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The Impact of Feeding Methods on Exclusion from Child Care for Infants under Six Months of Age

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THE IMPACT OF FEEDING METHODS ON EXCLUSION FROM CHILD CARE FOR INFANTS UNDER SIX MONTHS OF AGE

by

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ABSTRACT

THE IMPACT OF FEEDING METHODS ON EXCLUSION FROM CHILD CARE FOR INFANTS UNDER SIX MONTHS OF AGE

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The increasing numbers of women entering the work force have created a greater need for accessible, quality, and affordable child care. Concurrently there is rising concern about the transmission of infection in child care settings. There is evidence, but no consensus, that breastfeeding may offer protection from infection, especially during the first months of life. However, employed/student mothers report that efforts to maintain breastfeeding are not well supported at the work/school site.

The purpose of this investigation was to examine the impact of infant feeding methods on the exclusion rate due to illness among infants less than six months of age during the first five weeks of enrollment at child care; to ascertain whether exclusion affected the mother's absenteeism from employment/school; and if other selected factors impacted on the exclusion rate. A five-part instrument, including a graduated infant feeding scale, was designed and validated for use in the research.

The study took place in the regional San Diego area with 37 participating mother-infant pairs attending four different types of child care facilities. Information obtained was analyzed in a quantitative and qualitative manner using Pearson's r, ANOVA, regression, and cross tabulations.

The results indicated that infant feeding mode was significantly correlated with exclusion rate; i.e., the more extensively the infants were breastfed the less likely they were excluded. In turn, maternal lost time from work/school was highly related to infant exclusion. Most other factors examined failed to show significant impact. Findings support breastfeeding as the ideal mode of infant feeding and reinforce a need for on-site child care.

DEDICATION

To all children,

tomorrow's bright promise.

ACKNOWLEDGMENTS

This work is the culmination of many caring individuals who contributed to my growth and gave me encouragement to sustain this quest for knowledge. To each and every one I am truly grateful.

All the mothers, who took precious time from their hectic schedules to participate because they desire something better for employed/student mothers, have my sincere thanks as do Pat, Emily and Amalia who shared that desire.

My gratitude goes to Dr. Gabriel Chong who recognized the importance and had the foresight to provide a model.

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CHAPTER ONE

Statement of the Problem

Poor infant feeding practices and their consequences are one of the world's major problems and a serious obstacle to social and economic development. Being to a great extent a man-made problem it must be considered a reproach to our science and technology and a blot on our so-called developmental achievements.

Joint WHO/UNICEF Meeting on Infant and Young Child Feeding, October 1979

Introduction

The relation of infant feeding to well being within the sphere of child care may be far more significant than has been previously recognized. A closer look at the connection is timely as child care assumes an increasingly important role in society.

Throughout history infant-child care has received varying degrees of attention and has generally been tied to the political and economic situation of a particular era. The United States has never established a national infant-child care policy, although it came very close to it with the Child Development Bill of

1971, written with the assistance of social scientists who perceived the future needs for child care. The bill was vetoed in response to harshly negative attitudes in the population toward the idea of working women leaving their child rearing responsibilities to others (Trotter, 1987). At that time there was no grass roots outcry from parents in need of child care.

Employment and child care

Drastic changes in employment demographics have occurred since 1971, and now nearly 50% of the workers in the United States are women (Berg, 1986; Bloom and Steen, 1988). The increase in the labor force of employed women with young children is even more remarkable. Married women with children under the age of three have become the fastest growing segment of the work force (Berg, 1986), with 51% percent of these employed women having an infant under one year of age (Bloom and Steen, 1988).

Contrary to some thinking, the majority of women who work do so out of financial necessity as opposed to a minority of women who chose to work because they have fulfilling jobs or do not care to stay at home. According to Zigler (1984), only one job out of four permits a man to make enough money to support a family of four above poverty level. In response to social demands, diverse family structures have resulted. In addition, there are now many more single parent families (Terr, 1989). Much of this can be attributed to the high divorce rate and the increasing number of births to single women. Berg (1986) reported that one in four children, including one out of every two black children, is raised by a single parent. Ninety percent of these single parent homes are

reported to be headed by women who must work to support themselves and their children. Women earn about 70% of what men earn for comparable work (Trotter, 1987). Many of these women also work longer hours than their male counterparts. As a result, fatigue and frustration are the norm.

In 1990, typical national charges for less than 12 month old infants in urban centers were $75-$125 per week (Child Care Resource Service, 1990). This is more expensive than comparable care for older infants and children, primarily because the ratio of workers to younger infants is the lowest for this age group.

Regardless of a mother's motive towards employment or possibly continued education, many women have a large range of conflicting feelings about leaving their infants in child care. This can be true for the mother who chooses to work and who may have ideal child care as well as for the mother who would prefer not to work but who has no choice and can not afford desired child care.

Some women do receive personal benefits from the work place. These may include support networks, such as friends; intellectual stimulation, such as employer seminars; and avenues for the improvement of self-concept, such as participation in related activities. In spite of these advantages, many women from all walks of life acknowledge that leaving their infants in child care is not easy for them.

Child care legislation

Grass roots concern for infant-child care needs and general public interest in the United States is now at an all time high (Walsh, 1990). Estimates of child care costs in this country are between $75-$100 billion annually (Trotter, 1987).

Child care issues are regularly seen on the agendas at local and national levels. In 1988 there were more than 100 child care bills pending in Congress (Bloom and Steen, 1988). In June 1989, the most comprehensive child care bill, The Act for Better Child Care (ABC), passed the Senate; but, in October it became ensnarled in controversy and debate when House members could not agree on funding sources (Nation's Health, 1990). The ABC is designed to help pay child care costs whether the chosen site is home care, family day care, or a child care center (Kilpatrick; Young Children, 1989). ABC also includes tax credit benefits for low income families with children. Although the act has not become law, it has furthered the cause of child care. For example, all 50 United States governors focused remarks on children's issues, including child care, during their 1989 State of the State addresses. The increased interest really has made child care an issue that 'has come of age' (Brown, 1989), and it is expected that a comprehensive child care bill will be enacted in 1990 (Willer, 1990).

Future needs

Friedman (1986) projected that in 1990, 65% of individuals entering the labor market will be women and that 80% of working women will be of child bearing age, and that of this group of women, 90% of them will become pregnant. The reality is that the number of employed or student mothers looking for quality child care is already astronomical and that future needs are likely to be even greater.

In some areas, the work place is changing as employers attempt to meet the needs of working parents. Ten percent of all employers in the United States

currently provide some child care benefits such as on-site facilities or referral services (Hellmich, 1988; Waterstrat, 1989). In 1989, *The Journal of the American Dietetic Association* staff reported that 500 United States hospitals offer on-site child care. This child care provision was instigated for the recruitment and retainment of staff, primarily nurses. Employees having the convenience of on-site facilities with easy access to their children have responded positively, and some hospitals have expanded their programs to the community at large (Powills, 1989).

However, this singular measure is not meeting the needs of millions of children. In the winter of 1984-85, approximately 31% of the children under five years of age received child care in the child's home, 37% in family child care, 23% in center based child care, and the remaining 9% were cared for by make-shift arrangements with one parent or the school (Lewin, 1988). Infant care is now the most sought after care, but it is the least available (Eichholz, 1986). Because of the difficulty in finding accessible quality care at an affordable price, employed mothers may find no alternative but to leave their infants in less than desirable locations that may have underqualified staff (Phillips, 1989). Many child care workers are paid at near poverty levels and may have limited education and training. A lack of child care employee training and over crowding are thought to contribute to the infection rates reported in many child care facilities.

Spread of infection has always been a concern for public health authorities. This concern not only includes the infections contracted by the

enrollees in child care, but the possibility of spreading index cases to the child care center workers and into the community at large (Wald, Dashefsky, Byers, Guerra and Taylor, 1988). The greatest problem of infection occurs in the infant population (Pickering, Bartlett and Woodward, 1984) with the highest infection rate reported during the first five weeks of enrollment in child care. During this five-week period, the average diarrhea attack rate is 25% (Schuman, 1983) of the infant enrollee population.

In the interest of public health, researchers are looking for cause and effect relationships and recommendations for infant-child care facilities. Berkelman, Guinan and Thacker (1989) reviewed 11 years of literature and concluded that health related problems and benefits for infants and preschoolers have not been defined in any systematic way. Some researchers have shown that children in home care present fewer infections for some diseases (Anderson, Parker, Strikas, Farrar, Gangorosa, et al., 1988; Johansen, Leibowitz and Waite, 1988) while other investigators have demonstrated that a lower incidence of illness is found in center-based care (Wald et al, 1988). The conclusions have been mixed.

Regardless of the source of infection, the resultant illnesses create medical hardships for those infected and other difficulties for the employed parents who then have to look for alternate child care, or sick child care (Thompson, 1988). Sick child care is extremely difficult to find and is the most expensive of all child care. When a sick child is temporarily excluded from child care, problems at the parents' work site may result. Searching for substitute care may cause the parent to be late, miss work or school, or be unable to function well while at work (Burud,

Aschbacher and McCroskey, 1984, p. 227).

The Issue

One component of child care that has not been well researched is the impact of the incidence of infection in conjunction with the method of feeding infants less than six months of age. During this critical age, the mother must often choose between breast and bottle feeding her infant. Recent reports on breastfeeding continue to support early epidemiological studies that demonstrated that breastfed infants have a lower incidence of morbidity and mortality from infectious disease than bottle fed infants (Chandra, 1989; Dolan, Boesman-Finkelstein, and Finkelstein, 1986). It is thought that this protection is afforded by properties of human milk not present in breast milk substitutes.

However, there are many health care providers, as well as mothers, who do not recognize any health differences between feeding methods. They do not realize that the feeding method may influence the incidence of infection and thus have an impact on wellness (Singhal, Taneja, Patwari and Mullick, 1988). Even within the United States some pediatricians recognize only the psychological benefits afforded by breastfeeding (Lawrence, 1989a, p. 25). Due to the lack of professional modeling and medical support, many women have turned to lay support groups. Historically these groups have been strong in the promotion of breastfeeding (Simon, Johnson and Liese, 1988). Consequently, it can be very difficult for a mother to make a qualified informed choice when she is receiving conflicting messages.

Often working mothers wishing to breastfeed report that they switch to bottle feeding their infants because the breastfeeding process causes too much interference with their schooling or employment (Ryan & Martinez, 1989). Some mothers anticipate this stress and never initiate breastfeeding because they feel that these activities are incompatible (Auerbach, 1984). The ensuing issue is to provide a supportive work/school environment for the mother wishing to continue breastfeeding, one that can benefit both the human development of the mother-infant dyad and society as a whole. Such an integration presents a leadership challenge.

