so that no woman was exposed for the full duration of a term pregnancy. Before the famine the women were considered to be in a reasonable nutritional state. Official figures of food distribution were used to estimate the average daily intake during the famine. At the lowest point of the famine the intake was estimated to be 1,145 kcal and 34 g of protein per day for expectant mothers. Birth records of maternity clinics were examined shortly after the end of the war imposed famine. Birthweights of 873 fullterm infants born during the hunger period were compared to those of 589 infants born during the previous winter, and 560 infants born during a winter prior to the war. The birthweights of infants born during the famine were significantly less than the two other time periods to which they were compared. At the 50th percentile the decrease was 240 g. Birthweights increased upon the restoration of food to prewar levels. A slight increase in the incidence of premature births (defined as any infant weighing 2,250g or

less) from 4.98 to 6.3 per cent was found between the winter prior to the famine and the hunger period. The percentages of stillbirths and neonatal deaths declined from the pre-hunger winter to the hunger period. This was attributed to the prevalence of amenorrhea and the sharp decline in the number of births during the latter months of the famine. This brief period of generalized undernutrition was associated with poor pregnancy outcomes.

In Leningrad a period of food deprivation lasted for approximately eighteen months although conditions were of extreme severity from September 1941 to February 1942 (Antonov, 1947). The people suffered from hunger because food was scarce and of inferior quality. In, 1942, the average birthweights for males and females carried to term were 529 g and 542 g less, respectively, than in the last half of 1941. There was a high incidence of premature births (41.2%) in the first half of 1942 and an exceptionally high proportion of stillbirths (6.5%). A large proportion of babies born during the first half of 1942 weighed less than 2500 g (49.1%).

The effects of the famine in Holland could be better defined because the famine period was for a more clearly specified period of time and was accompanied by "fewer and less severe hardships" (Bergner and Susser, 1970). Both the Leningrad experience and the Dutch famine provided evidence that acute maternal deprivation was associated with adverse fetal growth and development. The Leningrad women were exposed to a number of additional stresses including physical exertion, lack of rest, and constant nervous tension (Antonov, 1943). The influence on pregnancy outcomes of these additional stresses to which the women were exposed could not be determined.

These studies were retrospective, and did not provide individual dietary data. The only controls available were births before and after the food shortage. Three controlled trials of prenatal supplementation in developing countries have been conducted to assess the role of maternal nutrient intake on birthweight (Mora et al, 1979, Lechtig et al, 1975, McDonald et al, 1981). Each study incorporated a control group that was intended to account for environmental and social factors that could influence fetal growth. The focus of each study was the effects of energy and protein intakes.

2.2.3 Intervention Trials

2.2.3.1 Developing Countries

A prospective randomized trial was conducted in Bogota, Columbia (Mora et al, 1979). The study was designed to assess the effect of prenatal food supplementation on birthweight. Calorie and protein intakes were determined based on 24-hour recalls. Prior to supplementation the reported mean dietary intake was 1600 kcal and 35.5 g of protein. Poor families with children were selected to participate in the study if the mother was in the first or second trimester of pregnancy and malnutrition was present in at least fifty per cent of her children under five years of age. Families were randomly assigned to a treatment group that received food supplements of dry skim milk, enriched bread, vegetable oil, and a vitamin and mineral supplement, or to a control group, that did not receive food supplements. Supplementation began at the beginning of the third trimester of pregnancy. Food was distributed weekly at a field unit and random home

visits were conducted to monitor food utilization. The mean daily increases in dietary intakes were 155 kcal and 20g of protein. Birthweight data were available on 407 infants. The mean birthweight of full term infants in the treatment group was 50g greater than that of the control group. This difference failed to reach statistical significance. Only among male infants was the difference in birthweight between the treatment and control group statistically significant ($p<0.05$).

The influence of chronic maternal malnutrition on fetal growth has also been investigated in Guatemala (Lechtig et al, 1975). In this prospective study women in four rural villages were invited to attend a supplementation centre where they consumed, ad libitum, a liquid diet supplement. Two villages received a protein-calorie supplement while the other two villages received a supplement that did not contain protein. Dietary intake was estimated through 24- and 72-hour recalls at the end of each trimester of pregnancy. The average daily diet throughout pregnancy was 1500 kcal and 40g of protein. Of the 405 babies on whom information was available there were no differences in infant birthweights found between those who received the protein-calorie supplement and those who received a supplement containing only calories.

A secondary analysis was then completed that compared all women according to the total amount of additional calories ingested during pregnancy. It was found that women who consumed more than an additional 20,000 kcal had infants whose mean birthweights were 111g greater than those women who consumed less than an additional 20,000 kcal. While no benefit of protein supplementation was found in this study there did

appear to be a positive relationship between caloric supplementation and birthweight. The strength of these findings is limited because the original study was not designed to test this hypothesis.

A third intervention trial was conducted in Taiwan (McDonald et al, 1981). 294 women from 14 rural villages who were in the second or third trimester of pregnancy, were between the ages of 19 and 30 years, had one normal male child, and were planning to have another child participated. Prior to intervention the mean daily intake was estimated, from a preliminary dietary survey, to be 1200 kcal and 40g of protein. Women were randomly assigned to one of two treatment groups. Treatment group A received a liquid beverage containing 800 kcal and 40g of protein. Treatment group B received a liquid beverage containing less than 80 kcal. Women were visited quarterly, their food intake recorded, and their nutrient intake determined based on the analysis of duplicate samples of meals. Supplementation began three weeks after delivery and continued throughout until the gestation and lactation of a second study infant. The mean birthweight of Treatment group A was 94g greater than that of Treatment group B. This difference was not statistically significant. Among Treatment group B a significant correlation between maternal caloric intake and birthweight of the second study infant was found ($r=0.3999$, $p<0.01$).

It should be noted that the reported average daily caloric intake of Treatment group B throughout pregnancy was between 1200 and 1300 kcal. This was significantly lower than that of Treatment group A (difference = 484 kcal, $p<0.01$). It has been proposed that a threshold level of maternal dietary intake between 1500 and 1800 kcal exists which sepa-

rates those whose fetuses grow well from those who would benefit from supplementation (Dobbing, 1981). This intake is lower than that of Treatment group A and could explain the failure to find a significant correlation between caloric intake and birthweight among this group.

As in the previously described studies in Bogota and Guatemala, although not significant, an association between caloric supplementation and a moderate increase in birthweight was found. Similar intervention studies were initiated in New York and Montreal. This was in response to a concern that in industrialized countries chronic malnutrition was associated with an increased incidence of low birthweight among low income urban women.

2.2.3.2 North America

Rush, Stein and Susser (1980) hypothesized that prenatal nutritional supplementation could increase the mean birthweight of infants born to mothers at risk of delivering low birthweight babies. Study participants were selected from a large municipal hospital prenatal clinic in New York. The 770 women who participated were randomly assigned to one of three treatment groups. Group A received a liquid beverage supplement high in protein and energy, Group B received a liquid beverage supplement with a lower protein and energy content and Group C was a non-intervention control group. The control group's mean dietary intake was 2065 kcal and 79 g of protein. The increment for Group A based on 24-hour dietary recalls was 275 kcal and 27 g of protein and for Group B was 212 kcal and 4 g of protein. The mean birthweight of Group B was 41 g greater than the control group. This difference was not statistically significant.

An unexpected finding was that the mean birthweight of Group A was 42 g less than that of the control group. This apparent adverse effect of high protein supplementation suggested that protein may not have been the "panacea" as had been previously assumed by investigators when the intervention studies were originally designed. Naismith (1980) recognized that dietary protein might play a minor role in determining the outcome of pregnancy. He has proposed that the metabolism of protein is modified during pregnancy by the endocrine function of the fetal-placental unit. The negative effect on birthweight of high protein supplementation that was observed among the New York women remains unexplained.

A nutrition intervention program has been available to public prenatal patients at the Montreal Diet Dispensary since 1963 (Higgins, 1976). The program includes counselling and for three-quarters of the women food supplements of milk, eggs and oranges. 1213 recipients of the service between 1963 and 1974 were retrospectively matched with controls and the outcomes of their pregnancies compared (Rush, 1981). Information on the women's diets prior to supplementation was not available. A nonsignificant increase in the incidence of low birthweight between service recipients (5.7%) and controls (6.8%) was found. The mean birthweight of the infants born to recipients was 40 g greater than that of infants born to matched controls ($p < 0.05$). This finding of a modest rise in birthweight among infants whose mothers received supplementation is consistent with the previously reported intervention trials. These moderate effects were similar in developing countries and North American populations

2.2.4 Observational Studies

Epidemiological and quasi-experimental intervention trials have shown that maternal nutrient intake may have a modest effect on birthweight. An alternate method that has been used to investigate this problem has been "the accurate analysis of diets voluntarily consumed by pregnant women, with later comparison of maternal nutrient intakes with the outcomes of pregnancy" (Smith, 1947). Recent work has attempted to control for additional maternal characteristics that have been hypothesized to influence pregnancy outcome. These include maternal age, parity, smoking habits, and socioeconomic status. A failure to account for any of these variables could explain the weak relationships that have been found between maternal diet and birthweight.

Picone et al (1982) designed a study to control for these factors and study the relationship between diet and pregnancy outcome. Sixty patients of an urban hospital prenatal clinic were selected from a larger sample on the basis of defined criteria for age, height, parity, cigarette smoking, socioeconomic status, education, and health. All women entered the clinic prior to the thirteenth week of gestation. Two to six 24-hour dietary recalls were obtained for each subject. When the diets of the women were compared to their pregnancy outcomes maternal caloric intake was correlated with birthweight in the entire group, ($r=0.27$), in nonsmokers, ($r=0.34$), and in smokers, ($r=0.36$). All of these relationships were statistically significant ($p<0.05$). The ability to achieve this correlation was attributed to the control of many of the nondietary variables that have been associated with poor pregnancy outcome (Picone et al, 1982).

2.2.4.1 Quality of Diet

The described studies have all focused on the role of either caloric intake or protein intake or both. An alternate approach is to examine overall dietary quality as an independent variable. This approach assumes that nutrient balance rather than specific nutrients is more important. Philipps and Johnson (1977) studied the impact of quality of diet on birthweight. Forty-seven women in rural Wisconsin comprised the study's sample. Dietary intake was measured during the second half of pregnancy with the use of a daily food record sheet that was completed at eight day intervals. The mean intakes of 12 nutrients were then estimated and a Nutrient Adequacy Ratio determined by converting the nutrient intakes to a percentage of the Recommended Daily Allowances. From these 12 percentages a Mean Adequacy Ratio reflecting overall dietary quality was calculated. A significant positive correlation ($r=0.301$, $p<0.05$) between overall quality of the mother's diet and infant birthweight was found. While the Mean Adequacy Ratio reflecting overall dietary quality was directly correlated to birthweight, 10 of the 12 individual nutrient intakes were not. Similarly, the Mean Adequacy Ratio was selected before individual nutrients in multiple regression equations that were intended to be predictive of pregnancy outcome. Inclusion of the quality of diet in multiple regression equations consistently accounted for six to eight per cent of the observed variation in birthweight. Philipps and Johnson (1977) concluded that while there is sufficient evidence to suggest that maternal diet may influence pregnancy outcome, it would be appropriate to consider the influence of overall quality of nutritional intake in addition to that of energy and protein intakes.

2.3 SOCIAL INFLUENCES ON PREGNANCY OUTCOME

Poor nutrition and nutritional status have been used to explain an increased incidence of noninfectious diseases and poor health among segments of the population. While nutrition remains a component of prenatal care it is clear that its influences do not fully explain the observed variability in pregnancy outcomes. This has prompted interest in the identification of social and environmental factors that could influence health status. Attention has focused on certain aspects of the social environment, specifically the presence of other individuals and the nature and strength of the supports provided to the individual (Cassel, 1976, Cassel, 1974). Social support has been proposed as one social-psychological variable that could contribute to a generalized susceptibility to disease (Cassel, 1974).

2.3.1 Defining Social Support

The role of social support in influencing health has attracted considerable attention (Gottlieb, 1984, Turner, 1983, Cobb, 1976). There is confusion with respect to the definition and measurement of this social-psychological variable. A clear understanding of social support requires that it be distinguished from social networks. A social network is "a specific set of linkages among a defined set of persons, with the property that the characteristics of these linkages as a whole may be used to interpret the social behaviour of the persons involved" (Mitchell,1969). An important dimension of social networks is their functional characteristics, or the functions provided by the network (Israel, 1981). Social support may then be regarded as a function that may be provided by some or all social networks.

Tolsdorf (1976) defined the support that social networks provide as "any action or behaviour that functions to assist the focal person in meeting his personal goals or in dealing with the demands of any particular situation". It is the individual's assessment of the action or behaviour as helpful that allows it to be considered social support. Support may be classified as affective or instrumental (Israel, 1981). Affective support is nontangible, emotional support and instrumental support is the provision of tangible services such as financial aid or the care provided by health professionals. Cobb's (1976) definition of social support, that it is information leading one to believe that he or she is cared for and loved, esteemed and valued, and belongs to a network of communication and mutual obligation, focuses exclusively on the appraisal of socioemotional support. A more general definition was provided by Kaplan et al (1977) (in Thoits, 1982) that social support is "the degree to which an individual's needs for affection, approval, belonging, and security are met by significant others." These social needs may be met with either the provision of emotional or affective support as well as the provision of instrumental support (Thoits, 1982).

For the purpose of this study Cobb's (1976) definition was adapted to include both affective and instrumental support. Social support was defined as information that is transmitted to an individual through social ties to other individuals, groups, and the larger community that leads one to believe that he or she is cared for and loved, esteemed and valued, and belongs to a network of communication and mutual obligation. The information that may lead to this perception of social support may include the positive affect of one person to another, the endorsement of

another person's behaviour, perceptions or stated views, or the giving of symbolic or material aid (Kahn cited in Dimond, 1979).