Relevance of the Study to Leadership

The relevance of this investigation to leadership ultimately lies in the synapse of maternal-child health and nutrition. Specifically, the intent of this study is to encourage leaders to support and improve feeding guidelines for infants in child care and to promote public adaptation toward improved changes for employed or student mothers with infants. The relevance of the issue will be briefly discussed from three perspectives: leadership as it relates to nutrition and policy making, leadership as reflected in our modeling of nutrition practices, and the relevance of leadership to morality.

Leadership as it relates to nutrition and policy making.

The major concerns in the application of nutritional practices are rooted in a complex of interrelationships. These relationships are universally embedded in

the social, economic, and political arenas of our society. The combined result, described in the *Canadian Dietetic Association Model for the Practice of Dietetics* (1989), affects human nutrition consumption in concert with influential cultural norms. Historically, the outcome of these pressures is dependent on food availability, its nutrient composition, and food safety. The actualization of nutritional intake, or the lack of it, evokes the biological utilization of foods contributing to human physiological, pathological, and nutritional status. Ultimately, this culminates in the overall health and well-being of individuals. This synergy is a critical contribution to our population's cyclic pattern of growth and development (Yee, 1989) with impact on the ability to maximize human potential.

Leadership is essential in the creation of a substantial link between nutrition and policy making in order to achieve the desired result of a well-nourished population. This is a difficult task when experience shows us that there has been relatively little linkage between nutrition and policy making in our country. In actuality, many barriers exist. Primarily, the United States presently has no national nutritional policy. Many nutrition related laws that have been passed were based on ideology or short term economics rather than on scientific fact (Cross, 1988). To improve the situation, leaders and followers must engage in a relationship with participants willing and capable of identifying needs, and subsequently carrying the leadership process from the decision making stages to concrete changes in people's lives (Hollenbach, 1989). Burns (1978) was the first to provide a definition for this relational process of leadership:

"*Leadership is the reciprocal process of mobilizing, by persons with certain motives and values, various economic, political, and other resources, in a context of competition and conflict, in order to realize goals independently or mutually held by both leaders and followers*" (p. 425).

Different forms of leadership

Burns (1978) further defined leadership as being either transactional or transforming in nature. He described transactional leadership as the exchange of valued things by persons participating in a non-binding relationship. This type of leadership connotes honesty, responsible fairness, honoring commitments (Burns, 1978, p. 425) and is often instrumental in the shaping of private and public opinion. However, the resultant change is often shallow and short term as has been projected in many of our nutrition related policies, as well as policies for the care and protection of pregnant women (Miller, 1985). In contrast, Burns (1978) stated that transformational leadership is more profound and takes into account the wants and needs of followers, permitting change which can shape, alter and elevate motives, values and goals of leaders and followers alike. This process strives to provide for the collective societal needs of future generations.

Although both transactional leadership and transformational leadership acts create change reflecting human purpose, it is the latter, transformational leadership, that is embedded with universal values of liberty, equality, dignity, justice and human rights. These values are not achieved in isolation, but found in democratic relationships (Hollenbach, 1989). Thus, this form of leadership is more likely to allow for social change in the attitudes and behaviors existing in

our daily lives (Burns, 1978). It is the nature of transformational leadership that makes it essential to the synthesis of social practice and an axiom to the establishment of sound maternal-child nutrition policy. The total leadership process involves a critique of our past nutrition track record, the changing demographics, and desired maternal-child health benefits, in order to understand today's reality and provide subsequent encouragement, thus enabling leaders to engage in meaningful action. At the same time, responsible action requires the striving for an acceptable balance between individuals' rights and the overall good of the community at large (Bellah, Madsen, Sullivan, Swidler and Tipton, 1986; Bennis and Nanus, 1985). An example of this integration challenge to leadership is often demonstrated at the work and school site.

There are many obstacles following maternity leave for employed and student mothers who wish to continue breastfeeding their infants (Auerbach, 1984). The ramifications of these are important for leaders to understand before developing policy and making recommendations for change. Not only are leaders and/or policy makers in a position to expand educational avenues which can ultimately allow parents to make informed feeding choices, but these leaders and policy makers can also remove existing obstacles and assist mothers in the integration of their selection of school or employment demands (Tiedje and Collins, 1989).

The barriers to breastfeeding encountered by these mothers, the incidence of illness reported in child care, along with the lack of sick child care, are all interwoven into the composite growth and development of the child, and the

mother's employment, productivity, job protection, education, and child rearing responsibilities. The issue of having quality, affordable infant care facilities, preferably located where the mother can maintain a breastfeeding schedule if desired, is not just a community or national leadership challenge, but has international educational implications as well.

Leadership reflected in our modeling of nutrition practices.

It is observed that many persons from third world countries attempt to mimic the United States, following modeling projected in television, video, or from having exchange students in our country. Our United States hospitals and clinics have been observed practicing post partum separation of new mothers and their infants along with routinely giving infants supplemental formula, water, etc., by bottle (Lappe and McCallie, 1978; Lawrence, 1989b; Winikoff, Laukaran, Meyers and Stone, 1986; Reiff and Essock-Vitale, 1985; Sauve, 1987; Scrimshaw, 1984). Whatever the message channel, the United States has been chastised for exporting the baby bottle to developing countries (Williams, 1973). This supplemental bottle feeding has been construed by the populations in developing countries as acceptable clinical practice since individuals from these nations often perceive the United States as more knowledgeable and advanced. Advocates of breastfeeding, however, openly accuse baby bottle use for the millions of infant deaths occurring annually throughout the world (Jelliffe and Jelliffe, 1988; Palmer, 1988; Williams, 1986) and challenge the scientific substantiation of United States feeding practices. Minchin, 1985, stated it bluntly,

"artificial feeding of infants is, in fact, the largest uncontrolled in vivo experiment in human history" (p. 316). In addition, the problem has been compounded since the early introduction of bottle feeding has been reported as one of the main contributors in shortening the duration of breastfeeding (Winikoff and Laukaran, 1989). Concurrently, the increasing availability of substitute milks is another factor impacting infant feeding method selection and is also blamed for decreasing the duration of breastfeeding (Palmer, 1988).

Breast milk substitutes

The marketing of substitute or artificial milks has grown into a multi-billion dollar business, often indiscriminately targeted at persons not educated to make informed choices. All too often, individuals neglect to calculate the comparative high cost of artificial milks and the frequent use of contaminated water to prepare these milk formulas that can cause disease and death (Clement, 1988, p. 50). In 1981, the 42 year controversy involving the milk industry climaxed. The World Health Organization (WHO) intervened in the indiscriminate marketing of formulas with the introduction of an *International Marketing Code of Breastmilk Substitutes* (1981). The code was written in response to a general realization that universal breastfeeding rates had declined to alarmingly low levels (Sauve, 1987). The interest of the code was aimed at preventing the marketing of infant formulas directly to the public. At that time, the United States was the only nation of 118 that voted against implementation of the code (Allain, 1987). This action on the part of the United States has been interpreted as an anti-breast feeding stance, although some United States officials have argued that the true intent was

freedom of marketing rights.

Recently, in disregard of the code, some companies again are aggressively marketing both nationally and internationally to the public (Allain and Chetley, 1989). This present marketing action is causing concern and controversy (IBFAN, 1988; The Nation, 1989). Influential United States professional groups that espouse support of breastfeeding, such as the *American Academy of Pediatrics* (1988) and the *American Dietetic Association* (1989), have documented policy statements against these formula industry marketing strategies. However, often in what is construed as conflict of interest, these same prominent organizations accept enormous amounts of monies in free services and gifts from these major formula manufacturers.

The United States National Supplemental Food Program for Women, Infants, and Children (WIC) considers breastfeeding a priority, but has an historically small percentage of low income mothers breastfeeding for the duration recommended in the *Nation's Objectives, 1990* (1989). It is well recognized that breastfeeding management and counseling requires dedication, knowledge, and time. The primary reason for WIC mother's low incidence of breastfeeding is attributed to the many constraints encountered by WIC personnel, including the amount of professional time scheduled for client contact coupled with high case loads (Matheny, Picciano and Birch, 1987). These constraints demonstrate breastfeeding policy is not being endorsed nor carried out as proposed.

Infant morbidity and mortality

Cunningham (1987), stated that improvement in the incidence and duration of breastfeeding in the United States would be a contributing factor in reducing our infant morbidity and mortality rates. The United States is presently ranked eighteenth for infant mortality (*Children's Defense Fund*, 1989). It has been debated that there is considerable variance in the definition of surviving fetuses among countries and this may impact the statistics on mortality. Nevertheless, infants in the United States still die at an alarming rate during the first year of life, especially from families with a low socio-economic status (*Children's Defense Fund,* 1989). Miller (1985) has given three primary reasons for these deaths: childbearing by unmarried women has increased dramatically between 1960 and 1980 (from approximately 2% to 10% of the female population among whites, and from 22% to 49% among non-whites), and the teenage pregnancy rate is the highest in the world; secondly, family planning support systems are inadequate; and lastly, the increase in poverty found in many areas of the United States. In totality, the statistics are projecting a questionable shadow over our perinatal care.

Social support

Some argue that the United States does not need better technology to improve its mortality rate, but improved social support is what is really needed (Miller, 1985; Wagner, 1988). Two thirds of the nations in the world have implemented paid perinatal care leave policies with guaranteed job security for weeks or even months. It has been reported that the United States and

Zimbabwe are the only two countries out of 115 that do not have national maternity leave policies (*The American Public Health Association Report No. 5, 1988*). This lack of maternity leave has our mothers, who must return to school or work soon after delivery, searching for acceptable, economically feasible infant care.

In 1987, only 60% of medical residency training programs in the United States had maternity leave plans and many of these have been deemed inadequate (Bickel, 1989). Bickel (1989) estimated that 7,500 residents would become pregnant at least once during their training programs. These women residents are forced to accept a reality contradicting the advice many of them give patients, thus serving as poor models. These same professionals may draw upon this experience later in their careers when they are in positions to influence policy.

Although the previously mentioned are only a few selected examples, they nevertheless portray a less than desirable picture of the United States' position on maternal child health, a significant charge to leadership.

Leadership as it relates to morality.

The disparity in our projected image carries moral ramifications for leaders, especially if the United States is guilty of the charges, and truly wishes to be regarded as an exemplary model for the world. In order to be successful, policy makers and leaders must acknowledge moral values and issues involved in the leadership process. Foster has (1986a) described how this is an educational

process, requiring a vision for the future that is fused with ethics and ongoing reflective analysis. He contended that these elements are essential for responsible commitment to creative change, yet maintaining important continuity to our traditional heritage. This process of change can then result in the attainment of a higher state of consciousness for both leaders and followers (Bennis and Nannus, 1985; Burns, 1978; and Foster, 1986b).