The focus of these definitions is the relevance and significance of the human relationships. This is consistent with the belief that it is the quality of support and perception of support available that is the critical element (Turner, 1983). This requires that information on the subjective appraisal of the support available from the individual's social environment should be collected. The social context in which an individual functions represents an additional dimension of social support. It includes those people who are either potential or actual sources of support (Barrera, 1981). Social network analysis may be applied to provide a quantitative description of the structural (network size, density) and functional (affective support, instrumental support) properties of one's social environment. An alternate approach is the use of indices that reflect the availability of social resources, access to support, or participation in community organizations. "These measures provide information concerning the extent to which individuals are linked to significant people and have opportunities to interact in ways that might foster the expression of social support" (Barrera, 1981). This information may also include behaviorally oriented indices such as objective measures of the use of services. This objective information about the individual's social environment should be collected, in addition to the subjective estimation of social support, to allow both to be included in measures of social support.

2.3.2 Social Support and Health

A relationship between social support and physical health has generally been accepted (Gottlieb, 1984, Turner, 1983, Cobb, 1976). Two major hypotheses have been postulated to explain the manner through which social support might influence health status (Gottlieb, 1984). One theory is that social support may buffer the effects of stress and thereby influence health. The second hypothesis is that social support may directly influence an individual's health, either through shielding one from exposure to certain types of stressors or enhancing health and morale in general and serving a health promotive function (Gottlieb, 1984). Data have been collected to support both hypotheses (Gore, 1978, Berkman and Syme, 1979).

The stress-modifying effects of social support were examined by Gore (1978). A longitudinal investigation of the physical and mental health consequences of job loss and unemployment was conducted. Job loss represented a stressful life event. One hundred men who were employees of two companies that shut down participated in this study. Seventy-four men who were employed at comparable plants over the study period comprised a control group. Men were seen at home by public health nurses at six weeks before the shutdown, and at one, six, twelve, and 24 months after closing. Health variables measured included depression, illness symptoms and cholesterol levels. Social support was measured by a thirteen item index that reflected the individual's perception of support from family, friends and relatives, the frequency of activity outside the home with these people and the respondent's perceived opportunity for engaging in social activities. Those men with scores in the

lower third of the distribution were designated as unsupported. The remaining two-thirds were defined as supported. During unemployment the unsupported group experienced increased cholesterol levels and an increased number of illness symptoms. These findings demonstrated that lower social support was associated with poorer health measures during a stressful life event.

A direct effect of social support on health was reported by Berkman and Syme (1979). A nine year longitudinal survey was completed with 4725 residents of Almeda County. Demographic data were collected in 1965 and mortality data were collected for the period 1965 - 1974. Four sources of social contact were assessed. These were marriage, contacts with close friends and relatives, church membership, and group associations. For each age and sex category more social ties were associated with reduced mortality rates. A social network index that included data concerning each of the four measures of social ties was constructed to assess the cumulative effects of these four sources of contact. A decrease in social connection was consistently associated with an increase in mortality rate. This relationship was independent of physical health status at the time of the survey, year of death, socioeconomic status, and other health related behaviours including smoking, alcohol consumption and health care utilization. These data supported the hypothesis that social factors may be protective against mortality. The mechanisms through which social support exerts this influence on health could not be explained, and remain unknown.

2.3.3 Social Support and Pregnancy Outcome

The outcome of pregnancy is another health outcome that has been studied due to a possible relationship with social support. Similar approaches to those previously described have been applied to investigate this relationship. Nuckolls, Cassel and Kaplan (1972) conducted a study to determine the degree to which social support protects against adverse pregnancy outcomes. Psychosocial assets, which represented social support, were defined as any psychological or social factors that contribute to a woman's ability to adapt to her pregnancy. These were measured with a single score that was based on the subject's responses to questions measuring the woman's feeling or perceptions regarding herself, her pregnancy, and her overall life situation. The Schedule of Recent Life Experience was used to assess life crisis and stress. Among the 170 primagravidae included in the study it was found that under high stress conditions women with high levels of perceived support experienced fewer complications of pregnancy than did those women with low levels of perceived support. These findings suggested that social support may act to moderate the impact of environmental stresses, thereby positively influencing pregnancy outcome and health status.

A direct effect of social support on the number of complications of delivery, length of labor and mother-infant interactions was investigated by Sosa et al (1980). One-half of pregnant women who were admitted to a Guatemala hospital at delivery were randomly assigned to receive constant support from an untrained lay woman from admission to delivery. The women provided support in the form of physical contact, conversation and companionship. All women received routine medical

care. The random assignment continued until there were 20 women with uncomplicated labors and normal deliveries in both the control and experimental group. An association between the presence of a supportive companion during labor and a lower incidence of labor complications was found using a chi-square analysis ($p<0.001$). Women who were attended by a supportive companion were also found to have a significantly shorter length of labor. The positive effects of companionship during delivery demonstrated here may also apply throughout the prenatal period.

This has been examined by Pascoe, Chessare and Baugh (1985). These researchers investigated the relationship between social support and birthweight and intensive care admissions. Two hundred and one women completed a maternal social support index at their initial prenatal visit to a community hospital clinic. Most visits occurred 12 - 16 weeks post-conception and eighty percent of these women were welfare recipients. After delivery newborn birthweight and admission to intensive care was recorded. Data from primigravida and multigravida mothers were analyzed separately. For primigravida mothers a statistically significant association between social support and pregnancy outcome was not found. Among multigravida women a significant difference in pregnancy outcomes between women with high partner support and low partner support was found. This was not affected by the effects of smoking on pregnancy outcome. These data provide the strongest evidence to date of a relationship between social support and pregnancy outcome. The role of social support when accounting for other environmental influences such as nutritional intake, smoking habits, alcohol consumption and education should be considered.

2.3.4 Social Support and Nutritional Intake

The mechanisms through which social support exerts an influence on health, and pregnancy outcome are not understood. It is possible that higher levels of social support are associated with the use of preventive health practices that positively influence health. Dietary behaviour is a preventive health behaviour that may influence health status. Its relationship to social support was examined by McIntosh and Shifflett (1984). Their sample included 805 elderly persons who participated in 13 nutrition sites in Virginia. Nutrient data were derived from a 24-hour recall. Measures of social support were frequency of contact with friends, relatives and neighbours, community attachment, marital status, and living arrangements. Marital status, religious support and a close relationship to neighbours were associated with improved nutrient intakes. The possibility of a relationship between social support and nutritional intake among other population groups requires further examination. The demonstration of a relationship between social support and dietary behaviour might help to explain the mechanisms through which social support influences health.

Social support, as a component of antenatal care, has recently been investigated. Current prenatal care consists largely of advice on diet, smoking, and drinking. The effectiveness of this advice in altering the outcome of pregnancy is limited (Bryce and Enkin, 1984). However, anti-smoking advice and antenatal care, when accompanied by social support, have been found to have a positive effect on birthweight (Sexton and Hebel, 1984, Sokol et al, 1980). The effectiveness of this approach in the delivery of prenatal nutritional counselling has been partially examined by Orstead et al (1985). The infant birthweights of a group

of women who attended a single prenatal nutrition class were compared to a group of women who attended a similar class and additional counselling sessions. The second group had fewer low birthweight babies and had infants weighing 100 g more at birth. The women may have perceived the counselling they received as a form of social support and this support could also have contributed to the improved pregnancy outcomes of the second group of women. The effect on dietary intake of the nutritional counselling was not assessed. The relationship between social support and nutritional intake merits consideration.

2.4 ADDITIONAL INFLUENCES ON PREGNANCY OUTCOME

A number of maternal characteristics have been identified as having an influence on pregnancy outcome. Lower mean birthweights have been reported for infants born to women with lower levels of education and of lower socioeconomic status (Naylor and Myrianthopoulos, 1967). Marital status and maternal age have also been found to be associated with fetal growth (van den Berg, 1981). Smoking habits and alcohol consumption during pregnancy have been associated with adverse pregnancy outcomes. Smoking during pregnancy has consistently been related to lower birthweight babies and to an increased incidence of low birthweight. Babies of smoking mothers tend to weigh between 150 and 250 grams less than infants of nonsmoking mothers (Meyer and Tonascia, 1977). Smoking during pregnancy has also been associated with an increased incidence of complications, prematurity, and an increased incidence of perinatal mortality (Meyer, Jonas, and Tonascia, 1976).

Alcohol consumption during pregnancy has been discouraged because of known adverse effects on pregnancy outcome (Little and Streissguth, 1981). Fetal alcohol syndrome is an identifiable pattern of malformations that has been recognized in the newborn of alcoholic mothers (Clarren and Smith, 1978). Features of the syndrome may also appear in infants of moderate drinkers. It appears that the risk of poor outcomes is dose related, although a safe level of alcohol consumption has not been established (Little and Streissguth, 1981). These maternal characteristics, age, education, socioeconomic status, smoking, and alcohol consumption, obscure the role of nutrition and must be considered when studying the influence of social and environmental influences on the outcome of pregnancy.

Medical factors, including reproductive history, associated medical conditions, and events in the current pregnancy, have been found to be useful in predicting perinatal deaths (Morrison and Olsen, 1979). The use of a simple prenatal risk scoring system allows these factors to be considered when studying pregnancy outcome. The medical factors are generally not under the control of the mother and this has led to an interest in identifying factors that can be recognized early enough in the pregnancy to permit an intervention to modify or prevent an adverse outcome. Nutritional factors and social support are among these factors.

2.5 PURPOSE OF RESEARCH

The exact nature of the relationship between social support and pregnancy outcome remains unclear. The possibility that social support may be associated with nutritional intake, and thereby influence the outcome of pregnancy requires investigation. At the same time there are questions regarding the role of prenatal nutrition. To fully resolve this question it is important that the influence of the surrounding social environment be remembered. Accounting for social support may contribute to an understanding of the relationship between maternal nutrition and pregnancy outcome. This requires that nutrition be considered within the total environmental context of the mother. This study was designed to determine the ways in which nutritional and social factors may interact to influence pregnancy outcome.

2.6 RESEARCH QUESTIONS AND HYPOTHESES

This study was designed to further examine whether:

1. Nutritional intake is related to pregnancy outcome.
2. Social support is related to pregnancy outcome.
3. Social support is related to the quality of nutritional intake.

2.6.1 Hypotheses

To examine the above relationships five hypotheses were formulated.

1. Energy intake is positively related to pregnancy outcome.
2. Dietary protein intake is positively related to pregnancy outcome.
3. The quality of nutritional intake is related to pregnancy outcome.
4. Social support is positively related to pregnancy outcome.
5. Social support is positively related to the quality of nutritional intake.

Chapter III

METHODS

3.1 DESIGN

The conceptual framework for this study is illustrated in Figure 1. Three sets of factors have been identified as potential influences of pregnancy outcome. These are: (i) behavioural factors which include nutritional intake, smoking habits and alcohol consumption, (ii) social factors including social support and maternal characteristics (maternal age, education level and marital status), and (iii) medical factors.

Hypotheses were formulated regarding the relationships between nutritional intake, social support, and pregnancy outcome. These are indicated in Figure 1. Smoking habits, alcohol consumption, maternal characteristics, and medical factors are recognized as associated variables that also influence the outcome of pregnancy. These relationships are designated by solid lines. For each of the variables in this study, the indicators that were used are shown with lowercase letters.

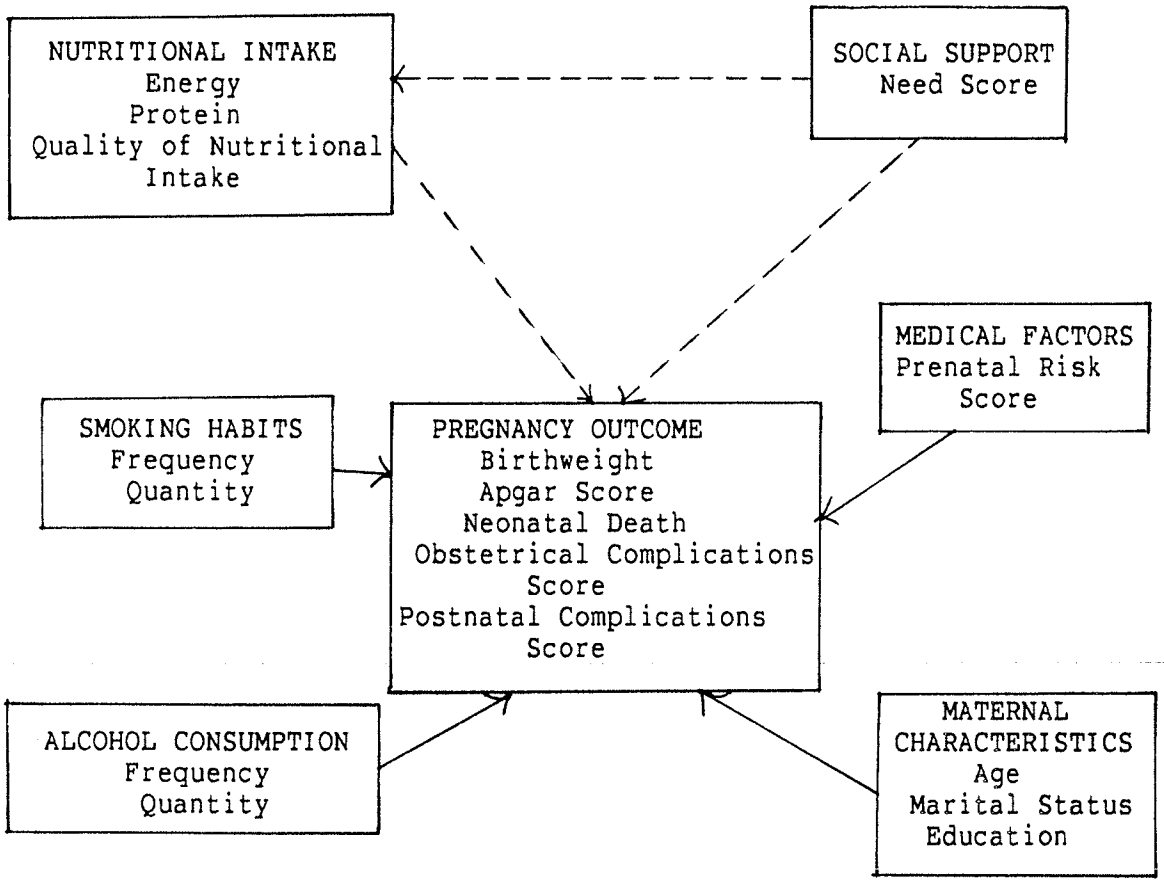

Figure 1: Influences on Pregnancy Outcome
Conceptual Framework

3.2 SUBJECTS

All women who participated in the study were clients of a preventive health service, Healthy Parent-Healthy Child. This service was part of the regular nursing services provided in eighteen nursing regions of North, East and West nursing districts of central Winnipeg by the City of Winnipeg's Public Health Nursing Branch. Women who were identified as being at high risk of poor pregnancy outcome due to environmental stresses were referred to the Healthy Parent-Healthy Child service. These referrals to Healthy Parent-Healthy Child were made by any agency or group in the community, by friends or by the woman herself. Public health nurses working in the areas serviced by Healthy Parent-Healthy Child also referred clients. After a referral was made a public health nurse made an initial visit to the pregnant woman. The nurse, after completing a social needs assessment, then classified the client as low to severe social need. Clients who had been classified as moderate to severe need were eligible to receive service from Healthy Parent-Healthy Child. Approximately one-half of all clients in the Healthy Parent-Healthy Child program were randomly assigned to receive visits from paraprofessional aides.