While raising opportunities to promote integration, the synthesis of social practices often creates ethical dilemmas for leaders. Such a dilemma occurs with the present attempt to supply affordable quality child care, professing that the first five years of life are the most important years (Whitney, 1989) yet concurrently compensating many child care workers at poverty levels (Fuchs, 1990). Simultaneously, individual mothers often incur frustration in selecting feeding modes for their infants that conform to their work or school situations. Any hope for solutions challenges mainstream thinking and the support systems which nurture these concerns (Hollenbach, 1989; Winicoff, 1988; Zigler and Hall, 1988).

The present overall situation is a charge for leaders to take action and initiate change in our profit driven society. Thus, as role models, leaders, together with persons and communities, can make communitarian contributions to society (Gardner, 1988; Morgan and Ramirez, 1983; Mepham, 1989). Foster (1988) believes this leadership process must exist within the context of the community as described by MacIntyre (1981). MacIntyre's thesis is based on *virtues* and *practice*, in which he depicted *virtues* as qualities enabling harmonious, purposeful life, embedded in individual *practice* as one lives out

life's narrative. Such a solid foundation based on morality ensures the development of positive human relationships. It is within this context that transforming change occurs. Change that fosters collaboration and responsibility through work, school, family, political and economic frameworks, and contributes missing links presently lacking in our country's maternal infant nutrition policy, is essential to the issue and the issue of leadership.

Relevance to leadership: conclusion and summary.

The initiation of change to meet our societal needs requires leadership of the future with a pivotal focus on children. Abraham Lincoln knew this when he stated:

> *A child is a person who is going to carry on what you have started. He is going to sit where you are sitting, and when you are gone, attend to those things which you think are important. You may adopt all the policies you please, but how they are carried out depends on him. He will assume control of your cities, states, and nations. He is going to move in and take over your churches, schools, universities, and corporations . . . the fate of humanity is in his hands* (Doan, 1989, p. 1, 4).

If we truly believe that our children are the future (Goldsmith, 1989), then the forementioned leadership challenges to the area of maternal child health in nutrition, policy making, modeling, and morality are fundamental to the combined issues of this study. Transformational leadership is rare and difficult to achieve

but it can be attained. Ideal change is substantive, transforming, and over time can be transferred to others. Furthermore, transformational change is possible in the field of nutrition in concert with the dramatic demographic phenomenon presently occurring with the increased number of women active in the work force. Presently, both employees and employers are affected by the lack of affordable, accessible child care (Greater San Diego Chamber of Commerce, 1989). This, however, will require companies that are responsive to employee needs (Schwartz, 1989) and an introduction of strategic plans to retain valued women employees. Therefore, the relevance of the issue of this investigation to leadership is self-evident.

In summary, leadership is truly needed in the exploration of our ongoing social change with its consequential nutritional implications for women and their infants. It is hoped that this investigation will contribute toward raising the consciousness of our leaders and policy makers by expanding horizons in the knowledge of nutritional needs and improving our capabilities in making beneficial, informed choices in this vital parenting issue. The ensuing charge to leadership is to integrate nutrition; specifically, to encourage leaders to improve infant feeding guidelines. Promotion of the well being of employed or student mothers and their infants in child care should be an integral part of our society.

Purpose of the Study

The purpose of this study was to determine if and to what extent the exclusion rate due to illness, among infants under six months of age, is related to

different feeding modes during the first five weeks of enrollment in child care. This study further ascertained whether the infant's exclusion affected the mother's absenteeism from her work site or school or resulted in loss of her work time in making alternate child care arrangements. Other factors related to the infant-child care facility, family history, infant characteristics, infant feeding and the handling of the mother's expressed milk were examined.

Research Questions

1. To what extent is the method of infant feeding related to the exclusion rate, due to illness, by infants less than six months of age attending child care?

2. To what extent is the infant's exclusion rate associated with hours lost at the work site or school by the mother?

3. Do other selected variables impact on the exclusion rate of infants less than six months of age enrolled in child care? These variables include:

(a) maternal age

(b) infant birth weight

(c) number of persons living in the household

(d) number of persons with reported allergies

(e) number of children under 12 years living in the household

(f) mean age of the children under 12 years living in the household

(g) total number of cigarettes smoked in the house daily

(h) number of dogs and cats in the house

(i) total milliliters of supplements taken

(j) total intake of formula

(k) number of infants less than three months of age, three to six months of age, and over six months of age at the child care site

(l) classification of child care site

(m) infant age on enrollment

(n) infant immunization

(o) sex of infant

(p) maternal marital status

(q) ethnicity

(r) mother's education

(s) maternal occupation

(t) household income

(u) maternal access to infant in child care

Other factors including: child care facility policies; any infant hospitalization or physician visits; who cared for the infant if the infant was sick; any reported outbreaks of infection at the site; selected foods given the infant; and additional specific handling of breast milk were examined qualitatively to provide further demographic and definitive data.

Definition of Terms

For the purpose of this study the following definitions were used.

1. *Breastfeeding:* A feeding mode that provides an infant with over 50% of the caloric intake from breastfeeding or expressed breast milk.

2. *Breastfeeding Rate:* The number of days an infant was breastfed prior to enrollment in child care divided by the age of the infant on enrollment.

3. *Diarrhea:* Increase in number of stools clearly in excess of what is normal for that particular infant and stools which are watery and unformed.

4. *Exclusive Breastfeeding*: An infant who receives his or her total intake from feeding at the breast.

5. *Expressed Milk:* Milk that the mother has pumped from her breasts.

6. *Exclusion to Child Care:* A policy that excludes admittance to an infant with any one or more of the following: fever, diarrhea, vomiting, an undiagnosed rash, a green nasal discharge, inconsolable crying for extended time.

7. *Exclusion Rate:* The number of hours excluded from child care divided by the number of hours spent in child care.

8. *Lost Hours Rate:* The number of hours that the mother is absent from work or spends looking for alternate child care divided by the total hours worked during the five-week period.

9. *Illness:* A condition marked by pronounced deviation from the normal healthy state.

10. *Index Case:* The first case in a family or other defined group to come to the attention of the investigator.

11. *Infant-Child Day Care Center:* A licensed facility that provides child care for infants and children.

12. *Infant-Child Care Home:* A licensed home that provides child care for infants. There are three classifications of these licensed homes: (a) those homes

that care for up to four infants; (b) those that care for six children including at least one infant; (c) those that care for 12 children including at ieast one infant.

13. *Infant:* Babies between 0-23 months of age.

14. *Formula Feeding:* A feed mode that provides an infant with over 50% of the caloric intake from formula.

15. *Lactation:* The physiological completion of the reproductive cycle with the secretion of milk.

16. *Maternal-Child Health (MCH):* The section of Public Health dedicated to the needs and services of women and children.

17. *Morbidity:* The sick rate. The World Health Organization Expert Committee on Health Statistics noted in its WHO Sixth Report (1989) that morbidity could be measured in terms of three units; (a) persons who are ill; (b) the illnesses (periods or spells of illness) that these persons experienced; (c) the duration (days, weeks) of these illnesses.

18. *Treated breast milk:* Expressed breast milk that has been frozen or heated.

19. *Supplementation:* Any intake by an infant in addition to breast milk if breastfed, or from formula if formula fed. This intake may include water, juices, teas, cereals, purees, eggs and mixtures of these.

20. *UNICEF:* United Nations International Children's Emergency Fund.

CHAPTER TWO

Review of the Related Literature

Introduction

The purpose of this chapter is to provide background information about the occurrence and prevention of infection in the child care environment. The chapter is divided into three parts: (a) a general overview of child care settings and the transmission of infections to specific populations--infants, children, parents, child care employees and the community; (b) a discussion of studies on infant feeding with a focus on the immunological properties of breast milk and its potential protective factors against infection; (c) a review of employed and/or student women who are electing to breastfeed their infants in spite of barriers they encounter at the work or school site.

A review of the literature was undertaken on the subject of child care, infant feeding, and employed or student breastfeeding mothers. *ERIC, Medline, Index Medicus* and *Dissertation Abstracts* searches were conducted using the descripters of infant day care, child day care, day care, illness, ill health, infection, breastfeeding, human milk, and milk feedings. Additional reviews were done of textbooks, current professional journals, and business magazines. Over 500 references were generated but no references of infant feeding methods in

correlation with illness in child care were produced. Dissertation Abstracts has one dissertation that studied infection in child care sites (Eicholtz, 1986).

The dramatic 300% increase in the number of infants and children enrolled in child care has been an historical change from 15 years ago (Aronson, 1989) when child care was actually considered illegal in some states (Morgan, Stevenson, Fiene and Stephens, 1984). Galinsky (1989) reported that a recent Phillip Morris survey conducted by Harris of over 2,000 parents with children under six years of age showed that 63% of the parents believed that society is doing too little for children. Ninety-three percent of those interviewed believed that women need help in the provision of loving care for their children as these women endeavor to remain productive members of the work force. The results of this Phillip Morris survey demonstrated an attitudinal shift from previous thinking that projected 'seeking help' was an admission of failure. In addition, more children's advocates are stressing that the health, safety, and nutrition needs of children must be incorporated into child care (Chapman, Goodwin and Brown, 1989) to protect the health and welfare of the children and communities at large from possible transmission of infectious diseases (Pickering and Woodward, 1982; Schuman, 1983).

Child Care Settings and the Transmission of Infections

The provision for child care is found in numerous settings including care in the child's own home, family child care other than the child's home, and center-based care. Approximately 17% of the sites fall under regulating guidelines, and

the majority of these regulated sites are child care centers. Traditionally, the largest number of children are cared for in home day care, especially infants (Aronson, 1989) and toddlers who are the most likely to contract and spread disease (Zigler and Muenchow, 1984). In 1984 many home-based sites were managed on an informal basis and were neither licensed nor regulated (Barlett, Reeves and Pickering, 1988). However, 46 states now have regulations for family child care, and licensing is required if tax credit is desired (Aronson, 1989). [The Dependent Care Assistance Plan (DCAP), under section 129 of the Internal Revenue Code, allows an employer to set aside $5,000 of an employee's salary on a tax free basis for child care expenses (*Greater San Diego Chamber of Commerce,* 1989, p. 11).]

Concern of Infection in child care settings

The possible spread of infection has caused concern and considerable controversy. In 1984 the first interdisciplinary symposium on infectious diseases in child care was held in Minneapolis. At that symposium, professionals presented state of the art topics in child care related to infectious disease and the resultant economic impact. Strategies for the control and prevention of selected diseases and other prototypical illnesses relative to child care in their etiology or epidemiology were discussed (Osterholm, Klein, Aronson and Pickering, 1984).