There were three groups of study participants. Subjects to be interviewed (INTERVIEWS) were selected from all clients registered with Healthy Parent-Healthy Child between July 1984 and November 1984, who were in their third trimester of pregnancy, and who had consented in writing that information contained in their service and medical records could be used for evaluation purposes. Data also were collected on clients who were registered with the service between August 1983 and

December 1984 and had completed a 24-hour dietary recall with a paraprofessional aide (AIDE RECALLS). Clients of Healthy Parent-Healthy Child who had received home visits from a paraprofessional aide as a component of their prenatal care (AIDE VISITS) comprised a third group of women for this study. Although dietary data were not available for this third group of study participants the relationship between social support and pregnancy outcome among this group could be tested. Figure 2 illustrates the data that were collected on each of these three groups.

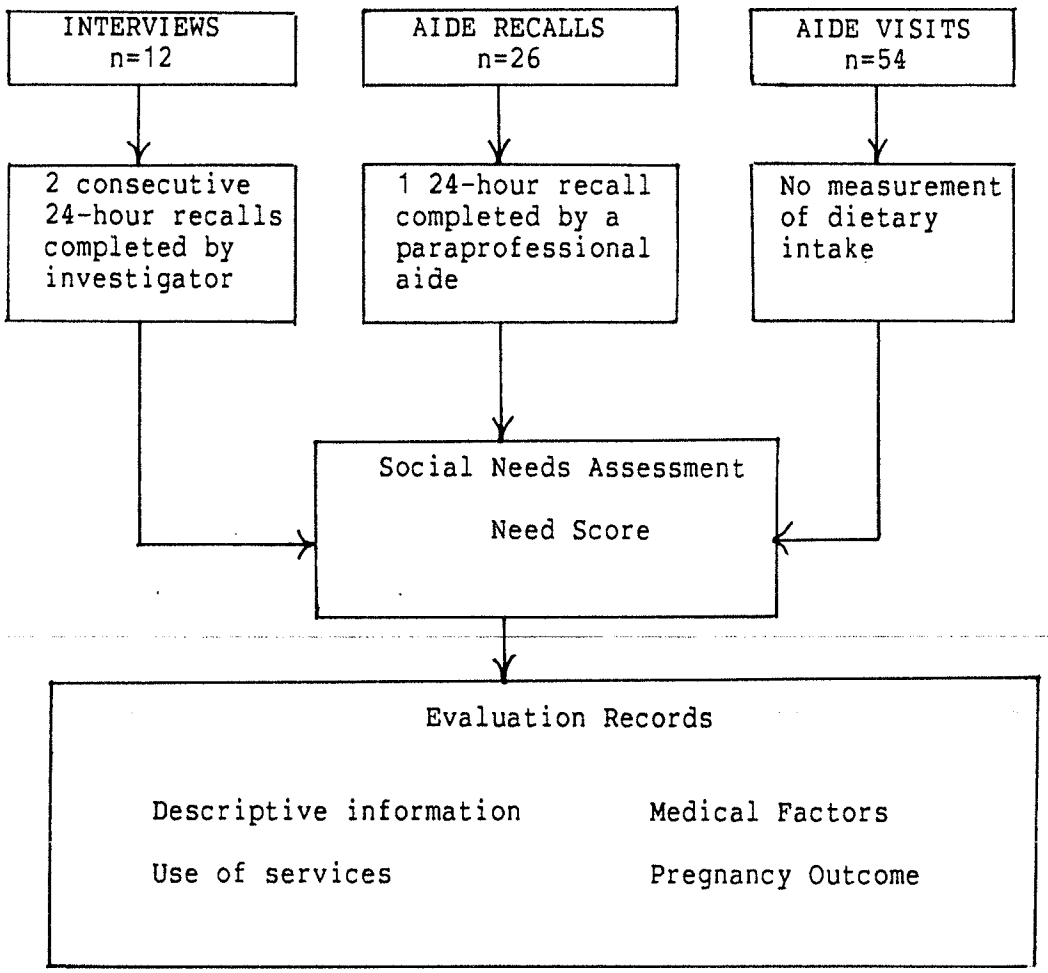

Figure 2: Types and Sources of Data Collected

3.3 SOURCES OF INFORMATION

3.3.1 Interviews

Names were obtained by the investigator of all women receiving service from Healthy Parent-Healthy Child between July 1984 and November 1984 who had consented to have their records examined for evaluation purposes. The investigator then forwarded these names to the Supervisor of the Nursing Region where they lived, after which the nurse in charge of the woman's case informed the woman of the personal interview for the purposes of this study. After the woman had agreed to a personal interview the nurse informed the interviewer.

The investigator conducted all interviews. Two interviews were scheduled with each woman on consecutive days. Women were visited at their homes and at the interview information was collected on food intake, smoking habits, alcohol consumption, prenatal class attendance, use of vitamin and mineral supplements, maternal age, marital status, education and source of income. The interview questionnaire that was used appears in Appendix A.

3.3.1.1 Nutritional Intake

The 24-hour dietary recall method was chosen to provide a quantitative estimate of the study participant's nutrient intakes. A method of collecting dietary information that would not discourage participation in prenatal services and care was an important consideration. The recall method was chosen because of its logistical simplicity. It could be integrated into prenatal care with a minimal impact on participant behaviour and convenience (Beaton et al, 1979, Rush and Kristal, 1982).

It was felt that food records, both weighed and estimated, would place too large a respondent burden and reduce subject cooperation. Dietary interviews have been recognized as being practical, economical, reasonably valid, and reliable (Karvetti and Knuts, 1981).

Although single 24-hour recalls do not provide reliable estimates of an individual's usual food intake it has been proposed that the average of repeated 24-hour recalls might provide a more accurate assessment of individual dietary intakes (Balogh, Kahn and Medalie, 1971, Karvetti and Knuts, 1981). Twenty-four hour recalls, as part of the personal interviews, were conducted on two consecutive days. This was intended to improve the accuracy of the estimated food consumption by reducing the intraindividual variation in food intake and still be feasible for the study population. Interviews were conducted on Tuesday, Wednesday, Thursday, and Friday so that information was collected for weekdays only. This was to reduce differences due to the day of the week effect as has been reported by Beaton et al (1979).

3.3.1.2 Questionnaire Development

Content

The 24-hour recalls formed one part of the individual interviews with women. The entire interview questionnaire was divided into three sections. Section A dealt with demographic information; Section B was the 24-hour recall; and Section C consisted of questions on additional behaviours that have been associated with pregnancy outcome. During the first interview answers to questions in all three sections were obtained while during the second interview only Section B (24-hour recall) was completed again.

A structured face-to-face interview format was used. (see Appendix A). Section A included close-ended questions on maternal age, marital status, education and source of income. Section B was a 24-hour recall where subjects were asked to remember everything that they had eaten or drunk the previous day from when they first got up until they went to bed, including all snacks or beverages consumed during the night. The time, location, description of the food, and estimated serving size was recorded for each food item. Section C included questions on prenatal class attendance, perception of where one would go to obtain information, smoking habits, alcohol consumption, and use of vitamin and mineral supplements. The questions were all close-ended with the exception of the last one where subjects were asked to recall all vitamin and mineral supplements that they were taking and the frequency and dosage of each supplement. The questionnaire was developed by the author who also conducted all of the interviews for the first study group.

Pre-test

Three clients of Healthy Parent-Healthy Child who were in their third trimester of pregnancy were interviewed on two consecutive days. Following this pre-test minor changes were made to improve the layout, and clarify unclear and awkward wording.

3.3.2 Aide Recalls

Six paraprofessional aides, working with public health nurses from the City of Winnipeg's Department of Health were randomly assigned to provide care to approximately one-half of the clients of Healthy Parent-Healthy Child. The second group of study participants was

comprised of clients of Healthy Parent-Healthy Child who had completed a single 24-hour recall with a paraprofessional aide.

Paraprofessional aides were community women who had been selected and trained to provide service, together with public health nurses, to clients of Healthy Parent-Healthy Child. One of the program's objectives was to improve maternal food habits and thereby improve the health of the mother and her infant. For this reason nutrition was one topic area included in the initial training the aides received. This training was conducted by a professional with training in foods and nutrition. Inservice training of the aides included further discussions of nutrition approximately one-half day per month. This information was presented by trained home economists or nutritionists.

Nutrition intervention included 24-hour recalls, weight gain records and discussions of usual food habits. The focus of these interventions was the identification of nutritional risk. Included among these risk factors was the pattern of food intake as compared to Canada's Food Guide. For this reason Canada's Food Guide and food group classification were emphasized in this training. Aides determined the most appropriate intervention activities for each client. Twenty-four hour recalls were discussed as one method of collecting information about food intake. The total intake for each of the four food groups of Canada's Food Guide could be assessed, and a discussion of food habits thus introduced. In addition to discussing a procedure for completing 24-hour recalls, role playing was used to facilitate understanding and to help the aides feel comfortable with the procedure. The aides often felt that the 24-hour hour recall was too formal an approach to use when

discussing food habits. They preferred to introduce the idea of completing a dietary recall after a level of trust had been established with the client. A standardized recall form that focused on food group classification was used by all six aides. (Appendix B). While not quantitative, the recalls that the aides completed provided descriptive information on the nutritional quality of the diets.

3.3.3 Nutritional Analysis

3.3.3.1 Nutrient Intake

Data from 24-hour recalls that the author completed during the personal interviews were analyzed for energy (kcal) and protein (g) content using the Nutrient Analysis Program (NAP) at the University of Manitoba. This program uses data from the 1984 Canadian Nutrient File (Sevenhuysen, 1984).

3.3.3.2 Quality of Nutritional Intake

Quality of nutritional intake was measured by a score that was a descriptive indicator of variety of food choice and adequacy of essential nutrient intake in relation to requirements. The dietary score used was based on Canada's Food Guide (Health and Welfare Canada, 1982) and the four food groups. This score is a modification of that used by the Expanded Food and Nutrition Program as a scoring system for the rapid evaluation of dietary adequacy (Bowering et al, 1977). Guthrie and Scheer (1981) reported that this modified score was a valid tool for assessing nutrient adequacy. For assessment it has been suggested that it is a better indicator of dietary balance than nutrient adequacy. This score attributed equal weights to each of four food groups with a

maximum of four points possible for each food group, and a total possible score of 16 for the day's intake. The scoring system used is found in Appendix C. It was based on two assumptions:

1. Diets providing foods eaten from each of the four major food groups can provide the basis for an adequate dietary intake.
2. Each food group has a unique nutritional composition and thus makes an equally significant contribution to nutrient adequacy.

(Guthrie and Scheer, 1981)

This score has been found to be highly correlated with other indices of dietary adequacy. These measures include the number of nutrients meeting 2/3 of the Recommended Daily Allowances, total calories, and nutrient adequacy ratios (Bowering et al, 1977). Diet scores were assigned for each day's intake for the recall obtained through personal interviews and for each of the single day aide recalls that were collected.

3.3.4 Evaluation Records

This study was conducted concurrently with an evaluation of the Healthy Parent-Healthy Child program. Evaluation files were compiled by two data collectors who were public health nurses who did not provide service to clients of Healthy Parent-Healthy Child. The information for the evaluation records was collected from the medical, nursing and service records of the clients and their infants. Descriptive information about each of the study participants, their use of services, medical factors, and measures of pregnancy outcome were obtained from

the evaluation files. The information from the evaluation files that was used for this study is found in Appendix D.

The information for these evaluation files had been abstracted from forms used by the City Department of Health. For each client, the data collectors assigned a four digit number that could be used to identify the client in each of her records. The same number was used to identify the subjects in this study. A TRS100 lapsize computer was used to enter the information from the client records directly into electronic storage and a verification copy of the data was produced at the same time. The data were then transmitted to the mainframe computer at the University of Manitoba with a telephone hook-up. This procedure reduced error and facilitated error checking. This data collection procedure was used for all information recorded from the nursing, service and family records that were examined for the evaluation of Healthy Parent-Healthy Child. The same procedure was used to record the data from the evaluation files for each of the three study groups: Interviews, Aide Recalls and Aide Visits.

3.3.4.1 Descriptive Information

Descriptive information on maternal age, gestational age (weeks) and cultural group were recorded at the time the client was referred to each of the three public health nursing offices. This information was recorded by the Nursing Supervisor in each office. The referral source and date of first visit were also recorded at this time.