Four years later the same concerns continued to surface. According to a report in *Infectious Diseases in Children* (1988), Pickering described four patterns of infectious disease transmission occurring in child care. The first pattern includes gastrointestinal and respiratory infections which occur in enrollees, child

care staff, and family members. The second pattern includes infections that might not be apparent in the child care attendees but are likely to occur in adult contacts. The third pattern is of those infections that are most commonly manifested in children; and the fourth pattern includes infections unapparent or mild in children, but that can have serious consequences for adults. These patterns of infectious disease spread create a public health concern (Adler, 1988; Pass and Hutto, 1984; White, Yow, Demmier, Norton and Hoyle, 1989).

Researchers have repeatedly emphasized that environmental factors linked to the transmission of disease at the child care site need to be considered (Peterson and Bressler, 1984). Because of these factors, additional immunization has been suggested for some child care attendees (Dawn, Gramoff, Gilsdorf, Murphy and Osterholm, 1984; Fleming, Cochi, Hull, Helgerson, Cundiff et al., 1984; Keenan and Caffery, 1988) and staff workers (Hinman, 1984) to lower the possibility of infection transmission. Stevenson , Sterne and Stephens (1984) suggested that there are many legal and practical considerations creating possibilities of liability for contracted infections and that good policy is needed.

Although progress has been made in structuring child care laws and regulations, overall national policies are lacking, and Morgan and Stevenson (1984) claimed that existing policies still contain serious gaps. For example, 16 states do not mention hand washing in their regulations and only 28 states require a source of running water in the diaper changing room (Aronson, 1989). Particularly lacking is a uniform criterion for exclusion from child care due to contagious disease (Aronson, 1986; Landis, Earp and Sharp, 1988; Pickering

et al., 1984; Shapiro, Kuritsky and Potter, 1984; Wald, Dashefsky, Byers, Guerra and Taylor, 1988; Zigler et al., 1984).

Jordan (1984) suggested that policy could be written to increase sick benefits for workers in the overall child care labor force. He also recommended the consideration of separate sick child care and suggested the replication of successful child care models for children with mild illness. The American Public Health Association (APHA) also encourages the development of policies, especially to address the gap in issues surrounding Human Immunodeficiency Virus (HIV) positive children attending child care. To define health safety, the American Academy of Pediatrics (AAP) and the APHA have launched a three-year program to establish health, safety, sanitation, and nutrition for child care, to be published in 1990 and to serve as a state guide for regulation requirements (Aronson, 1989).

Improved child care staff training has been targeted as another manner of decreasing infection, particularly for improving the ability to identify potentially critical areas in the chain of disease transmission (Gilliss, Holaday, Lewis and Pantell, 1989; Peterson et al., 1984; Taras and McCaffrey, 1989; Zigler et al., 1984). The APHA is particularly interested in having educational programs developed for both parents and child care workers. Within the realm of staff training, the maximization of hygiene practices has been considered a priority issue (Hadler and McFarland, 1984; Hutto, Little, Ricks, Lee and Pass, 1986; Murphy and Bale, 1988; Pickering et al., 1982; Steketee, Reid, Cheng, Stoebig, Harrington et al., 1989).

This recommended improvement in hygiene may require better or more extensive sanitation codes or perhaps better building designs (Aronson, 1986). Such recommendations often result in expensive modifications (Kelley, 1989). An increase in codes or regulations also requires evaluations and surveillance (Davis and Pfeiffer, 1984) and thus creates roles for infection control specialists (Goodman, Glode, Pfeiffer and Grady, 1984).

Seasonal variations and the weather may also have an effect on the incidence of infections related to child care (Jordan, 1984). More recently, Urtis, Clayton and Jay (1988) have suggested that the incidence of disease may not be as accurate an indicator as the severity of the case. They stressed, however, that we need to strive to prevent infections in all categories, especially for infants, where infections are a high contributor to morbidity and mortality. Regardless of the cause of infection, the psychological and economic impact is considerable for families and employers (Pickering, Bartlett and Woodward, 1984).

Implications of disease transmission in child care

In 1980, Honeywell executives estimated that 61% of the employee absenteeism at Honeywell work sites was due to unmet child care needs, particularly sick children (Jordan, 1984). These investigators also found that 83% of parents have no available solution for alternate care when their child becomes ill. The National Center of Health Statistics, writing on Child Care Showdown, stated that women take more sick time than men (*San Diego Union*, 1989). They speculated several reasons for this difference and, excluding time taken off for birthing, found that women with children under six years of age have the highest

rate of absenteeism. In the first controlled cost benefit study conducted at a corporate on-site child care center, Burud and Ranson (1989) demonstrated work differences between employees using on-site child care and those utilizing other child care. A significant difference was clearly seen in the reduction of employee turnover from 9.5% to 2.2% in employees using on-site child care. These researchers (Burud, 1989) also reported less absenteeism and shorter maternity leaves. Many employees also stated that on-site child care was an important factor for their accepting the job. The resultant hardships created when children of employed women become ill presents leaders with one of their greatest challenges; e.g., to provide quality child care without driving child care centers out of business (Aronson, 1986).

Along with improving staff competency and working conditions, increased pay levels for child care workers has been recommended (Pickering et al., 1982). On an average, child care employees receive $10,000 annually and have a reported 35% turnover rate (Brown, J., 1989). Galinsky (1989) reported that 90% of respondents in the Phillip Morris study endorsed the following statement: *"Currently, child care workers receive the same pay as parking lot attendants."* In order to attract higher calibre providers, training and work conditions need to be improved and wages need to be raised. *"These actions could help alleviate some of the negative stress incurred by child care staff and have positive impact on increasing the self-esteem of child care workers"* (Dalton, 1987, p. 145). However, accomplishing all these without increasing overall child care costs and adverse public opinion is difficult, if not impossible, and may create policy

trade-offs (Kagan and Newton, 1989; Zigler et al., 1984).

The 1989 national average annual cost for child care is $3,000 with infant care costing close to $6,000 (Aronson, 1989). The Greater San Diego Chamber of Commerce (1989) reported that child care is often the fourth highest expense for a family of four after food, housing, and taxes. Child care costs may be estimated using *Morgan's formula,* whereby the annual salary of the teacher is divided by the number of children per teacher and then multiplied by two (Aronson, 1989).

Overall, the education of child care providers, public health workers, health care providers and parents is considered an important element in minimizing health and welfare problems that may occur in the provision of child care (Lopez, Dilberto and McGuckin, 1988; Pickering et al., 1984).

In summary, the possible spread of infections within and from the child care environment is a growing concern as the number of families involved in child care increases. Results from studies have fueled groups and individuals into pressuring for action. Improvement in intercommunication, in conjunction with dissemination of knowledge, is suggested (Aronson, 1989; Fitzsimmons, 1989a; Goodman et al., 1984). Young child care educators and health care professionals are making a concerted effort to look for possible ways to improve the health and safety of child care attendees, and thus prevent the transmission of child care based illnesses while yet maintaining realistic costs of care. Although education and hygiene factors are important facets to examine and will undoubtedly reduce transmission of infection, the consideration of how infant

feeding modes impact infection rates should not be ignored.

Infant Feeding and Potential Protective Factors Against Infections

This part of the literature review was undertaken to examine differences among infant feeding methods and their possible association with reported infections. The scientific community has long been in agreement that infants and young children are more susceptible than older children to many infections because of their limited immune defense systems (Klein, 1984; Whitelaw and Parkin, 1988). On a global basis, 15 million infants die annually (Wellstart, 1988). The major causes of death are diarrhea, malnutrition, and respiratory infections. Ninety-five percent of these deaths occur in non-industrialized nations (Latham, 1982). However, infants in industrialized nations are not excluded from the nutritional effects of acute infections and chronic disease (Farthing and Keusch, 1985). Infantile diarrheal disease in the United States has been deemed the cause of 10% of all pediatric emergencies and hospital admissions (Cohen and Balistreri, 1989). The Center of Disease Control research from 1973-1983 reported in the *Journal of the American Medical Association* (1988) that diarrheal deaths constitute an important and preventable fraction of post neonatal mortality in American children, with 70% occurring before six months of age. The highest incidence is found in the southern states in the African-American population. Although there are several contributing factors to these statistics, nutrition is a vitally important component in the overall equation (Cunningham, 1987).

Infant feeding practices

Infant feeding practices have changed greatly during the past two decades (Dusdieker, Booth, Seals and Ekwo, 1985). Within the industrialized nations of the world, one of the major swings has been a resurgence in the popularity of breastfeeding as the ideal method of feeding infants (Foman, 1987).

This change has been credited to a strong ecological movement concurrent with an explosion of scientific literature confirming that human milk is more than a mixture of nutrients, and that breastfeeding is more than a means of supplying them (Lawrence, 1989c; Pierse, Van Aerde and Clandinin, 1988; Winnikoff and Baer, 1980). The emerging holistic view has emphasized that human milk and breastfeeding comprise a unique biological system of interacting balanced nutrients (Barness and Gilbert-Barness, 1989), enzymes, life-protecting immunological substances, an epidermal growth factor, with a remarkable ability to match the continual changing needs of the infant, plus providing developmental and psycho-social benefits (Jelliffe and Jelliffe, 1981; Myres, 1988; Wellstart, 1988).

In 1985 Martinez and Krieger reported that approximately 61% of mothers in the United States chose to breastfeed their infants, compared to 25% in 1971. Since that time, the incidence of breastfeeding in the U.S. decreased to approximately 52% in 1988 for new mothers leaving the hospital, and to 22% at five to six months of age (Lawrence, 1989a). However, Lawrence (1989a) reported that breastfeeding rates have continued to remain high among educated and economically advantaged women. There are regional differences observed

in the incidence of breastfeeding, with a 75% incidence seen in the west coast areas of the United States compared to less than 25% incidence in the southeast.

The controversy

In 1981, a task force commissioned by the Department of Health and Human Services reviewed the post-1970 literature on infant feeding with the purpose of examining the epidemiologic evidence and reporting the trends and effects of feeding methods on infant health. The task force concluded that breastfeeding does appear to decrease an infant's risk of gastrointestinal infection and otitis media. Recently, Teele, Klien, Rosner et al. (1989), also reported a lower incidence of otitis media exhibited in breastfed infants. The 1981 task force reported that the effect of infant feeding methods on the risk of other infections and allergic disease was less certain (Simopoulos and Grave, 1984). These researchers stated that the benefits of breastfeeding were relatively modest in populations having good sanitation, nutrition, and medical care. However, these same task force members found only a few studies that controlled for confounding variables (Kovar, Serdula, Marks and Fraser, 1984). For example, Martorell and O'Gara (1986) emphasized that socio-economic status is an extremely important variable and should not be ignored. Studies that may include some of the considered important variables often do not provide definitions. Specifically, most do not define breastfeeding (Gurwith, Wenman, Hinde, Feltman and Greenberg, 1981) or do not define it well enough to analyze accurately the research (Burkhalter and Marin, 1989), or may define it in such a way that it may impart bias, (Kramer, Barr, Leduc, Boisjdy, McVey-White et al.,

1985).