A separate listing of all clients referred to Healthy Parent-Healthy Child was maintained by the Healthy Parent-Healthy Child staff. From this file the number of mobility changes (the number of times the client changed her address) were recorded. The gestation period in weeks and the date of delivery were recorded for each client from the birth notices that were on file in each of the three district nursing offices. The difference between the date of delivery and the first visit date was later calculated to determine the number of weeks that the client received prenatal care from Healthy Parent-Healthy Child.

3.3.4.2 Social Support Measures

At the first visit the public health nurse assigned a social need score that reflected the client's need for social support. Possible scores were zero to four where a higher score indicated a higher need for support. Healthy Parent-Healthy Child provided service to women who had been classified as moderate to severe social need. This was indicated by need scores of two, three or four. The needs assessment was based on similar observations for each client although it is likely that it contained a subjective component from the nurse administering the score. The assessment included questions and observations about the physical environment, family structure, and financial resources. It also considered contacts outside the immediate household including the use of the health care system. It was intended to identify clients who were having difficulty coping with their environment due to their social circumstances. The social needs assessment that was used to determine the need score was related to the woman's perceptions of support and

help that were available to them. The focus of this score was the subjective appraisal of support. The guidelines that were used to determine this score are outlined in Appendix E.

Additional information was collected from the evaluation files on the client's use of services. This objective information provided data about the individual's social environment. The total number and mean number of home visits per month the client received from the nurses and aides were recorded from the family records that were maintained by the nurses and aides. The total and mean number of service contacts per month that the client herself initiated were also recorded. The original person or agency that had referred the client to the public health nursing office was an additional indicator of the individual's social environment.

3.3.4.3 Medical Factors

The Manitoba obstetrical risk score is a prenatal risk score that has been found to be useful in predicting perinatal deaths (Morrison and Olsen, 1979). It includes observations about the woman's medical history and events in the current pregnancy that may influence the outcome of pregnancy. The score that was assigned upon admission to the hospital was recorded from the woman's hospital record for the Healthy Parent-Healthy Child evaluation. This score represented medical factors that might predict a poor pregnancy outcome. This scoring form is shown in Appendix F.

3.3.4.4 Pregnancy Outcome

Pregnancy outcome was measured by five objective medical indicators. These were birthweight (grams), Apgar score, neonatal death, Littman-Parmelee obstetrical complications score , and Littman-Parmelee postnatal complications score. Birthweight has been the main outcome considered in studies investigating the relationship between environmental factors, including nutrition, and pregnancy. A higher incidence of congenital defects, mental retardation and poor growth have been found among low birthweight infants (less than 2500 grams) (van den Berg, 1981).

The Apgar score is another measure of pregnancy outcome. This score is based on observations of heart rate, respiration, muscle tone, reflex irritability, and colour. Scores of zero, one and two are assigned to each item. The maximum possible score is ten with the higher scores representing more favourable pregnancy outcomes. Evaluations are made at one and five minutes after birth. The five minute Apgar score was chosen over the one minute Apgar score because it has been found to be a better indicator of pregnancy outcome (Pritchard and MacDonald, 1980). Birthweight, neonatal mortality and five minute Apgar score were recorded directly from the client's hospital records.

The obstetrical complications score and postnatal complications score provided a method of scoring obstetric and neonatal events that are related to the viability of the infant. The obstetrical complications score was based on 41 items and the postnatal complications score was based on ten different items that have been associated with an increased risk of infant mortality. These scores have been found to be predictive

of short term morbidity and mortality (Littman and Parmelee, 1977, Littman and Parmelee, 1976). The client's hospital records were examined and the number of optimal responses for each item determined. From this the obstetrical complications score and postnatal complications score could be assigned, entered directly into electronic storage and verified. The criteria for these scores are listed in Appendix F.

3.4 STATISTICAL ANALYSIS

All statistical procedures were performed utilizing SAS (Statistical Analysis System) facilities (Statistical Analysis System, 1982). Null hypotheses were rejected if the probability was less than or equal to 5 percent.

3.4.1 Quality of Nutritional Intake and Pregnancy Outcome

Descriptive statistics including means, standard deviation and standard error were computed to describe the energy and protein intakes of those clients who completed two consecutive 24-hour recalls. A $\log_{10}$ transformation was performed on the obstetrical complications score (OCSLOG). Infant birthweights and OCSLOG were described using means, standard deviation and standard error. Pearson's correlation coefficients were calculated to assess the relationship between these nutrient intakes and measures of pregnancy outcome.

Diet scores were described using means, standard deviation and standard error. Pearson's correlation coefficients were computed between diet scores, birthweight and OCSLOG for the twelve women who had

completed two consecutive 24-hour recalls with the author, or the 26 women who had completed a 24-hour recall with a paraprofessional aide.

3.4.2 Social Support and Pregnancy Outcome

The total number of visits, total number of client initiated contacts, gestational age, duration of service, and average number of visits per four weeks were described using means, standard deviation and standard error. These means were compared using a one way analysis of variance. There are three assumptions made underlying the use of this technique. It is assumed that all observations are independent, that the variances are equal for each treatment population and that the populations are normally distributed. While these assumptions are formally stated it is known that the analysis of variance technique will yield accurate results even if population variances are not homogenous and even if population distributions are not normally distributed (Welkowitz, Ewen and Cohen, 1976). These observations were independent and it was therefore felt that this statistical test was appropriate. There are two additional considerations with these data, a small sample and unequal cell sizes. With minor adjustments to the computations, the analysis of variance technique can be used with unequal cell sizes. The between-group variance estimate is calculated by computing a weighted sum of squares and the estimate of error variance is also a pooled estimate (Steele and Torrie, 1980). With a small sample size it is more difficult to obtain statistical significance. Since there are fewer estimates of the error variance the mean square error term may be higher and when the between-group error term is compared to it the F value may

be small. Also, when the degrees of freedom are lower a higher F value is needed to obtain statistical significance.

The mean, standard deviation, and standard error for birthweight and OCSLOG were computed for each need score level. The means were then compared using a one way analysis of variance. The frequencies of high and low postnatal complications scores and prenatal risk scores were computed by need score. Referral source and cultural distribution by need score were described with frequencies. These statistics, involving the relationship between social support and pregnancy outcome, were calculated for the 26 women who had completed a twenty-four hour recall with a paraprofessional aide and for the 54 women who received home visits from paraprofessional aides.

3.4.3 Social Support and Quality of Nutritional Intake

For the diet scores that were assigned to the 26 women who completed a 24-hour recall with a paraprofessional aide the mean, standard deviation and standard error were calculated by need score. These means were compared using a one way analysis of variance.

Chapter IV

RESULTS AND DISCUSSION

4.1 SUBJECTS

The number of referrals to Healthy Parent-Healthy Child was fewer than originally scheduled. This reduced the number of study participants in all three groups: those who completed consecutive 24-hour recalls with the author, those who completed a single 24-hour recall with a paraprofessional aide, and those who received home visits from paraprofessional aides.

The reduction in referrals may have occurred through the influence of three factors (Sevenhuysen, 1985). Firstly, the number of referrals to Healthy Parent-Healthy Child did not increase over the period of the program up to December 1984. The number of referrals appeared to increase slightly after December which coincided with the termination of the evaluation design's random assignment of one-half of clients to receive aide visits. During the time that the evaluation of the Healthy Parent-Healthy Child service was being conducted only one-half of the clients were eligible to receive visits from a paraprofessional aide. All clients had access to the services of a public health nurse throughout the program. Since aide visits could not be guaranteed to all clients of Healthy Parent-Healthy Child before this the number of referrals may have been reduced. Secondly, forty-five percent of

clients moved their residence at least once during the time that they received service from Healthy Parent-Healthy Child. A large number of evaluation files, therefore, did not contain complete information. If the information on pregnancy outcome was not available the clients could not be included in this present study. Thirdly, in addition to their high mobility, and the lower number of referrals, twice the number of women started service in the second half of pregnancy compared to the number starting in the first half. This did not always allow sufficient time to obtain consent from the woman for the use of data from her medical, nursing and personal records for evaluation purposes. In addition it reduced the time available to make arrangements for the author to complete two interviews before delivery of the infant.

Twelve clients who completed two 24-hour recalls with the author and for whom additional information also was available from their evaluation records comprised one study group (INTERVIEWS). An additional 26 women who had completed a single 24-hour recall with a paraprofessional aide and for whom information was available from their evaluation records formed a second group (AIDE RECALLS). The 54 women, including the second group of 26 women, formed the study group in this study (AIDE VISITS).

The demographic characteristics of the three study groups are described in Table 1. Information on marital status, education and source of income was available for only twelve women who completed a personal interview with the author. The majority of these women were single, receiving social assistance and had not completed high school. The downtown area of Winnipeg where these women lived has been identi-

fied as having a high percentage of unemployed persons who receive social assistance (Winnipeg Core Area Initiative Policy Committee, 1981). It is likely that low income status was a common characteristic of all study participants. There did appear to be differences in the three groups with respect to maternal age, cultural group and gestational age at referral. Women who were interviewed by the author were slightly younger and entered the service earlier in their pregnancy. The shorter gestational age of this group is likely due to the time required to make arrangements for the personal interviews to be conducted. There was not sufficient time to make the arrangements to interview women who entered late in their pregnancy. This introduced a bias into this group of 12 women. The mean maternal age of the other two groups was similar. The 54 women entered slightly later in their pregnancy. Again, the completion of a 24-hour recall with an aide may have introduced bias into this group, as it may have taken time for the aide to establish a relationship with the client before suggesting that a recall be completed. The cultural distribution of the 12 women is not representative of all clients of Healthy Parent-Healthy Child. It would appear that those clients who agreed to complete two personal interviews with the author were a unique group.

TABLE 1

Demographic Characteristics of Study Participants[1]

	Interviews (12)	Aide Recalls (26)	Aide Visits (54)
Maternal Age (years)			
mean	20.3	21.9	22.2
< 20	(6) 54.5%	(9) 34.6%	(19) 38.0%
20-24	(3) 27.3%	(12) 46.2%	(16) 32.0%
> 24	(2) 18.2%	(5) 19.2%	(15) 30.0%
Cultural Group			
Native or Metis	(6) 50.0%	(19) 79.2%	(39) 73.6%
South East Asian	(2) 16.7%	(1) 4.2%	(11) 20.8%
Other	(4) 33.3%	(4) 16.7%	(3) 5.7%
Gestational Age (weeks)			
mean	15.2	21.7	24.11
≤ 20	(7) 63.6%	(10) 43.5%	(18) 36.0%
> 20	(4) 36.4%	(13) 56.5%	(32) 64%
Marital status			
Married	(3) 25.0%	-[2]	-
Single,separated	(9) 75.0%	-	-
Education			
< Grade 12	(10) 83.0%	-	-
Grade 12	(2) 17.0%	-	-
Source of Income			
Social Assistance	(9) 75.0%	-	-
Other	(3) 25.0%	-	-

[1] Numbers may not always total due to missing values.
[2] Not available

4.2 PREGNANCY OUTCOME

Five measures of pregnancy outcome were recorded for this study. These were neonatal death, five minute Apgar score, birthweight, obstetrical complications score, and postnatal complications score. No neonatal deaths were recorded among clients of Healthy Parent-Healthy Child, and this variable was subsequently dropped as a measure of pregnancy outcome. The perinatal death rate in the inner city area of Winnipeg in 1982 was recorded as 14.7 per 1000 total births (Winnipeg Department of Health, 1982). It is therefore surprising that no neonatal deaths were recorded among the 207 women who were included in the evaluation of the Healthy Parent-Healthy Child program. It was later found that some women had withdrawn from the program after a perinatal death had occurred, and they had selectively been omitted from the evaluation by program staff.

A five minute Apgar score of less than or equal to six has been defined as a poor pregnancy outcome (Pritchard and MacDonald, 1980). This occurred in three cases. This small number would not be useful to distinguish good and poor pregnancy outcomes. It was also included in the determination of the obstetrical complications score and was therefore dropped as a measure of pregnancy outcome. Birthweight was recorded in grams and treated as a continuous variable.

Possible values for the obstetrical complications score ranged from 50 to 160. The intervals between the values were unequal and the intervals between the higher values were also relatively large. Such a pattern would have biased the mean. To overcome this, and enable the

variable to more closely approximate a continuous variable a $\log_{10}$ transformation of the score was performed (OCSLOG). This procedure was consistent with that used in the data analysis for the evaluation of Healthy Parent-Healthy Child and was based on information from all the evaluation records, rather than only those used for this study.

The postnatal complications score was assigned in a manner similar to that of the obstetrical complications score. The highest possible score was 160 and the second highest score possible was 104. Approximately fifty percent of the study participants received a score of 160. Of the remaining half the majority were 104. Therefore, postnatal complications score was treated as a dichotomous variable with values of 160 representing a more favourable pregnancy outcome than scores of less than or equal to 104.

Originally it was intended that the Manitoba prenatal risk score would be used as an intervening variable to represent additional medical factors that might predict a poor pregnancy outcome. The score used for this study was recorded upon admission to the hospital at delivery and in this sense was no longer a risk score because there was no time for intervention to reduce the risk. For this reason it was used in these analyses as an additional measure of pregnancy outcome. This score was also treated as a dichotomous variable with scores less than or equal to two representing a low risk for a poor pregnancy outcome. A score greater than two represented a high risk score for a poor pregnancy outcome. The scoring form designated scores of 0 to 2 as low risk, scores of 3 to 6 as high risk and scores of 7 or more as extreme risk (Morrison and Olsen, 1979). The latter two categories were collapsed

into one because there were very few scores greater than or equal to seven. As indicated in Table 2 the pregnancy outcomes of the three groups of study participants were very similar.