This noted flaw in study design has continued to create controversies in the results of newer research of the impact of feeding methods on the incidence of illness in infants (Bauchner, Leventhal and Shapiro, 1986; Brown, Black, Lopez de Romana and Creed de Kanashiro, 1989; Cunningham, 1988b; Habicht, DeVanzo and Butz, 1986; Jason and Jarvis, 1987; Kramer, 1988b, Lennox, 1983).

One well designed recent study by Howie, Forsyth, Ogston, Clark and Florey (1990) applied methodological criteria utilized by Bauchner et al. (1986). These criteria included adjustment for confounding variables, avoidance of detection bias, and definitions of outcome events and infant feeding. Infants in the study were divided into four groups according to feeding modes from time of birth: (a) breastfed for 13 weeks; (b) breastfed and supplemented before 13 weeks of age; (c) breastfed at birth but discontinued before 13 weeks of age; (d) bottle fed from birth. Breastfeeding, however, was not clearly defined. These researchers concluded that breastfeeding during the first 13 weeks of life confers protection against gastrointestinal disease and that the protection persists beyond the period of breastfeeding.

The 1981 Health and Human Service Task Force did not examine some other important areas of research including the immunologic, biochemical, and total nutrient composition of breast milk compared to commercial infant milk formulas. Perhaps these were not included in detail because less knowledge was available at that time compared to the wealth of information available today.

Protective factors

Recently, illuminating studies have described the composition of human milk (Woodhouse and Lönnerdal, 1988) and how this highly complex nutrient containing fluid forms a biological anti-infective umbrella for the protection of the neonate's immature gastrointestinal and immunological systems (Savilahti, Salmenpera, Taino, Halme, Perheentupa et al., 1987; Chandra, 1989). Notably, the protection varies with the specific pathogens involved and with the chronological age and maturity of the infant (Lawrence, 1989a, p. 118). The concentration of the resistance factors available in human milk decreases as the infant matures. But the infant's increased intake of this milk, in combination with the development of the infant's own immune system, assures continuous protection (Chandra, 1982; Jatsyk, Kuvaeva and Gribakin, 1985; Kramer, 1988a). It is thought that the protection continues through gradual weaning and also with partial breastfeeding (Lawrence, 1989a, p. 126). This may account for the protection into the second year of life credited to human milk (Goldman, Goldblum and Garza, 1983). Campell and Latham (1988) and Leventhal (1986) reported that breastfed infants are less likely to be hospitalized than their formula fed counterparts. In their report to UNICEF, Popkin, Atkin, Adair, Akin, Black, Briscoe et al. (1989), pointed out that breastfeeding not only reduced morbidity and mortality, but it may increase the nutritional status sufficiently to prevent disease or, at least, reduce its severity.

The protective factors offered by colostrum and human milk are contained in its many bioactive components. Principal ones include immunoglobulins, bifudus

factor, bile salt stimulated lipase, complement C3, C4, epidermal growth factor, lactoferrin, lactoperoxidases, lymphocytes, lysozymes, macrophages, and a thermostable antistaphylococcal factor (Milla, 1986; Butte, Goldblum, Fehl, Loftin and Smith et al., 1984). Each of these plays a vital role in the provision of protection against disease and offer specific benefits.

All classes of immunoglobulins have been identified in human milk (Lawrence, 1989a, p. 126). These include IgA, IgD, IgM, and IgE. Of these, IgA represents 90% of the immunoglobulins found and is recognized as the principal resistance factor against organisms that infect the gastrointestinal tract, particularly, E. coli, enterovirus, as well as septicemia, in the newborn (Lawrence, 1989c). The bifidus factor is a component credited with supporting lactobacilli growth that hinder growth of undesirable pathogens, specifically shigella, E. coli, and yeast. The role of bile salt stimulated lipase is displayed in the production of anti-parasitic lipids and is known to inactivate giardia lambia (Goldman, 1986). Complement components of human milk, C3 and C4, also aid in the destruction of various undesirable bacteria, including E. coli (Lawrence, 1989a, p. 140).

Another valuable component, the epidermal growth factor, with its mucosal cell growth stimulating activity, is important in the maturation of the neonate's intestinal tract (Jansson, Karlson and Westermack, 1985) and may decrease the occurrence of allergic disease (Hamburger, 1988). This hypo-sensitizing action is thought even more protective if the breastfeeding mother avoids the consumption of common allergenic foods throughout pregnancy (Björjkstén and

Kjellman, 1987) and lactation (Chandra, 1989; Chowdhury and Chandra, 1989).

There are many other elements of human milk that function in the prevention of undesirable bacterial growth. Lactoferrin is a major one of these. It is a powerful iron binding protein that prevents the multiplication of undesirable organisms by depriving them of necessary iron (Bullen, 1981). Lactoperoxidase also functions in the oxidation of bacteria, notably the destruction of streptococci and enteric bacteria (Worthington-Roberts and Williams, 1989, p. 292).

Human milk also contains important enzymes. Lysozyme is an example and has a valuable role in promoting a positive influence on the intestinal flora, through the destruction of the bacterial cell membrane, specifically E. coli and salmonella organisms (Lawrence, 1989a, p. 134). Lipid factors in human milk are capable of enveloping viruses and rendering them inactive; i.e., herpes simplex, polio virus, coxsackie virus (Lawrence, 1989a, p. 139), influenza virus, (Cunningham, 1987), and respiratory syncytial virus (Dolan et al., 1986; Goldman, Atkinson and Hanson, 1987; Tyrrell, 1981). The latter, respiratory syncytial virus, is considered the most common cause of hospitalization for infants in some industrialized countries (Lawrence, 1989a, p. 138).

The cellular components of human milk, primarily macrophages and lymphocytes, are also known to have many important functions. These functions include the synthesis of complement, lactoferrin, lysozyme and other elements that facilitate phagocytosis. Macrophages appear to mediate protection against necrotizing enterocolitis in the newborn (Chandra, 1982; Worthington-Roberts and Williams, 1989, p. 292). The lymphocytes have several roles, most

importantly the synthesis of IgA.

Data support the concept of the protection afforded by human milk through a vital role of enteromammary and broncho-mammary pathways (Lawrence, 1989a, p. 119). These pathways generally include interaction of immunoglobulins in the mucosal tissue of the gut, lungs, and mammary glands, but also can extend to the salivary, and the lacrimal glands and to the genital tract. The phenomenon allows for immunity at one site to foster immunity at a distant mucosal site (Worthington-Roberts and Williams, 1989, p. 192). This process is accomplished with the migration or *homing* of immature protective cells into the mammary glands where synthesis of protective immunoglobin cells occurs. These protective immunoglobins are subsequently excreted in the breast milk (Garza, 1984). Therefore, maternal exposure to specific environmental pathogens results in the mother's developing immunity and passing this acquired immunity on to her infant through her milk. These pathways and the total combination of the component parts in human milk are thought to have a synergistic effect on the formation of the overall protective role provided by breastfeeding (Garza, Schanler, Butte and Motil, 1987).

In addition, another portion of the reported protection offered by breastfeeding may be enhanced by the psychological interaction established between the mother and the infant (Hughes, Townsend and Branun, 1988). This relationship may be reflected in the attachment association exhibited by infants to their care givers at a later age (Lewis and Feiring, 1989; Howes, 1989).

It is acknowledged that human milk can harbor undesirable viruses as well;

i.e., human immunodeficiency virus (HIV), Cytameglo virus (CMV), and Hepatitis B virus. However, the ramifications of this are, to date, not fully understood but require careful monitoring in relation to breastfeeding (Lawrence, 1989a, p. 143; O'Connor, 1989). It has been suggested that a breastfed infant from an HIV sero positive mother may become sufficiently immunized through the mother's milk (Dewey, Garza, Martorell, Kramer, Hanson and Chandra, 1987).

Although newer studies have been enlightening, there remain undetermined components in breast milk. For example, to date, only 75-85% of the whey protein fraction in breast milk has been identified and quantified. This leaves a considerable protein portion that may be nutritionally and physiologically significant to the breastfed infant (Woodhouse and Lönnerdal, 1988). Industry has been able to replicate closely many of the ingredients of human milk. However, there still remain many differences, and these manufactured milks do not contain the fore-mentioned immunological properties, enzymes, nor hormones, considered important to growth promotion and maturation (Gulick, 1986).

The effect of handling and storage practices on the immunological properties and safety of human milk is a concern. Employed or student mothers electing to continue breastfeeding, even though they may be separated from their infants for extended periods of time, can express their milk during the separation to use at a later time. This milk expression assists the mother in maintaining an adequate supply of milk and can be beneficial in relieving maternal discomfort (Lawrence, 1989a, p. 314). These mothers often pose questions about milk

storage techniques. Generally, suggestions are given emphasizing good hygiene practices, recommended refrigeration for no longer than 24-48 hours, or freezing of expressed milk for a period up to three months, storage in glass containers, followed by thawing of frozen milk in warm water (Lawrence, 1989b).

Interestingly, Barger and Bull (1987) found no difference in bacterial growth between breast milk and other milks stored at room temperature for up to 10 hours duration. Lawrence (1989a, p. 126) stated that boiling human milk destroys essentially 100% of the immunologic activity present. She also stated that the cellular components of breastmilk do not tolerate heating to 63 degrees centigrade nor cooling to minus 23 degrees centigrade. Overall, handling of expressed breastmilk is considered important because techniques utilized may alter or negate protective capabilities (Manelyla, Xanthou and Lapis, 1985; Sosa and Barness, 1987).

The Introduction of solids

The supplementation of solid foods to infants has also been poorly defined in the literature (Auerbach, 1988) and thus adds another factor compounding the confusion over the relationship between feeding and illness (Wilkinson, 1981). Brown et al. (1989), attempted to compensate for this definitional discrepancy in study design. This joint study with Brown's group from Johns Hopkins School of Public Health and the Peru National Institute research team divided their sample into four groups, determined by the extent of breastfeeding and the introduction of solid foods. Their methodology allowed for a clearer interpretation of the results which demonstrated that the introduction of supplemental foods coincided with an

increase in the incidence of infection. Such a sample division is rarely defined. However, it has been previously shown that the introduction of other foods to infants is an important consideration with the probability that any additional supplements will influence the amount of breast milk consumed, along with the possibility of introducing contaminants (Whitehead, Paul and Ahmed, 1986).