TABLE 2

Pregnancy Outcomes of Study Participants[1]

	Interviews (12)	Aide Recalls (26)	Aide Visits (54)
Mean Birthweight (grams)	3410	3417	3369
Mean OCSLOG	1.9917	1.9834	1.9825
5 minute Apgar Score			
low (≤ 6)	(0) 0%	(1) 3.8%	(2) 3.7%
high (> 6)	(12) 100%	(25) 96.2%	(52) 96.3%
Postnatal Complications Score			
low (≤ 104)	(6) 50.0%	(13) 52.0%	(24) 45.3%
high (160)	(6) 50.0%	(12) 48.0%	(29) 54.7%
Prenatal Risk Score			
high risk (> 2)	(0) 0%	(9) 36%	(13) 26%
low risk (≤ 2)	(12) 100%	(16) 64%	(37) 74%

[1] Numbers may not always total due to missing values.

4.3 NUTRITIONAL INTAKE AND PREGNANCY OUTCOME

4.3.1 Interviews

4.3.1.1 Energy and Protein Intakes

Table 3 indicates the energy and protein intakes of twelve clients who completed two consecutive 24-hour recalls. These intakes are compared,

in Table 3, with the mean intakes obtained in the Nutrition Canada Survey for pregnant women living in the Prairies (Health Protection Branch, 1973) and the recommended nutrient intakes for pregnant women (Bureau of Nutritional Sciences, 1983). The mean nutrient intakes of the study participants were lower than the results reported in the Nutrition Canada Survey (Health Protection Branch, 1973). It must be remembered that these means are based on only twelve observations and are therefore sensitive to extreme values. Two of the subjects had energy intakes less than 800 Kcal. These two extreme values would reduce the estimate of the group mean. The median energy intake was 2198 Kcal which is similar to the mean reported by Nutrition Canada (Health Protection Branch, 1973). A similar argument could be applied to explain the lower mean protein intake observed among these twelve women when compared to the findings of Nutrition Canada (Health Protection Branch, 1973). The median protein intake among these women was 73 g which is greater than the mean, but less than the mean reported by Nutrition Canada (Health Protection Branch, 1973). The mean protein intake was greater than the protein intake recommended for pregnant women in the Recommended Nutrient Intakes for Canadians (Bureau of Nutritional Sciences, 1983). Thus, it appears that the protein intake of this group is adequate.

4.3.1.2 Nutrient Intakes and Pregnancy Outcome

Pearson's correlation coefficients (r) were determined to assess the relationship between energy and protein intakes and pregnancy outcome measures. Birthweight and OCSLOG were the only two measures of pregnancy outcome that were continuous and could, therefore, be used in this

TABLE 3

Energy and Protein Intakes of 12 Clients Who Completed Two 24-Hour Recalls and Comparison with Recommended Nutrient Intakes (RNIs) and Nutrition Canada Results

	Mean	Standard Deviation	Median	% RNIs of Mean	Nutrition Canada (Prairies)
Energy (Kcal)	1894	768	2198	-	2206
Protein (g)	69	29	73	104%	83

correlational analysis. No significant relationships between maternal energy and protein intakes and birthweight and OCSLOG were found. These correlation coefficients and their significance levels are indicated in Table 4.

TABLE 4

Pearson's Correlation Coefficients (r) Between Energy and Protein Intakes and Birthweight and OCSLOG for 12 Clients Who Completed Two 24-Hour Recalls

	r	probability
Energy * Birthweight	0.3220	0.3074
Energy * OCSLOG	0.2360	0.4602
Protein * Birthweight	0.4955	0.1014
Protein * OCSLOG	0.5058	0.0934

There are no reports in the literature correlating OCSLOG with either energy or protein intakes. The correlation between maternal energy intake and birthweight (r=0.3220) is similar to that reported by McDonald et al (1981) and Picone et al (1982). McDonald et al (1981) reported a correlation of r=0.3999 ($p<0.01$) among 37 women in Taiwan who received a liquid beverage supplement that contained less than 80 Kcal. Picone et al (1982) also reported a positive correlation, r=0.27 ($p<0.05$), among a group of 60 women who were patients of a hospital prenatal program and enrolled in the Women, Infants and Children Program in Connecticut.

The lack of statistical significance in this present study may be partially due to the small sample size. With a sample size this small the absolute value of the correlation must be 0.576 or larger to obtain significance (Welkowitz, Ewen and Cohen, 1976). The studies of Picone et al (1982) and McDonald et al (1981) both had larger samples. With a small sample size statistical significance can be overemphasized. It is also important to look at the absolute value of r. None of the three correlation coefficients between energy intake and birthweight was high. This suggests that the relationship between the two variables is weak.

Osofsky (1975) has suggested that the weak associations between prenatal energy intake and birthweight that have been observed may be due to a relatively adequate nutrient intake. This suggestion is consistent with Dobbing's (1981) proposal that a threshold level of 1500-1800 Kcal exists which separates those whose fetuses grow well from those that would benefit from prenatal supplementation. In this study the mean energy intake was 1894 Kcal. This is greater than this theo-

retical level and may explain the low correlation obtained in the present study. Four individuals consumed less than 1500 Kcal. The birthweights of their infants ranged from 2890g to 3580g. All of these birthweights are greater than 2500g which was formally defined as low birthweight, and were not the lowest four birthweights recorded. The range for the 12 women was 1700 g to 4780 g. Among these 12 women it did not appear that consuming less than 1500 Kcal was associated with a lower birthweight baby. The numbers are extremely small and this makes it difficult to draw any conclusions about the relationship between prenatal energy intake and birthweight. The prenatal care that these 12 women received may also have obscured any relationship between energy intake and pregnancy outcome.

4.3.1.3 Quality of Nutritional Intake

Diet scores were assigned to the 24-hour recalls that were completed by the twelve study participants. Pearson's correlation coefficients (r) between the diet scores and energy and protein intakes were determined. These correlations were found to be highly significant ($p=0.0001$). The correlation between diet score and energy intake was $r=0.8980$, and between diet score and protein intake the correlation coefficient was $r=0.9334$. Similarly, Bowering et al (1977) reported a highly significant correlation ($r=0.75$, $p<0.001$) between energy intake and diet score.

Among these twelve women the mean diet score ($\pm$ standard error) was 10.2 ± 1.2. The maximum score was 16. Bowering et al (1977) reported on the use of a diet score to analyze single day 24-hour recalls that

were obtained from sixty low income pregnant women who received home visits and nutritional counselling at an obstetric clinic. The mean ($\pm$ standard error) was 11.0 $\pm$ 0.3. The total possible score was 14. The score used by Bowering et al (1977) assigned one point up to a maximum of four for each serving consumed in the Milk and Milk Products group, Fruits and Vegetables, and Breads and Cereals. One point for each serving up to a maximum of two was assigned for each serving consumed in the Meat, Fish, Poultry and Alternates group. The score used in the present study was similar except that it allowed two points per serving up to a maximum of four for each serving consumed in the Meat, Fish, Poultry and Alternates group. The total possible contribution from each food group was therefore equal in this scoring system. Given that the total possible scores are different, a comparison can be made only in terms of percent mean of total. For the women studied by Bowering et al (1977) the mean diet score as a percent of total was 78.6% and for this present study it was 63.8%. Using diet score as a measure of the quality of nutritional intake it appears that the quality of nutritional intake of the twelve women who participated in this study was inferior to that of the women in the study by Bowering et al (1977).

4.3.1.4 Quality of Nutritional Intake and Pregnancy Outcome

Pearson's correlation coefficient (r) was determined to measure the association between diet score and birthweight ($r=0.4871$). This correlation was not statistically significant. Philipps and Johnson (1977) reported a significant positive correlation between overall quality of the mother's diet and infant birthweight ($r=0.301$, $p<0.05$). Again, the

lack of statistical significance in the present study may be partially due to the small sample size (n=12). Forty-seven women participated in the study by Philipps and Johnson (1977). As observed when studying the relationship between energy intake and birthweight, the correlation between diet score and birthweight was not high. While the null hypothesis that p=0 must be accepted it is likely that a weak relationship does exist between quality of nutritional intake and birthweight. A larger sample size would allow this relationship to be more fully examined.

The low correlations that were obtained between diet score and birthweight and OCSLOG did not make it reasonable to continue with a regression analysis. The practical significance of such an analysis would also be limited with such a small sample size. Originally it was intended that smoking habits and alcohol consumption would be included in these analyses. This information was not complete and was not included in this study.

4.3.2 Aide Recalls

4.3.2.1 Quality of Nutritional Intake

The diet scores based on the interviews from the twelve women who had completed interviews for this study were highly correlated with energy and protein intakes. The score was based on an equal contribution from each food group and was intended to assess dietary balance. However, these high correlations with energy and protein intakes indicated that it is closely related to measure of dietary adequacy. The recalls that were completed by the aides provided qualitative information on the

number of servings provided by each food group but did not provide quantitative data. Diet scores were calculated for five women who had been interviewed for this study and who had also completed a 24-hour recall for the aide. This was done to determine if there were significant differences between the recalls completed by the author and those completed by paraprofessional aides. A paired t-test did not show significant differences between the diet scores (t=0.09). This justified the use of a diet score to assess the quality of nutritional intake based on 24-hour recalls completed by paraprofessional aides.

The mean diet score ($\pm$ standard error) of the twenty-six one day 24-hour recalls that were completed by paraprofessional aides was 10.85 ($\pm$ 0.57). This score is slightly higher than the mean for the consecutive twenty-four hour recalls for the author (10.2 $\pm$ 1.2). However, this score as a percent of total (67.8%) is lower than that reported by Bowering et al (1977) (78.6%). These data must be interpreted with caution because they are based on only 26 single day estimates of food intake. It is possible that a larger sample, or repeated recalls might have yielded different results.

4.3.2.2 Pregnancy Outcome

A small and nonsignificant correlation was found between diet score and birthweight (r=0.0646). A stronger correlation was found between diet score and OCSLOG (r=0.3035). These low correlation coefficients appear to indicate that the relationship between diet score and birthweight or OCSLOG is weak. It is unlikely that diet score would be useful in predicting the outcome of pregnancy if either of these two

measures of outcome were being used. It has previously been suggested that a relationship would only be expected if nutrient intakes were inadequate. There are no established criteria to define adequate and inadequate nutrient intakes using this diet score. A second consideration is that among the 26 women there were only twelve distinct values of diet scores. The small number of values may limit the correlation that was obtained because the variability of the diet scores may be somewhat limited, which would cause the absolute value of the correlation coefficient to be decreased (Welkowitz, Ewen, and Cohen, 1976). To avoid this limitation, two levels of dietary quality based on this diet score were assigned.

A diet was assigned to Level 2 if it included one serving in both the Milk and Milk Products Group and the Meat, Fish, Poultry and Alternates Group and two servings in both Fruits and Vegetables and Breads and Cereals. All diet scores not meeting these criteria were assigned to Level 1. Bowering et al (1977) had applied these criteria to further describe the nutritional intake and dietary adequacy of the sixty women who participated in their study. The use of such a system in this present study enabled the pregnancy outcomes from two diet levels representing differing levels of quality of nutritional intake to be compared using this small sample.

Forty-two percent of the women met the first level and fifty-eight percent met the second level. The mean ($\pm$ standard error) of diet level 1 (8.41 $\pm$ 0.52) was compared to that of diet level 2 (12.63 $\pm$ 0.52) using a student's t-test. The mean scores between the two levels were found to be significantly different ($p=0.0001$). It appears that this

classification system is a useful way of distinguishing between the diet scores. It is not surprising that the diet scores between the two levels are different. To be classified in the second level requires a maximum number of servings in each food group, and therefore a minimum of eight points to be assigned. Diets in the first level do not have this minimum attached to them. It is logical, therefore, that the quality of nutritional intake between the diet levels as measured by the diet score was not equal.

Table 5 compares the mean birthweight and OSCLOG for the two diet levels. Both the mean birthweight and OCSLOG were greater in diet level two. The differences were not statistically significant when compared using a student's t-test. The high variability and small numbers would contribute to the difficulty in obtaining statistical significance.

TABLE 5

Birthweights and OCSLOG for Diet Levels 1 and 2 for 25 Clients who Completed a 24-Hour Recall with a Paraprofessional Aide

	Diet Level 1 (11)	Diet Level 2 (12)
Birthweight (grams)	3380 ± 193[1]	3444 ± 203
OCSLOG	1.9569 ± 0.0179	2.003 ± 0.0237

[1] mean ± standard error

Table 6 compares the number of high and low postnatal complications scores and prenatal risk scores by diet level. When postnatal complica-

tions score was considered there was a greater percentage of low scores than high scores in diet level 1, whereas in diet level 2 this pattern was reversed. There was a greater proportion of high scores than low scores. For prenatal risk score for both diet levels 1 and 2 there were more low risk scores than high scores. These data do not suggest a consistent relationship between diet level and pregnancy outcome when either means or frequencies were considered. A larger sample and a better estimate of dietary intake such as repeated 24-hour recalls would be needed to further examine test this relationship.

TABLE 6

Frequencies of High and Low Postnatal Complications Scores and Prenatal Risk Scores by Diet Level for 26 Clients who Completed a 24-Hour Recall with a Paraprofessional Aide

	Diet Level 1 n=10	Diet Level 2 n=15
Postnatal Complications Score		
low (≤ 104)	6[1](60%)	7 (47%)
high (160)	4 (40%)	8 (53%)
Prenatal Risk Score		
high risk (> 2)	4 (40%)	5 (33%)
low risk (≤ 2)	6 (60%)	10 (67%)

[1] (Frequency)

A relationship between prenatal risk score and dietary assessment had previously been reported. Hindle (1983) reported that among 251 patients at the Women's Hospital in Winnipeg completing a dietary assessment with a dietitian was more significantly related to pregnancy

outcome than any other nutritional parameters including daily energy and protein intakes and number of servings from each of the four major food groups. Clearly, nutritional factors alone are not explaining any differences that exist in the pregnancy outcomes of the women in this study. Social factors were also examined because of their potential influence on pregnancy outcome.