In conclusion, there are many who argue that the scientific literature reveals a rationale for supporting breastfeeding as the ideal method of feeding most infants, at least during the first four to six months of life (American Academy of Pediatrics, 1988; Chandra, 1984; Cunningham, 1988a, 1988b; Foman, 1987; Garza et al., 1987; Gerrard, 1974; Hamburger, 1988; Jelliffe and Jelliffe, 1981; Kramer et al., 1985; Latham, 1982; Lawrence, 1989a). Researchers with new evidence are suggesting that breastfeeding may also offer some potential degree of protection against disease including, but not limited to, obesity and atherosclerosis (Lawrence, 1989a, p. 300); cancer (Davis, Savitz and Graubard, 1988); early onset of diabetes (Boren, 1987; Borch-Johnsen, Mandrup-Poulsen, Zachau-Christiansen, Joner, Christy et al., 1984; Gill, 1984); and some metabolic disorders (Lawrence, 1989, p. 347). Recent studies have continued to examine the impact of breastfeeding and clarify the nutritional and immunological composition of human milk. *"Some researchers have shown that breastfed infants have fewer infections, others have shown no differences, but none has reported increased morbidity among groups of infants fed human milk"* (Garza et al., 1987, p. 27).

Employed Women Breastfeeding Their Infants

Considering that incurred infections at the child care site are considered a major problem and that there may be protection afforded young infants receiving human milk, this section of the literature review will focus on some of the barriers encountered by employed or student women who elect to continue breastfeeding their infants.

Breastfeeding and employment are less likely to be considered socially or medically incompatible than they once were. However, combining work and lactation places an excess of responsibility on women in a society where male partners often contribute little in child rearing and household tasks (Aronson, 1989; Fitzsimmons, 1989b). Professionals who have worked with these lactating women realize that stress, both emotional or physical, can interfere with normal hormonal functions resulting in a decrease in a mother's milk production (West, 1980). The result is that the mother may switch to bottle feeding if she perceives her milk production is not sufficient to sustain normal growth and development for her infant (Auerbach, 1984); or, she may make the change resulting from effective marketing on the part of the formula industry which tries to convince mothers that its manufactured products are good breast milk substitutes (Hofvander, 1983). Inadequate education of health workers and lack of support from health services may further encourage a change (Barber-Madden, Petschek and Pakter, 1987). Regardless of the reasons, Van Esterik and Greiner (1981) argued that understanding the impact of women's work on breastfeeding has not been well defined.

The decision to return to work or school and to continue breastfeeding involves a clear look at personal values, fears, roles and beliefs about mothering, in addition to economic or personal realities (Perry, 1990). Edwards (1983) has observed that a mother is more likely to succeed at breastfeeding when she is happy at home, work or school, for personal satisfaction plays an important role in successfully managing multiple jobs. Howell (1973) estimated that full time employment, coupled with the assumption of sole responsibility for domestic needs, demands a weekly investment of 105 hours. Brazelton (1986) stated that the real issue facing career women is *when* to return to work without endangering their infant's development. Dixon (1988) described three important elements basic to the infant's cognitive development. These elements are *consistency* in the child's social interactions; *contingency,* in which the child begins to recognize events in response to his or her behavior; and thirdly, *reciprocity* in relationships. Dixon (1988) claims that all of these are necessary to the development of basic trust. This author (Dixon, 1988) proposes that this relatively complex relationship, the act of breastfeeding, provides: (a) the infant the earliest and most extensive model for social interaction to the world; (b) enhancement of self esteem in parenting. Dixon (1988) also stresses that cultural backgrounds and social roles perceived by mothers have implications in the feeding relationship and should not be ignored.

Erikson (1980) described how infants pass through stages that lead to the development of basic trust in their environment. Newton (1977) found that infants who were breastfed for two to three months with frequent bottle supplementation

had lower average adjustment and social adaptability scores compared to those who were exclusively breastfed for four to six months. The amount of time required for this development may vary among mother-infant pairs, and Brazelton (1986) recognized that not all women have the desirable length of time to establish this basic trust prior to returning to work or school. This lack of time can cause mothers unanticipated anxieties, guilt feelings, and exhaustion (Balk and Christoffel, 1988; Grams, 1985; Shepherd and Yarrow, 1982). Many of the authors demonstrated a prejudice, recommending that mothers stay home if at all possible (Heins, Stillman, Sabers and Mazzeo, 1983).

Feeding recommendations should include consideration of cultural variations and individual values; otherwise, the advice may further contribute to a woman's frustration and jeopardize her chances for a successful breastfeeding employment experience (Dixon, 1988; Majewski, 1986), especially if accessible child care is not provided. Thus quality, available child care is important in facilitating a positive outcome for these working mothers desiring to breastfeed their young infants (Hignett, 1988; Morse, Bottorff and Boman, 1989); that is, child care that encourages psychological growth through supporting breastfeeding.

Barriers encountered

In 1984, Auerbach surveyed 596 lactating employed women from 51 occupations. Three-fourths of these women returned to work within 12 weeks post partum, and 48% of them returned to full time work. Forty-four percent reported that their employer was unaware that they were breastfeeding their infants. Some of the women reported that their employers were supportive of

their desire to continue breastfeeding and gave them time to express their milk. Women who had problems (16% of the total) reported that 31% of their employers considered breastfeeding an impediment to productivity, 25% refused to give them breaks, 19% made derogatory remarks, and 14% refused to allow the infant to be brought to the work site. In summary, Auerbach showed that 84% of the women that she studied reported 30 different obstacles confronting them in their efforts to combine working and breastfeeding. Fatigue was the most cited problem.

Maternity leaves vary considerably throughout employment jurisdictions. Kantrowitz (1988), reported that professional women appear to have more control over their work environment and may be able to structure a more satisfactory relationship between their employment and infant feeding roles. Eighty-two percent of the women in Auerbach's study (1984) said they would continue to breastfeed their next baby on returning to work, but would prefer to stay home with a future baby. The majority of women, however, may not be able to exercise this option.

Adolescent mothers may choose to return to school and in some areas of the United States, special programs have been established allowing these young mothers to enroll their infants in a school on-site child care center. These schools make an extended effort to help these mothers to complete high school in hopes of preventing subsequent unemployment, poverty and welfare dependency (Ruff, 1987). Many of these mothers are electing to breastfeed their infants for the same reasons that other mothers are; i.e., because they think it is best for their babies

(Neifert, Gray, Gary and Camp, 1988). These researchers reported that 17% of the 244 adolescent mothers they studied returned to school within the first two months postpartum.

MacLaughlin and Stretnik (1984) found 73% of the 96 adult women that they studied returned to work for financial reasons. Returning to work creates a life style change that may result in *domestic crisis* from the attempted management of created overload, and coping with unexpected events (Morse, Bottorff and Bowan, 1989, p. 182). According to a general survey undertaken by the *Daily Californian* (1986), 53% of the respondents, men and women, said employers should make allowances for breastfeeding. Suggestions have been offered to allow women to reconcile their productive and reproductive lives (Balk and Christoffel, 1988).

Supportive systems

These suggestions include reallocation of some domestic chores to male partners (Giele, 1980; Whyte, 1978). Another suggestion has been to encourage successful working breastfeeding mothers to act as mentors and support other women (Bamisaiye and Oyediran, 1983), especially in hospitals where breastfeeding staff return to work following maternity leave (Katcher and Lanese, 1985; Reifsnider and Taylor-Myers, 1985; Zambrana, Hurst and Hite, 1979). This staff position provides breastfeeding nurses the unique opportunity to act as role models and assist other mothers.

Moore and Jansa (1987) surveyed companies to examine types and prevalence of policies established to support breastfeeding among their

employees. They found that breastfeeding promotion programs varied but that there were some progressive industries throughout the country that supported the practice. The most innovative programs were found in the hospital and insurance industries. A Canadian study by Morse et al. (1989), reported that flexible work schedules were the main contributors for employed women to maintain lactation. The dominant success factor was the availability of the infant to the mother's work place. The women in the study who had this access returned to work at 17.8 weeks postpartum compared to others at 25.5 weeks.

Legislative support has also been advocated for employed breastfeeding mothers (Lofton and Gotsch, 1983; Scrimshaw, Engle, Arnold and Hayes, 1987). In 1984, Koop, the United States Surgeon General and Deputy Assistant Secretary for Health, set goals for our country, stating that by 1990, 75% of all mothers should be breastfeeding their neonates and that 35% should maintain this practice for the first six months of their infant's life (U. S. Department of Health and Human Services, 1989).

Lack of support

However, the American Pediatric Association (APA) and the World Health Organization (WHO) have noted that work environments, in both policy and structure, often are not supportive of women who choose to breastfeed (Barber-Madden et al., 1987). The authors reported several contributing factors for the noted lack of support. These included: insufficient maternity leaves, lack of child care at work sites, rigid time schedules that do not allow for nursing breaks, lack of privacy for expressing breast milk, and no facilities for

refrigeration. Because of these conditions many women elect to wean their infants when they return to work in spite of their desire to continue breastfeeding (Auerbach, 1984). Morse et al. (1989), reported that 41% of primipara mothers cited 'returning to work' as the main reason for weaning. Until employers develop maternity polices that do not discourage breastfeeding, the recommended six months of breastfeeding will be very difficult to achieve for most employed women in the United States (Kurinij, Shiono, Ezrine and Rhoads, 1989).

In conclusion, this section of the literature review has examined many challenges faced by employed and/or student lactating mothers who for various reasons are combining significant roles with important results; e.g., child development, economic necessity, and adult fulfillment. Reiger (1988) suggests that this role combination entails a complex experience of autonomy and connectiveness to others. She also states that it is important for women to have this reproductive control of their bodies with its possible positive long term effects on lactation and their own health.

These reasons further support a rationale for on-site child care (Fitzsimmons, 1989c) and the need to facilitate easing of the nationai crisis in the lack of available infant care as presently experienced in the regional San Diego area (Fitzsimmons, 1989d). Research investigators have shown that a change in the lack of infant-child care may be facilitated through different channels and that increased recognition and support are needed for mothers endeavoring to better themselves and society through their commitment and contribution.

Summary

This three-part review of the literature has shown that the increasing number of women in the work force has created a need for available, quality, affordable child care, and that there is a great deal of concern expressed about the transmission of infection within the sphere of child care. The exclusion of sick infants and children from child care is the primary, combative measure presently practiced. This practice often creates problems for the employed or student mother who then must search for alternate care. There is evidence that breastfeeding may be protective, especially during the first four to six months of life when infants are very susceptible to disease. However, there is no total consensus in the literature nor in practice regarding this relationship. Research reveals that the employed mother's efforts to maintain breastfeeding are generally not supported at the work or school site.