4.4 SOCIAL SUPPORT AND PREGNANCY OUTCOME

4.4.1 Aide Recalls

4.4.1.1 Social Support Measures

Two changes were made to the social support measures that were recorded for these analyses. The number of times that the clients changed addresses had not been consistently recorded and was not included. An additional variable, the average number of visits that the woman received per four weeks that they were registered with Healthy Parent-Healthy Child was determined. In this way it could be determined if differences in the total number of visits the clients received were related to the gestational age upon entry to the program, and the length of time that the women received service.

Thirty-one percent of the study participants who completed 24-hour recalls with a paraprofessional aide were assigned a need score two, forty-six percent were assigned a need score three and twenty-three percent were assigned a need score four. Table 7 indicates the means for the total number of visits the clients received, the total number of contacts clients initiated with Healthy Parent-Healthy Child, the number of weeks the women were receiving service from Healthy Parent-Healthy

Child prior to delivery (duration of service), the gestational age of the women upon entry to the program, and the average number of visits the women received per four weeks of service, for each need score category. These means were compared using a one-way analysis of variance procedure. The F-ratios and significance levels are indicated in Table 7. It was found that there were statistically significant differences between need scores and the total number of visits the clients received ($p<0.01$). Scheffe's test was the multiple comparisons procedure used to describe these inequalities. This is the appropriate procedure to use when the means are based on unequal replications (Nexter and Wasserman, 1974). It was found that the mean number of total visits received by the women with a need score two was significantly different than the mean number of total visits received by women with a need score four ($p < 0.05$). It appears that the total number of visits that the clients received increased as need score increased.

No significant differences between need scores were found for the other four variables. The mean gestational age upon entry to the program decreased as need score increased, although not significantly so. Thus, the duration of service increased across need scores because the earlier in their pregnancy the women entered the program the longer they would have received care prior to delivery. It would be expected that the longer the woman received service, the greater the number of total visits she would receive. The average number of visits per four weeks did not differ between the three need score groups. One observation was eliminated from the calculation of the mean for need score level two because it was greater than five standard deviations from the

TABLE 7

Results from One-Way ANOVA Comparing Clients' Use of Services Across Need Scores for Clients who Completed a 24-Hour Recall with a Paraprofessional Aide

	Need Scores[1]			F ratio	Probability
	2	3	4		
Total Visits	5.67	8.64	12.17	6.60	0.0063
Total Number of Client Initiated Contacts	1.67	1.45	3.17	0.67	n.s.[2]
Duration of Service (weeks)	12.14	1.43	17.8	0.86	n.s.
Gestational Age (weeks)	26.0	20.64	18.2	1.62	n.s.
Average visits/ 4 weeks	2.22	3.75	2.94	0.36	n.s.

[1] Means
[2] Not significant at $p \leq 0.05$

mean and it caused the mean to be highly skewed to the right. Although not significant it appeared that women with a need score three may have been visited slightly more often. The difference is very small, and the means are based on a small number of observations so it is difficult to speculate whether this pattern is meaningful or due to chance. The total number of client initiated contacts also increased across need scores. It is likely that this pattern is also related to the increased exposure to the Healthy Parent-Healthy Child service that also occurred, as indicated by the increasing total number of visits across need scores.

All of these differences are likely related to the difference in gestational age between the three need scores. If women entered the service earlier in their pregnancy they would receive care longer, receive more visits and have more time to initiate contacts with the service themselves. The observed pattern for gestational age is not in the expected direction. Clients with less social support, and therefore a higher need score, would be hypothesized to be less likely to utilize health care services and would probably seek care later in their pregnancy. The average gestational age at time of referral for all three groups is lower than might be expected. Again, all these women had been identified as being in moderate to severe need of social support and as having a history of being noncompliant with traditional health care services. It might have been expected that they would not seek care until later in the third trimester of pregnancy.

Differences in referral source by need score do not explain the differences in gestational age. Table 8 shows that for each need score level approximately one-half of the referrals were made by individuals, either public health nurses or paraprofessional aides, and the remainder were made by hospitals or community agencies.

Table 9 indicates the cultural distribution across need scores. Eighty percent of the 26 participants were Native or Metis. It is not reasonable to expect that cultural group contributed to the differences that were observed between need scores.

These 26 women may have been more responsive to the service. They participated in a 24-hour recall with the aide which makes them unique

from other clients that received home visits from paraprofessional aides. This may have created a bias in this sample which may have minimized differences between need scores in the client's use of services.

TABLE 8

Frequencies of Referral Source by Need Score for 23 Clients Who Completed a 24-Hour Recall with a Paraprofessional Aide

	Need Score		
	2 (8)	3 (10)	4 (5)
Public Health Nurse	3	2	2
Paraprofessional Aide	1	4	0
Hospital	1	3	2
Agencies	3	1	1

TABLE 9

Cultural Distribution by Need Score for 24 Clients who Completed a 24-Hour Recall with a Paraprofessional Aide

	Need Score		
	2 (8)	3 (11)	4 (5)
Native or Metis	7	8	4
Other	1	3	1

4.4.1.2 Pregnancy Outcome

The means for birthweight and OCSLOG by need score of the twenty-six women who completed a 24-hour recall with a paraprofessional aide are shown in Table 10. As need score increased the mean birthweight decreased. The variability was high so that these differences were not significant. OCSLOG increased with need score, which is in the opposite direction to birthweight. A higher OCSLOG indicates a more favourable outcome, and using this variable as a measure of pregnancy outcome it seems that those women with a higher need score had better pregnancy outcomes. These differences were not statistically significant. The fact that the observed pattern with birthweight is opposite to that observed with OCSLOG suggests that the slight differences observed are due to chance. It is unlikely that they reflect meaningful differences that exist in birthweight or OCSLOG between need scores.

TABLE 10

Birthweights and OCSLOG Across Need Scores for 26 Clients who Completed a 24-Hour Recall with a Paraprofessional Aide[1]

	Need Score		
	2	3	4
Birthweight (grams)	3586 ± 199	3364 ± 254	3297 ± 241
OCSLOG	1.986 ± 0.079	1.973 ± 0.0307	2.000 ± 0.0340

[1] mean ± standard error

The number of high and low postnatal complications scores and prenatal risk scores for the three need score levels are shown in Table 11. When postnatal complications scores were examined it was found that the number of high and low scores was approximately equal for need score four. Comparing need scores two and three more high scores than low scores were found for need score two, while for need score three this pattern was reversed. There were more low scores than high scores. The postnatal complications scores therefore suggest that a greater number of women with a higher social need score had poor pregnancy outcomes than did those with a lower need score.

The prenatal risk score is based on medical factors and clinical observations associated with a poor pregnancy outcome. Whereas, with the postnatal complications score a higher score represents a more favourable pregnancy outcome, with the prenatal risk score a higher score represents a greater risk of a poor pregnancy outcome. It would be expected that women with a high prenatal risk score would have a low postnatal complications score. The frequency of high and low prenatal risk scores across need scores followed a pattern opposite to that observed for postnatal complications scores, as shown in Table 11. For need score two there were more high risk scores than low risk scores and for need score three there were more low risk scores than high risk scores. The inconsistencies that were noted with birthweight and OCSLOG as well as with the postnatal complications scores and prenatal risk scores do not provide evidence of a relationship between pregnancy outcome and need for social support among these 26 women. The small sample size may have contributed to these inconsistent and inconclusive findings.

TABLE 11

Frequencies of High and Low Postnatal Complications Scores and Prenatal Risk Scores by Need Score for Clients who Completed a 24-Hour Recall with a Paraprofessional Aide[1]

	Need Score		
	2 n=8	3 n=12	4 n=6
Postnatal Complications Score			
low (≤ 104)	3[2](37.5%)	8 (75%)	2 (40%)
high (160)	5 (62.5%)	4 (25%)	3 (60%)
Prenatal Risk Score			
high risk (> 2)	5 (62.5%)	3 (27%)	1 (17%)
low risk (≤ 2)	3 (37.5%)	8 (73%)	5 (83%)

[1] Numbers may not always total due to missing values.
[2] (Frequency)

The lack of an association between social need score and pregnancy outcome may be partially explained by two factors. It has been suggested that this group of 26 women may not have been typical of all those visited by aides. It is possible that women who completed recalls were more interested in nutrition than those who did not. The willingness of a woman to complete a 24-hour recall with the aide may also indicate attitudes towards health care different from those other women. The effect of such differences in the health care practices or associated health status of these 26 women could have obscured a relationship between need for social support and pregnancy outcome.

Another consideration is the time that the need score was assigned. The need score was assigned upon admission to Healthy Parent-Healthy Child. The service, itself, was intended to provide social support.

This might have caused a change in the woman's perception of support that was available to her. There is no measure of this because a needs assessment was not completed at delivery. However, the major limitation of these data remains the small sample size. Analyses were therefore repeated using all women who had received home visits from paraprofessional aides. Dietary data were not available for these women but it allowed a greater number of subjects to be included in the investigation of the relationship between social support and pregnancy outcome.

4.4.2 Aide Visits

4.4.2.1 Social Support Measures

The results of analyses, based on 54 women who received home visits from paraprofessional aides, are shown in Tables 12 to 16. Fifty-two percent of the women were assigned a need score two, thirty-five percent were assigned a need score three and thirteen percent were assigned a need score four. Table 12 indicates the results from a one way analysis of variance comparing the means for total visits, total number of client initiated contacts, duration of service, gestational age, and average number of visits per four weeks of service, across need scores. These measures were intended to reflect objective measures of the client's use of services. None of the differences between the means was statistically significant. The mean total visits increased with need score. On average, clients with higher need scores received more total visits than did clients with lower need scores. A similar pattern was observed with the number of contacts clients initiated to the service. The mean increased as need score increased. It is likely that the total number

of client initiated contacts is related to the total visits and that with more exposure to the service clients initiated more contacts.

The duration of service is related to gestational age upon entry to the program. Clients entering the Healthy Parent-Healthy Child program early during their pregnancy received prenatal care for longer periods. As shown in Table 12 the average gestational age for women with a need score two or three is very similar. The women entered care at approximately the same time in their pregnancy, around the twenty-third week of gestation, and received prenatal care for approximately thirteen weeks. Clients with a need score four entered the service earlier, around the nineteenth week of gestation and received care throughout the second half of their pregnancy. It would be expected that women who were receiving service from Healthy Parent-Healthy Child longer would receive more visits. The average number of visits per four weeks was also determined to investigate the possibility that any differences in total visits were related to the duration of service. It appeared that women with a need score two were visited slightly less frequently than women with need scores three or four. These differences were very small and not significant.

Differences in the mean gestational age between need scores may be related to the manner by which clients were initially referred to Healthy Parent-Healthy Child. The frequencies of referral source by need score were therefore tabulated and are presented in Table 13. Four out of five clients with a need score four were referred by a public health nurse. Among clients with a need score two or three, approximately one-half of the referrals were made by individuals, either public

TABLE 12

Results from One Way ANOVA Comparing Clients' Use of Services Across Need Scores for Clients who Received Home Visits from a Paraprofessional Aide

	Need Scores[1]			F ratio	Probability
	2	3	4		
Total Visits	5.86	7.95	9.00	2.63	n.s[2]
Total Number of Client Initiated Contacts	0.61	0.95	1.14	0.44	n.s.
Duration of Service (weeks)	13.90	12.93	17.50	0.60	n.s.
Gestational Age (weeks)	23.73	23.65	19.17	0.71	n.s.
Average visits/ 4 weeks	2.09	3.08	2.66	1.24	n.s.

[1]Means
[2] not significant at $p \leq 0.05$.

health nurses or paraprofessional aides, and the remainder were made by hospitals or other community agencies. While the public health nurses referred most of the women with need scores of four the numbers are too small to make any conclusions regarding differences in referral source between need scores.

Healthy Parent-Healthy Child was designed to provide service that was culturally appropriate. Clients received visits from aides with the same cultural backgrounds as themselves. It is possible that different cultural groups responded differently to the service or used the service differently. For this reason the cultural distribution by need score for the 54 women who received home visits from a paraprofessional aide

TABLE 13

Frequencies of Referral Source by Need Score for 48 Clients Who Received Home Visits from a Paraprofessional Aide

	Need Score		
	2 (26)	3 (17)	4 (5)
Public Health Nurse	4	4	4
Paraprofessional Aide	9	5	0
Hospital	10	5	1
Agencies	3	3	0

is shown in Table 14. The three cultural groups were defined as Native or Metis, South East Asian and Other. All clients with a need score four were Native or Metis. Similarly, the majority (83%) of those clients with a need score three were Native or Metis. Seventeen of the twenty-eight clients with a need score two were Native or Metis and ten of these clients were South East Asian. Differences in outcome measures between women with need scores two or three may be influenced by cultural background. Those with need scores three or four will not show this influence as they belong to the same cultural group. It is possible that in comparing differing needs for social support, which the need score represents, cultural differences are also being compared.

The means for total visits, total number of client initiated contacts, duration of service, gestational age, and average visits per four weeks, for women with a need score two were calculated separately for Native or Metis women. Although these means were slightly higher

than those calculated for all women with a need score two the differences were very small. For each of the five variables the means for the two groups were within two standard errors, and would not, therefore, be significantly different. The results therefore suggest that all women with a need score two may be compared to those with need scores three or four.

TABLE 14

Cultural Distribution by Need Score for 53 Clients who Received Home Visits from a Paraprofessional Aide

	Need Score		
	2 (28)	3 (18)	4 (7)
Native or Metis	17	15	7
South East Asian	10	1	0
Other	1	2	0

4.4.2.2 Pregnancy Outcome

The mean birthweights and mean OCSLOG, by need score, of the 54 women who received home visits from paraprofessional aides are indicated in Table 15. A one way analysis of variance did not reveal significant differences between these groups. The mean birthweight of the need score three group was the largest, followed by need score two and then need score four. This does not suggest a consistent relationship between need for social support and birthweight. For OCSLOG, as need score increased OCSLOG decreased. This pattern is in the expected direction but, again, the differences are small. The inconsistent patterns between need score and birthweight or OCSLOG, as well as the insignificant differences in these dependent variables between the need score groups do not suggest that there is a relationship between social support and pregnancy. Within the need score two group the means for birthweight and OCSLOG for the Native or Metis women and South East Asian women were considered separately. The pattern was the same when the two cultural groups were examined individually. Thus, cultural differences are not obscuring a relationship between social support and pregnancy outcome among these women.

The number of high and low postnatal complications scores and prenatal risk scores by need score are shown in Table 16. The number of high and low scores were equal among women with a need score four. Looking at postnatal complications scores, for need score two there were more high scores than low scores and for need score three there were more low scores than high scores. This suggests that a lower need for social support may be associated with a more favourable pregnancy

TABLE 15

Birthweights and OCSLOG Across Need Scores for Clients who Received Home Visits From a Paraprofessional Aide[1]

	Need Score		
	2	3	4
Birthweight (grams)	3253 ± 78	3613 ± 165	3175 ± 242
OCSLOG	1.985 ± 0.0940	1.984 ± 0.0218	1.968 ± 0.0224

[1] Mean ± standard error

outcome. However, when the prenatal risk score is considered, there were more low risk scores than high risk scores for both need score levels two and three. These data do not suggest a relationship between social need score and risk of a poor pregnancy outcome.

When Native or Metis women and South East Asian women in the need score two group were considered separately the frequency of high and low postnatal complications scores and prenatal risk scores followed a pattern similar to that of the total group of women with a need score two. Again, differences in pregnancy outcomes between cultural groups do not appear to be influencing the relationship between social support and pregnancy outcome among these women.

Among the 54 women who received home visits from a paraprofessional aide, it appears that there may be a slight relationship between post-natal complications score and need score. It must be remembered that

need score four women were not considered because there were only seven women in this group and the number of high and low postnatal complications scores and prenatal risk scores were similar. These data do not provide sufficient evidence to describe any potential relationship between need for social support and pregnancy outcome.

TABLE 16

Frequencies of High and Low Postnatal Complications Scores and Prenatal Risk Scores by Need Score for Clients who Received Home Visits from a Paraprofessional Aide[1]

	Need Score		
	2 n=28	3 n=19	4 n=7
Postnatal Complications Score			
low (≤ 104)	10[2](36%)	11 (58%)	3 (50%)
high (160)	18 (64%)	8 (42%)	3 (50%)
Prenatal Risk Score			
high risk (> 2)	4 (15%)	6 (35%)	3 (43%)
low risk (≤ 2)	22 (85%)	11 (65%)	4 (57%)

[1] Numbers may not always total due to missing values.
[2] (Frequency)

4.4.3 Aide Recalls versus Aide Visits

A limitation of this study was the small sample size. Findings obtained from a sample of 26 women were compared to those obtained with 54 women to determine if the results could be generalized to all women who received visits from paraprofessional aides, rather than simply those who had completed a 24-hour recall.

As has already been described, the cultural distribution of the two groups differed, with those women completing 24-hour recalls being primarily Native or Metis, whereas, for those who received home visits, approximately 20% were South East Asian. These differences, and their influence on the clients' use of services , and indicators of pregnancy outcome were discussed earlier in this section. For both groups the mean total visits and the mean number of client initiated contacts increased across need scores. With the 26 women the increase in mean total visits was significant, ($p<0.05$). Again, it is likely that the number of client initiated contacts was related to the total number of visits that the clients received, and as the number of visits increased contacts with the service increased proportionately. For both groups, there did not appear to be any differences in the average number of visits per four weeks between need scores.

Among the women who completed a 24-hour recall with a paraprofessional aide the mean gestational age did decrease and the mean duration of service did increase as need score increased. In the group of 54 women the duration of service was similar for clients with a need score two or three. For the women who had completed a 24-hour recall with an aide there appeared to be more differences in mean gestational age and duration of service between need score levels two and three which did not appear when data from the group of 54 women were analyzed. Cultural differences do not explain this observation, so it suggests a bias in the 26 women who completed 24-hour recalls with an aide.

For both the 26 women who completed a 24-hour recall with a paraprofessional aide and the 54 women who received home visits from a parapro-

fessional aide, the data did not show a relationship between need score and birthweight or OCSLOG. When postnatal complications score was considered, for both groups, in the need score group two there were more high scores than low scores and in the need score three group this pattern was reversed. For prenatal risk scores, among the 26 women there was a higher proportion of low risk scores among women with a need score three as compared to need score two. Among the 54 women there were more low risk scores than high risk scores for both need score levels two and three. Women with a need score four, in either group, were not considered because of the small numbers. The number of high and low postnatal complications scores and prenatal risk scores were approximately equal in the need score four groups. These findings do not provide evidence of a relationship between pregnancy outcome and social support among either the 26 women who completed a 24-hour recall with a paraprofessional aide or the 54 women who received home visits from paraprofessional aides.

It appears that the need score used for this study does not distinguish between good and poor pregnancy outcomes. The failure to establish a relationship between need for social support and pregnancy may be due to four factors. These include: the small sample size, the inclusion of more than one cultural group and the unequal numbers of observations in the three need score groups. All of these limitations made the estimates of the means more sensitive to extreme values and made it more difficult to detect statistically significant differences.

The use and structure of the need score must also be considered. The need score was assigned upon admission to the program. The visits that

the clients received may have provided social support during the prenatal period. Thus the need score that was assigned when the client entered the program may not have represented their need for social support at delivery.

The instrument that was used to assess social support recorded this variable on an ordinal scale of measurement. All clients of Healthy Parent-Healthy Child were assessed as being in moderate, high or extreme need of social support. It meets the criteria for an ordinal measure because it allowed the ordering of observations but did not consist of equal sized units (interval measure) nor was it based on a true zero point (ratio measure) (Babbie, 1980). The need score was a qualitative measure of social support that included both affective and instrumental dimensions of the concept. Possible relationships between social support and pregnancy outcome may have been obscured by this broad measure of social support. A more precise measure of different aspects of social support perceived by the woman may be more useful to determine if a relationship exists with pregnancy outcome.

Pascoe, Chessare and Baugh (1985) identified three elements of social support: partner support, kin support and emergency child care. High and low subgroups for each of these elements were defined. Among 140 multigravida mothers no statistically significant differences in birth-weights or neonatal intensive care unit admissions were found between the low and high subgroups of kin support or emergency child care. However, there were differences in the pregnancy outcomes between the low and high partner support subgroups. Infants born to mothers in the low partner support group were significantly smaller, when the frequency of smoking was controlled. Mothers with low partner support were about

three times more likely to deliver infants weighing less than 2500 grams and newborns of these women were more likely to require neonatal intensive care as compared to the high partner support group. It is possible that a relationship between specific aspects of social support and pregnancy outcome were obscured in this study by the general measure of social support that the need score represented.

4.5 SOCIAL SUPPORT AND QUALITY OF NUTRITIONAL INTAKE

4.5.1 Aide Recalls

The data collected from the 26 women who had completed a single 24-hour recall with a paraprofessional aide were used to investigate the relationship between social support and quality of nutritional intake. The mean diet scores for each need score are indicated in Table 17. No significant differences in mean diet scores were found between the three need score groups.

It is unlikely that the slightly greater mean diet score for the need score group three suggests a meaningful pattern. A difference of one point between diet scores represents one serving in any food group or one-half serving in Meat, Fish, Poultry and Alternates. It must also be remembered that these diet scores are based on a one day estimate of food intake. Given this, and recognizing that the differences in diet scores between the three need scores is small, it is not possible to interpret these differences as meaningful.

The number of cases in diet level 1 and diet level 2 by need score are shown in Table 18. For need score level two and four there were

TABLE 17

Comparison of Diet Scores Across Need Scores for 26 Clients who Completed a 24-Hour Recall with a Paraprofessional Aide

	Need Score		
	2 (8)	3 (12)	4 (6)
Diet Score (mean)	11.5	10.25	11.17
(range)	7-16	6-14	6-14

more clients with a diet that was assigned to level two than to level one. For need score three the number of clients in diet levels one and two were equal. The numbers in each cell are too small to determine if there was an increase in the number of women with a lower quality of nutritional intake as need score increased. These data do not provide evidence of a relationship between quality of nutritional intake and social support. A larger sample and repeated recalls would yield stronger data upon which to test this relationship.

TABLE 18

Frequencies of Diet Levels 1 and 2 by Need Score for 26 Clients who Completed a 24-Hour Recall with a Paraprofessional Aide

	Need Score		
	2 (8)	3 (12)	4 (6)
Diet Level 1	3	6	2
Diet Level 2	5	6	4

Chapter V

CONCLUSIONS

This study failed to show any relationships between prenatal nutritional intake, social support and pregnancy outcome. Weak and insignificant relationships were found between maternal energy and protein intake and birthweight and OCSLOG among 12 women who completed two consecutive 24-hour recalls. Similarly, a weak and insignificant relationship was found between diet score and OCSLOG among the 12 women who completed two consecutive 24-hour recalls and among 26 women who completed a single day 24-hour recall with a paraprofessional aide. When the diets were classified into diet levels a higher diet level was associated with better measures of pregnancy outcome when birthweight, OCSLOG or postnatal complications score was considered. None of these relationships was statistically significant. A larger sample and a better estimate of dietary intake would be needed to test the relationship between quality of nutritional intake and pregnancy outcome.

Social support was considered as an additional influence on pregnancy outcome. This relationship was tested on both the 26 women who completed a 24-hour recall with a paraprofessional aide and on 54 women who received home visits from a paraprofessional aide. As the need for social support increased the total number of visits, total number of client initiated contacts and duration of service increased. The gestational age upon referral was lower for those women in extreme need of

social support, as compared to those with a moderate or high need of social support. This group appeared to differ with respect to their pregnancy outcomes as well. The numbers were too low to draw any conclusions about these apparent differences. The average number of visits per four weeks of service was not different between the three different levels of social support.

A consistent relationship between social support and birthweight or OCSLOG was not found. A slight improvement in the pregnancy outcomes of women with a moderate need for social support as compared to women with a high need for social support was noted when postnatal complications score was considered but not with the prenatal risk score. Cultural differences between the study groups were not contributing to any differences in the pregnancy outcomes.

There was no evidence of a relationship between need for social support and quality of nutritional intake when the mean diet scores were compared across three need score groups. This was based on data collected from 26 women who had completed single 24-hour recalls with a paraprofessional aide.

The failure to find relationships between quality of nutritional intake, social support and pregnancy outcome may be due to a number of factors. The major limiting factor is the sample size. The sample was very small, and the three groups with different levels of social support were not equal. A stratified sampling procedure would be useful if this study were to be repeated. A second problem is the measure of food intake. A single day 24-hour recall is not an appropriate measure of

an individual's food intake. Repeated 24-hour recalls would have provided a better estimate of food intake. A third limitation is the measure of social support. The need score in this study did not appear to distinguish between good and poor pregnancy outcomes. These data do not justify the use of this score to identify women at risk of poor pregnancy outcome. Rather than using a broad measure of social support it might be more appropriate to use a measure that identifies selected aspects of the construct. An additional consideration is the difficulty in reaching the study population. Data collection procedures should address the inaccessibility of this group. Finally, in addition to nutritional and social influences on pregnancy outcome a number of other factors have been identified as influencing the outcome of pregnancy. These include education, smoking habits and alcohol consumption. These factors were not controlled for in this study and this may have obscured any relationships that do exist between quality of nutritional intake, social support and pregnancy outcome. In this way it would be clear whether the patterns that appeared in these data were meaningful. There are many questions remaining regarding the influences on perinatal health. The ways in which nutritional and social factors may interact to influence pregnancy outcome has important implications for the planning of interventions, and for these reasons merit further investigation.

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Appendix A

QUESTIONNAIRE

Introduction to Interview

Hello, my name is Debbie. I am working with (use name of paraprofessional aide and/or nurse). By visiting you we hope to help you and your family. To make sure that we are helping as much as possible I would like to ask you a few questions. Your answers will help us learn how the service is helping. This is so that we can make the service better in the future. There are no right or wrong answers to any of the questions that I ask. Your answers will not change any of the services that you are now getting. Your name will not be used and the information will not be used to identify you in any way. We simply want to learn how we can make the service better, and how to help you and your baby to be healthy. The questions today should take thirty to forty minutes to answer. I would also like to come back tomorrow to talk to you again. It should only take about twenty to thirty minutes to talk then.

If there is anything that you don't want to answer just tell me and we will skip over it and go to the next question, okay?

Columns
1 - 5

Subject Number

Section A

First, I would like to learn a little more about you. As I mentioned earlier, your name will not be used and your answers will not be used in any way that can identify you.

Circle response given

1. What age category do you fit into? Are you - READ ALL ANSWERS UNTIL ANSWER IS GIVEN. IF NO ANSWER CHECK NO RESPONSE.

   6 - 7

   1. less than 20
   2. 20- 35
   3. over 35
   4. no response

2. What is your marital status?

   8 - 9

   1. single
   2. married (including common-law)
   3. separated or divorced
   4. other

3. What is the highest grade of school that you have finished?

   10 - 11

   1. Grade 8 or less
   2. some High School
   3. Grade 12
   4. some Vocational School, College or University
   5. Diploma or Degree received
   6. other

What is your source of income?

12 - 13

1. Social Assistance (Welfare, Mother's Allowance)
2. Support from family, Social Assistance
3. Earnings of Self and/or spouse
4. Support from family
5. Other

Instructions for Completing Recall Form

TIME

For each meal or snack mentioned record the actual time the foods are eaten.

LOCATION

After the subject has described a food or meal ask where the food was eaten. Record it as HOME for foods prepared at home, F (FAMILY/FRIENDS) for foods eaten at a friend or relative's, and OUT for foods purchased and consumed away from home, such as those foods eaten at commercial eating establishments or convenience foods purchased at stores or vending machines.

FOOD ITEM AND DESCRIPTION

List each food or beverage that is mentioned. Ask about each item, such as the way it was prepared. For combination dishes list each item on a separate line when possible.

AMOUNT

Record the amount of food eaten, as they are described, in household units.