Although considerable research has been completed, it is clear that more is needed to further define and interpret the total impact of infant feeding methods on the incidence of infection in child care for the infant, mother, family, community and society at large. This combination of concerns has preempted this exploration of the relationship between the incidence of infection and the feeding method utilized by employed or student mothers leaving their infants in child care.

CHAPTER THREE

Research Design and Methodology

Study Objectives

The purpose of this study was to examine infants less than six months of age enrolled in child care settings in regional San Diego with a focus on the exclusion rate, due to illness, in relation to the infant feeding methods practiced. The study also provided data recording the number of employment hours that the mother was absent and/or forfeited as a result of any infant illness. In addition, the data obtained were utilized to show the contribution of other variables, apart from the feeding methods, that may have had impact on the explanation of variance observed in the exclusion rate. The three null hypotheses tested in the study were as follows:

Null Hypothesis 1. There is no association among feeding methods and the rate of exclusion for illness in infants less than six months of age attending child care;

Null Hypothesis 2. There is no association between exclusion rate due to illness among infants less than six months of age and the number of hours of employment forfeited by the mother either because of her absence from work and /or time spent making alternative arrangements;

Null Hypothesis 3. Exclusion rate cannot be further explained by the following variables:

(a) maternal age

(b) infant birth weight

(c) number of persons living in the household

(d) number of persons with reported allergies

(e) number of children under 12 years living in the household

(f) mean age of the children under 12 years living in the household

(g) total number of cigarettes smoked in the house daily

(h) number of dogs and cats in the house

(i) total milliliters of supplements taken

(j) total intake of formula

(k) number of infants less than three months of age, three to six months of age, and over six months of age at the child care site

(l) classification of child care site

(m) infant age on enrollment

(n) infant immunization

(o) sex of infant

(p) maternal marital status

(q) ethnicity

(r) mother's education

(s) maternal occupation

(t) household income

(u) maternal access to infant in child care.

Other factors including: child care facility policies; infant hospitalization or physicians visits; who cared for the infant if the infant was sick; reported outbreaks of infection at the site; selected foods given the infant; and additional specific handling of breast milk were examined qualitatively to provide further demographic and definitive data.

An extensive search of the literature did not provide an instrument capable of measuring the relationship between exclusion rate from child care and the infant feeding mode. Therefore a five section instrument (Appendix A, Sections I-V) was developed specifically for this study in an effort to provide researchers a tool which can be easily used by both researchers and respondents in expanded studies.

Design

Although studies have been written implicating infant child care sites with the transmission of disease (Aronson, 1989; Pickering, 1984) and many researchers have offered suggestions to alleviate the problem (Gilliss, Holiday, Lewis, Pantell and 1989), none have looked at a possible correlation of infection to the method of infant feeding. This present study primarily tested the infant feeding mode as a correlate in the incidence of infection incurred during the first five weeks of enrollment in infant child care.

This study of 37 mother-infant dyads at 18 sites was designed utilizing a checklist instrument providing data from four sources: (a) a diary kept by the mother (Appendix A, Section I); (b) information provided by the child care center

director (Appendix A, Section II); (c) a brief questionnaire completed by the mother of each infant (Appendix A, Section III); (d) a final interview with the mother by the investigator (Appendix A, Section IV). Data from the diary were used to determine: (a) the extent of breastfeeding; (b) the number of hours that the infant was excluded due to illness; (c) the number of hours that the mother forfeited from her employment or schooling to care for her infant or find alternate care. The remaining three sections provided data to ascertain the effect of other factors on the exclusion rate. The study included data from Monday through Friday at the child care facility and the mother's non-employed days at home throughout each five-week study period.

With the exception of two mother-infant dyads, the data were collected prospectively. Those two dyads studied retrospectively were completed within a reasonable parameter of two and one-half months. They were included because the detail of recall was minimal.

Instrumentation

A major source of information was provided from the simple diary kept by the mother (Appendix A, Section I). The diary was designed as a five-week calendar with seven slots for each day. The mother was requested to record daily the appropriate amount in each of the designated spaces. This diary thus provided a daily record for each dyad's five-week study period that included: (a) the number of ounces of breast milk consumed, (treated or untreated; i.e., frozen, heated, or used as freshly expressed breast milk); (b) the number of ounces of

other liquids and any supplemental foods given the infant; (c) the number of hours the infant spent in child care; (d) the number of hours the infant was excluded from child care; (e) the number of hours the mother was absent from her employment due to her infant's illness; (f) the number of hours she forfeited from work in obtaining alternate child care when her infant was excluded from child care; (g) the seventh space allowed for a notation to go to the reverse side of the diary in case the mother wished to elaborate on one of the entries.

The second source of information came from the child care center director (Appendix A, Section II). This information included specific policies followed by the center, the number of infants enrolled, and the number of infants assigned each worker, ages of infants at the center, immunization of the staff, any reported outbreaks of infection, exclusion policy and handling of expressed human milk.

The third source of information was a check list questionnaire presented to the mother at the beginning of each individual study (Appendix A, Section III). There is no commercial questionnaire available for this purpose so one was specifically designed (Sowell & Casey, 1982). The quantitative methodology in the form of a survey provided insight (Achterberg, 1988 and Firestone, 1987) that will allow other researchers a plan for testing the results (Coen, 1985). These factors included a brief family history including: maternal ethnicity, occupation, number of hours that the mother was employed each week, marital status, family support network, selected infant characteristics, additional infant feeding questions, infant immunization status, and, if applicable, the handling and storage of expressed breast milk fed to the infant.

The fourth data source came from an interview with the mother at the completion of the five-week study period (Appendix A, Section IV). The interview consisted of a review of the diary and any questions that the mother and investigator had pertaining to the infant's feeding. In addition, if the infant was ill during the five-week period, questions were asked about who cared for the infant and whether a physician visit and/or hospitalization was required.

The fifth part of the instrument, a graduated feeding scale (AppendixA, Section V) was designed to define the supplemental intake through an assigned daily value. In addition, the data obtained from the checklist questionnaire and final interview provided definitive information to add flexibility and depth to the data collected (Mausner and Kramer, 1985).

Rationale and Methodology

The protection afforded by breastmilk is thought to be proportional to the quantity consumed and relative to other possible contaminating factors (Chandra, 1986; Whitehead, 1986). The majority of the literature describes three patterns of infant feeding practices: (a) artificial/ bottle feeding; (b) breastfeeding; or, (c) combined feeding. However, practitioners note wide ranges within these latter two categories and it is recognized that few mothers exclusively breastfeed their infants (Burkhalter, 1988). For example, some classify an infant as breastfed if the infant breast feeds one time a day, but this may not be considered breastfeeding by other researchers who consider breastfeeding to signify that the infant consumes the majority of his/her caloric intake from the breast.

The approach used in this study was to ascertain the amount of supplementation given the infant assuming that this supplementation either replaced human milk intake and/or reduced the amount of protection afforded the infant from his/her consumption of human milk. To date, there are no universally used instruments to quantify breastmilk supplemental intake. Therefore, a *graduated infant feeding scale* (Appendix A, Section V) was designed so that human milk and supplementation could be described. Using the scale, the investigator was able to approximate closely the supplemental intake of each infant and designate a number indicating the comparative level of human milk consumption. The designated numbers ranged from ten (exclusively breastfed) to zero (predominately supplementary fed).

Reliability and Validation of the Feeding Scale

The reliability of the graduated infant feeding scale was tested by a group of experts. A preliminary study was undertaken with ten pediatricians to examine the content of the scale and to check for agreement. In order to do this, each of the ten pediatricians was given the same three sample case studies and requested to record the intake of each infant using the graduated feeding scale. Each of the three hypothetical case studies presented an infant who was supposedly consuming different types and amounts of supplements. The individual results were compared and an agreement of 85-90% was obtained from the three values of Case study 1, Case study 2 and Case study 3 (Appendix B, Sections I-III).

Because of the absence of a standardized criterion, the validity of the scale was determined by professional confirmation. The scale was found to be reflective of differential consumption of human milk and supplementation.

Validation of the Instrument

The initial draft of the data collecting instrument; e.g., from the diary, child care provider, questionnaire and final interview with the mother, (Appendix A, Sections I-IV) was reviewed for content validation by 12 professionals qualified in pediatrics, nutrition, evaluation, psychology, administration and education. The instrument was also pilot tested.

A pilot study with three mother-infant dyads was conducted to identify ease of facilitation of the study and for the ease of understanding and completing the instrument by the mother. Based upon the professional review and the pilot study, revisions of the initial instrument were made resulting in the forms found in Appendix A, Sections I-V. The pilot study also showed that additional child care sites were needed to attain sufficient subject recruitment for the study.

The methodology used to designate the extent of breastfeeding, calculate the exclusion rate, and to calculate the total hours forfeited by the mother was as follows: (a) *a diary* provided data to determine the amount of supplementation, including expressed breast milk that was refrigerated, frozen, and/or heated; (b) *hours spent* at child care and hours excluded; (c) *hours forfeited* by the mother. A feeding scale designed for the study allowed individual feeding values to be calculated from the intake recorded in the diary. The level of breastfeeding

practiced by each individual dyad was approximated by, (a) averaging the daily assigned scale number each week over the five-week period; (b) *the exclusion rate* for each child was calculated by dividing the number of hours that the infant was excluded due to illness by the number of hours that the child was scheduled to be in child care; (c) *the lost hours rate* by the mother was calculated by dividing the number of hours that the mother forfeited by staying home or looking for alternate care by the number of hours that the mother was normally employed or in school.

Setting

There are approximately 700 slots for infants 0-23 months of age in licensed child care in San Diego, and it estimated that 20% of these are occupied by infants six months or younger (Child Care Resource Center, 1989). The investigator obtained cooperation from 18 regional San Diego infant-child care facilities. These infant-child care sites were centers, homes, schools, and a hospital, and included ten San Diego infant-child care centers, five San Diego infant-child care homes, two San Diego School infant-child care centers, and one Tijuana hospital. The sites were restricted to the San Diego regional area for convenience and cost containment.

The exclusion policies for illness established by each site were similar, with the primary concerns being: diarrhea, vomiting, fever, green nasal discharge, undiagnosed rash, and inconsolable crying (Appendix C). Minor differences of interpretation were noted by the investigator.

Sample

The sample population for this study consisted of 37 mothers and their apparently healthy term (38+ weeks gestational age) infants, weighing more than 2,500 grams at birth. The duration of study for each mother-infant pair was the first five weeks of attendance in child care. The age of the infants on enrollment ranged from two weeks to 21 weeks at the beginning. In order to keep within the age limitation, no infant over 4.9 months of age was enrolled in the study. The sampling was a convenient sample due to the fact that the research was based on volunteer participation by the mothers.