FOOD CODE AND AMOUNT (GRAMS)

These columns are for computer coding which will be done after the interview has been completed to permit computer analysis of the food intake.

Introduction to Recall

Now I would like to ask you about the foods that you eat. These questions will help us to be able to give the best service possible. There are no right or wrong answers to any of the questions that I ask.

Could you please tell me everything that you ate and drank yesterday from the time you got up in the morning until you went to bed at night. Please tell me everything you ate or drank at home and away from home, and please include all snacks and drinks.

Use the following prompts as required:

When was the first time you ate, or had anything to drink yesterday?

Did you eat at home?

What did you eat?

When did you eat again?

Was there anything else?

Did you have anything to drink?

Be sure to ask probing questions about the foods eaten:

Did you have anything with your tea?

24 HOUR RECALL FORM

Subject Number _____
Recall Number 1 2
Day of Recall Tu W Th F

Date and Time of Interview
_____

Time	Location	Food Item	Description	Amount (Household Units)	Food Code	Amount

Is this the way you usually eat?

1. Yes
2. No

How? _____

Why? _____

_____

Subject Number _____

Section C

5. Are you going to prenatal classes?

14 - 15 [ ][ ]

1. Yes
2. No
3. no response

6. Are there still questions about your pregnancy that you would like answered?

16 - 17 [ ][ ]

1. Yes GO TO QUESTION 7
2. No GO TO QUESTION 8
3. no response GO TO QUESTION 8

7. Where do you think you could go to get the answers?
RECORD FIRST ANSWER IF MORE THAN ONE GIVEN

18 - 19 [ ][ ]

1. Doctor
2. Family/friends
3. Pamphlets/books/magazines
4. Don't know
5. No questions
6. other

8. Do you smoke?

1. Yes GO TO QUESTION 9
2. No GO TO QUESTION 10
3. No response GO TO QUESTION 10

9. About how many cigarettes do you smoke in a day?

20 - 21 [ ][ ]

1. 0
2. less than 1/2 pack
3. less than 1 pack
4. less than 2 packs
5. more than 2 packs
6. no response

10. Do you drink alcohol?

1. Yes GO TO QUESTION 11
2. No GO TO QUESTION 13
3. No response GO TO QUESTION 13

Subject Number _____

Section C

11. About how often do you drink?

22 - 23 [ ][ ]

1. 0 times
2. 1 - 3 times/month
3. 1 - 7 times/week
4. more than 8 times/week
5. no response

12. About how many drinks do you drink then?

24 - 25 [ ][ ]

1. One
2. 2 - 4
3. 5 - 6
4. more than 6
5. no response

13. Are you taking any pills from the drugstore, like vitamins or iron?

26 - 27 [ ][ ]

1. Yes GO TO QUESTION 14
2. No CONCLUDE INTERVIEW
3. No response CONCLUDE INTERVIEW

14. What kind are you taking?

	Brand	Dosage and Frequency
Multivitamins		
Vitamins (indicate)		
Minerals (indicate)		
Other		

15. For each one mentioned go back and ask, how much of " " are you taking, and how often do you take it?
RECORD UNDER DOSAGE AND FREQUENCY

TO CONCLUDE;

First interview: Thank-you for your help. I would like to come back tomorrow at about this same time and ask you a few more questions. It should only take about twenty minutes to talk then.

Second interview: That's all the questions that I had to ask. If you want to ask me anything about these questions you can phone me at 474-8315 or 589-4381. Thanks again for your help.

Appendix B

AIDE RECALL FORM

HP26-6/77

		4	2½	5	5	

Appendix C

QUALITY OF NUTRITIONAL INTAKE

Twenty-four hour recalls that were completed by paraprofessional aides or in personal interviews conducted for this study were evaluated and a score reflecting quality of nutritional intake was assigned. This score was based on the recommendations of Canada's Food Guide for pregnant women. The total score possible is 16, there will be a maximum of 4 points possible for each food group. A point will be assigned each time a serving is mentioned as indicated below. Half-servings will be included in the tabulations.

FOOD GROUP	SCORE EACH TIME SERVING IS MENTIONED	MAXIMUM SCORE
Milk and Milk Products	1	4
Breads and Cereals	1	4
Meat, Fish, Poultry and Alternates	2	4
Fruits and Vegetables		
Fruits	1	2
Vegetables	1	2
TOTAL SCORE		16

Appendix D

DATA COLLECTED FROM EVALUATION FILES OF HEALTHY PARENT-HEALTHY CHILD PROGRAM

Data Collection Instructions

Supervisor Healthy Parent-Healthy Child Listing

Client Number

Need Score (number)

Maternal Age (years)

Gestational Age at Referral (weeks)

Culture Native or Metis

South East Asian

Other

Referral Source Public Health Nurse

Paraprofessional Aide

Agency

Hospital

Referral Date (week number)

First Visit Date (week number)

Healthy Parent-Healthy Child Cards

Service Type Treatment

Control

Special Request

Family Records - Nurse and Aide

Total visits - nurse (number)

Total visits - aide (number)

Total number of client initiated contacts - nurse (number)

Total number of client initiated contacts - aide (number)

Birth Statistics

Gestation Period (rounded weeks)

Date of Delivery (week number)

Hospital Records

Prenatal Risk Score (at admission)

Birthweight (grams)

Five minute Apgar score (Score: 1-10)

Neonatal Death Yes

No

Littman Parmelee Obstetrical Complications Score

Littman Parmelee Postnatal Complications Score

Appendix E

GUIDELINES FOR SOCIAL NEEDS ASSESSMENT

PHYSICAL ENVIRONMENT

Type: House or apartment? Number of rooms? Crowded? Sleeping arrangements? How long there? Plans to stay? Amount of furniture Appropriate for lifestyle? Food preparation? Wash? Sleep? Storage? Sanitary facility? Things to read? Laundry facilities? Transport: Does she have a way to get around in the daytime?

HISTORY, LIFESTYLE & BELIEFS

Identity: Clear ethnic & cultural? Arrived recently from outside town? From where? Marital Status: Single, divorced, common law, married? Any impact of religion on life? Recent changes? Problems at present? What changes would she like in her life? How much is possible to change? What things will make it easier or harder for her to get what she wants? Consider: Needing information about something? Does she think it's important to her? How does she feel about it? How do other people who are important to her feel about it? What things in her day-to-day situation make it easier or harder (money, transportation, etc.)

RELATIONSHIPS AND INTERACTIONS

Consider this to be within immediate household.
Responsibility sharing, making and spending money? Who? How much? Adequate? Any problems agreeing on budget? Other major decisions shared? Divergence of belief system and conflict. Attitude about pregnancy, at beginning and now? Planned? Attitude of others about pregnancy, father of child? mother? grandmothers? Other input? (About the unborn baby: Who will care for him/her during the day?

Babysit? Get up at night? What will the father of the child, mother, grandmother or others do?)

FINANCIAL RESOURCES

What the family members do: Mother: work, school, stay home, kind of work - education achieved? Her hopes for the future? Father: kind of work, school stay home, hours, education achieved, pay hours, plans, do you get help for money from family or others? Are you ever short of rent or food money? Why?

FORMAL AND INFORMAL SOCIAL NETWORK

Consider this to be out of immediate household.
Support for mother: if she has a bad day what does she do? Does she turn to someone and whom? With whom does she discuss her pregnancy? TV? If troubled about something, what does she do? Share it? With whom? Give example? Who does she think will be most important to her in taking care of her baby in the next year? In taking care of her own life? How does she get along with her boyfriend or husband? Mother? Who else in her family or her husband's family is important to her? What community resources has she used in the past year? Member of any community organizations?

STRENGTHS AND LIMITATIONS

Attitude: Loneliness, boredom, depression, etc. Does she try to avoid being lonely, depressed, bored, etc? How? What does she think will be important for her to do in raising the child. About the youngest sibling (record age), if present: What kind of child? How does he/she handle discipline? Example of child behaviour. What like

best? Least? Had any problems? How managed?

KNOWLEDGE OF GOOD HEALTH PRACTICES AND USE OF HEALTH CARE SYSTEM

Health: Mother: How is she feeling? Have any health problems herself?

Father: How is he feeling? Have any health problems himself? Other family members? Any health problems? Does the mother do anything to avoid diseases? To stay healthy? Do they attend for medical check-ups even when they are not sick? Where do they go when they need medical help? Does she attend for prenatal care?

0 NO FURTHER NEED Mother has resolved problem or has adequate resources and motivation to do so without home visiting.

1 MILD NEED Fairly well informed, with adequate resources and motivation and a positive support system. Needs support and reassurance. Needs information, resources and/or referral.

2 MODERATE NEED Less well informed, less practical sense; inexperienced, insecure, parent coping with unusual health problems. Follows through on referrals and counselling advice but needs direction. Needs help in problem recognition. Poor support system.

3 SEVERE NEED Lacks information, experience or motivation. Health care not a priority. Failure to bond. Negative or no support system operative. Continuing unresolved health problems. Potential abuse or neglect.

4 CRISIS OR VERY SEVERE Totally lacking in coping or management skills; isolated or lacking any viable supports. Severe health problems. Poor resource management. Any physical abuse or neglect not remediated or stabilized. Failure to thrive for any reason. Severe parental deprivation. Possibility also initial visits around grieving or death and dying counselling. Coercive efforts needed to gain compliance with standard care.

Score the mother overall on her degree of Need.

Appendix F

MEDICAL SCORES OF PREGNANCY OUTCOME

The following items were considered prior to the assignment of the obstetrical complications score or the postnatal complications score.

Obstetrical Complications Score

Item (Optimal Response)

Gestational Age (>37 weeks)

Birthweight (> 2500 grams)

Marital Status (Married)

Maternal Age (18-30)

Previous Abortions (2 or less)

Previous Premature Births (No)

Previous Stillbirths (No)

Prolonged Unwanted Sterility (No)

Length of Time Since Last Pregnancy (> 12 months)

Parity (1-6)

Pelvis (No disproportion)

Blood Group Incompatibility (No)

Bleeding During Pregnancy (No)

Infections or Acute Medical Problems During Pregnancy (No)

Drugs Given to Mother During Pregnancy (No)

Maternal Chronic Diseases (No)

Chronic Drug Abuse (No)

Blood Pressure During Pregnancy (<140/90)

Hyperemesis (No)

Hemoglobin Level at End of
Pregnancy (10 or more)

Twins or Multiple Birth (No)

Membranes Ruptured Prior to
Delivery (0-12 hours)

Delivery (Spontaneous)

Forceps (None)

Duration, First Stage (3-20 hours)

Duration, Second Stage (10-120 minutes)

Induced Labor (No)

Drugs During Labor and
Delivery (No)

Amniotic Fluid (Clear)

Fetal Presentation - Delivery (Vertex)

Fetal Heart Rate During
Labor (100-160/minute)

Nuchal or Knotted Cord (No)

Cord Prolapse (No)

Placental Infarction (No)

Placenta Previa or Abruptio (No)

Onset of Stable Respiration
Within 6 Minutes (Yes)

Resuscitation Required (No)

Prenatal Care During First
Half of Pregnancy (Yes)

Apgar Score - 1 minute (7-10)

Apgar Score - 5 minutes (7-10)

Postnatal Complications Score

Respiratory Distress (No)

Positive or Suspected Infection (No)

Ventilatory Assistance (No)

Noninfectious Illness or Anomaly (No)

Metabolic Disturbance (No)

Convulsion (No)

Hyperbilirubinemia or Exchange
Transfusion (No)

Temperature Disturbance (No)

Feeding Within 48 Hours (Yes)

Surgery (No)

PRENATAL SCORING FORM

1) Score each question as indicated 2) Total each category score at 1st visit 3) Repeat at 36 weeks 4) Record on P/N sheet

I. REPRODUCTIVE HISTORY

AGE	<16 = 1	☐
	16 - 35 = 0	
	>35 = 2	
PARITY	0 = 1	☐
	1 - 4 = 0	
	5 + = 2	

PAST OB HISTORY

HABITUAL ABORTION INFERTILITY	= 1	☐
P P H MANUAL REMOVAL	= 1	☐
BABY >9 LBS (4082 gm)	1	☐
BABY <5½ LBS (2500 gm)	= 1	☐
P E T /HYPERTENSION	= 1	☐
PREVIOUS CAESAREAN	= 2	☐
STILLBIRTH OR NEONATAL DEATH	= 3	☐
PROLONGED LABOUR OR DIFFICULT DELIVERY	= 1	☐

CATEGORY SCORE _____ +

II. ASSOCIATED CONDITIONS

PREVIOUS GYNAECOLOGICAL SURGERY	= 1	☐
CHRONIC RENAL DISEASE	2	☐
GESTATIONAL DIABETES	= 1	☐
DIABETES MELLITUS	= 3	☐
CARDIAC DISEASE	= 3	☐
OTHER MEDICAL DISORDERS (Chronic bronchitis, Lupus Etc SCORE ACCORDING TO SEVERITY (1 to 3)	=	☐

CATEGORY SCORE _____ +

III. PRESENT PREGNANCY

		1ST VISIT	36 WEEKS
BLEEDING			
< 20 WEEKS	= 1	☐	☐
> 20 WEEKS	= 3	☐	☐
ANEMIA < 10 gm %	= 1	☐	☐
PROLONGED PREGNANCY 42 WEEKS	1	☐	☐
HYPERTENSION	= 2	☐	☐
PREMATURE RUPTURE MEMBRANES	= 2	☐	☐
POLYHDRAMNIOS	2	☐	☐
SMALL FOR DATES	= 3	☐	☐
MULTIPLE PREGNANCY BREECH	= 3	☐	☐
MALPRESENTATION			
Rh ISOIMMUNIZATION	= 3	☐	☐

CATEGORY SCORE _____

TOTAL RISK SCORE 1st VISIT = ☐ TOTAL AT 36 WEEKS = ☐

(Record scores in box on prenatal sheet)

NOTE: LOW RISK = 0 - 2
HIGH RISK = 3 - 6
EXTREME RISK = 7+

Prenatal Risk Score