Data Collection

A list of child care providers was obtained from the Child Care Resource Center, San Diego. Providers were interviewed in person or by telephone. Providers who demonstrated interest and were enrolling infants who met the study criteria were asked by the investigator to facilitate recruitment by extending an invitation to the infant's mother to participate in the research. This was presented in the form of an invitation (Appendix D).

The child care provider gave consenting mothers a research packet containing a: (a) consent form (Appendix E); (b) questionnaire (Appendix A, Section III); (c) diary (Appendix A, Section I). Mothers were instructed to sign the consent form, complete the questionnaire and return both to the investigator in a self addressed-stamped envelope. The mother was also requested to keep a diary (Appendix A, Section I) for the first five weeks of her infant's enrollment at

the child care site. Upon receipt of the consent form and questionnaire, the investigator telephoned the mother. The purpose of the phone call was to introduce the investigator to the mother and to clarify any possible questions that the mother might have concerning completion of the diary. At that time the mother was asked to return the diary at the end of the five-week period and informed that the diary was self-addressed and stamped on its reverse side.

Upon receipt of the diary, the investigator interviewed approximately 50% of the mothers by telephone and the other 50% in person to: (a) clarify any discrepancies or unclear responses; (b) to complete the final interview. At that time, the mother was mailed or given a copy of the booklet, *Good Nutrition for Your Baby* (Jones, 1985) and a check for twenty dollars in appreciation for her participation.

It was necessary for the investigator to check periodically with the child care directors to inquire if new infants had been enrolled. Study packets were subsequently sent to the providers as needed.

Protection of Human Rights

Each mother was invited to participate in the study. The invitation was presented with a consent form (Appendix E). The form stated the purpose of the study and described what the mother's participation entailed. It also advised the mother that she could decline to answer any of the questions and could withdraw from the study at any time. A signed consent form was completed by each participant. The mother was advised that all information was to be confidential.

Anonymity of data was preserved through the use of code numbers utilizing the infant's birth date. Protection of human rights was reviewed and approved by The University of San Diego's Committee on Protection of Human Subjects (Appendix F).

Assumptions

Six assumptions were made in the study. It was assumed that: (a) all the mothers would keep complete and accurate records; (b) the center operators would answer honestly and to their best ability all questions regarding policies for dealing with illness and the exclusion at their facility; (c) the exclusion policies across sites were similar; (d) the number of infants in the center would remain constant throughout the study period; (e) the mothers were healthy and not undergoing medical treatment for infectious disease; (f) no epidemics (so deemed by the Department of Public Health) would occur during the study period.

Limitations with this Proposed Study

1. Recruitment of subjects was limited due to the fact that the majority of the child care centers in San Diego County do not accept infants under two years of age. Nationally, only 14% of infants enrolled in child care are cared for in centers (Aronson, 1989). Listings of child care homes are difficult to obtain, especially, if multiple levels of socio-economic status are desired.

2. Controversy prevails within the pediatric medical community about the use of fever to determine illness and thus exclusion. This study adhered to the

established guidelines of each site with respect to fever and exclusion.

Data Analysis

Analyses were conducted using the Statistical Package for the Social Sciences (SPSS/PC+). Means and standard deviations were generated on demographics, and physical parameters to characterize the sample infants and mothers. Frequency distributions were conducted to characterize further the mothers on the basis of the categorical data available.

Pearson's product moment correlation coefficient (r) analysis was used to determine the association between: (a) exclusion rate due to illness with the five-week averaged scale scores based on the amount of human milk and supplements consumed; (b) exclusion rates due to illness with the total number of hours forfeited by the mother based on hours of employee/student absenteeism, plus hours devoted to making alternative child care arrangements. Correlational analysis was also used to assess the relationship between the exclusion rate for illness and 13 interval level variables.

One-way analysis of variance (ANOVA) was used to determine the influence of 10 categorical variables on the exclusion rate for illness. Based on the results of the correlation and ANOVA, a stepwise regression analysis was conducted to ascertain the relative influence of the selected variables on the exclusion rate due to illness. Cross tabulation analysis was employed to show descriptively the relationship of the scale with selected variables. An alpha level of .05 was selected as the accepted level of significance for all statistical

procedures.

Information obtained from the child care center director, the questionnaire, and the interview were examined for their descriptive input and provided cross checks and thick description for deeper understanding, identifying trends and assisting in the formulation of future topics to be researched.

Summary

A study was conducted to determine the impact of feeding method on the exclusion rate of infants from child care in mother-infant pairs from four different types of infant-child care sites in the regional San Diego area. Participants were informed of their rights and anonymity was maintained throughout the study. A five-part instrument was designed and validated for use in this research to investigate the impact of feeding method and other potentially related factors on the exclusion rate from child care. In addition, the relationship between the exclusion rate and time forfeited by the mother from her employment/school was examined. Six assumptions and two limitations to the study were identified. The information obtained was analyzed in a quantitative and qualitative manner using Pearson's product moment correlation, ANOVA, stepwise regression, and cross-tabulation to support the hypotheses tested.

CHAPTER FOUR

Research Findings

Introduction

The purpose of this study was to determine the impact of feeding mode on exclusion rate due to illness among infants under six months of age during their first five-weeks of enrollment in infant-child care, and to determine if the infant's exclusion resulted in forfeited time from the mother's work or school. The research questions, in summary, were: 1. To what extent is the method of infant feeding related to the exclusion rate due to illness? 2. To what extent is the infant's exclusion rate associated with the time forfeited by the mother from her work or school? 3. Are other selected variables likely to identify trends that influence the exclusion rate due to illness from child care and the lost time rate by the mother? In order to investigate these research questions, the researcher invited employed and student mothers in the regional San Diego area, with infants 21 weeks of age or less enrolled in child care to participate in the study from August 1, 1989 to March 1, 1990.

Sample Characteristics

Forty-three mother-infant pairs were initially enrolled, but five pairs were

subsequently excluded from the study because they did not meet study criteria; one mother was continually ill; another began child care in Texas; one mother moved before the final interview; one infant was diagnosed as having an allergic disease; and the fifth infant's birth weight was below the minimum requirement of 2,500 grams. This reduction left a total of 38 mother-infant pairs who participated in the study. The completion rate of these remaining 38 pairs enrolled was 100%. During the statistical analysis phase of the study, the data from one of the 38 mother-infant pairs were removed because the preliminary analysis revealed that the results from the dyad relating to exclusion rate and lost time rate exceeded three standard deviations from their respective means and if retained would yield misleading results.

Eighteen different child care sites were involved in the study. These sites were classified into four subgroups; i.e., child care center, home, hospital, and school (Table 1). The list of sites and their respective locations are given in Appendix G. The highest study participation occurred at child care centers (58%) with the lowest participation found at a hospital site (11%).

Table 1

Participation at Child Care Sites

	Center	Home	Hospital	School	Total
Number of Sites	10	5	1	2	18
Number of Dyads	22	5	4	6	37
Percentage	58%	13%	11%	18%	100%

N =37

Maternal Characteristics

The characteristics of the 37 participating mothers are provided in Table 2. The study sample included mothers from 16 to 37 years of age. The majority of mothers were caucasian, married and living with their husbands, while the remainder, with one exception, were single teenage mothers living with their parents. One young mother lived in a group home for unwed teenage mothers.

The mothers as a group were highly educated with 76% having at least one year of college education. Sixty percent of the mothers reported three or more years of college. The majority (73%) of the maternal group were employed as professionals. Six (16%) of the mothers were high school students, and two mothers were studying for advanced degrees, making a total of eight student mothers in the total study group. One of the two mothers studying for an advanced degree was also working full time in a professional capacity. The second of these mothers was a full time graduate student.

Fourteen (38%) of the mothers had access to their infants during the hours their infants spent at child care. Of these, six were teenage student mothers who had their infants in an adjoining child care center on the high school campus. Four of the fourteen mothers worked at the child care sites where their infants were enrolled. The remaining four mothers with access to their infants had their infants with them at their work site. In addition, the grandmother of one infant was employed at her granddaughter's child care site.

Table 2

Demographic Characteristics of the Mothers

Age in Years		Mean		S D	Range
		27.84		6.41	16-37
Marital Status				Married	Single
				31 (84%)	6 (16%)
Ethnicity		Caucasian		Hispanic	Other
		25 (68%)		7 (19%)	5 (13%)
Occupation		Professional		Non Professional	Student
		27 (73%)		2 (5%)	8 (22%)
Education level*	G 1-8	G 9-12	C 1-2	C 3-4	C 5 +
	5 (14%)	4 (11%)	6 (16%)	19 (51%)	3 (8%)

N = 37

Note. * Education level

G 1-8 = Elementary school

G 9-12 = High school

C 1-2 = College ≤ 3 years completed

C 3-4 = College 3-4 years completed

C 5 + = College > 4 years completed

Characteristics of the Household

Table 3 shows that the number of persons living in each household was relatively small, consisting of three or four persons, including the infant. The major exception was the teenage group home for unwed mothers which had a total of 16 members. Fifty percent of the households had no other children. An additional 40% had just one other child less than 12 years of age, with a mean age of 4.60 years ± 2.00 and a range of six months to seven years.

Eleven (30%) of the 37 households reported one family person diagnosed as having allergies. No one smoked in 29 (76%) of the homes. The mean number of cigarettes smoked daily in the remaining 8 (24%) homes was 4.64 ± 13.90 with a range of 1-75. Twenty-four (65%) of the households reported having no pets, while the other 13 (35%) had a maximum of two pets (dogs and/or cats).

Table 3

Characteristics of the Household

	Mean	SD	Range
Income (thousands)	48.65	17.02	0>60
No. Living in Home	4.30	2.57	0-16
No. with Allergy	0.39	0.65	0-2
No. Children < 12 years	0.81	1.37	0-7
No. of Smokers in Home	0.44	4.25	0-7
No. of Cigarettes Smoked	0.47	13.90	0-75
No. of Pets in Home	0.44	0.65	0-2

N =37

Characteristics of the Infants

The infants were almost equally distributed by sex, 19 male (51%) and 18 female (49%). The mean infant age on enrollment was 65.59 ± 32.01 with a range of 21 to 135 days (Table 4). Upon enrollment there were 14 (38%) infants between 3-6 weeks of age, another 14 (38%) between 6-12 weeks of age and 9 (24%) between 12-21 weeks of age. The mean birth weight, 3,508.81 grams, (Table 3) of the infants falls at approximately the 50th percentile on the National Center for Health Statistics (NCHS) Weight for Age Standards (Hamil, Drizd, Johnson, Reed, Roche & Moore, 1979). Within the total sample there was a wide range in infant birth weights, from 2,500-5,938 grams. The mean number of physician visits for illness reported in the individual five-week period was 0.95 ± 1.00 with a range of 0-4 visits. No infants were hospitalized during their study period.

Table 4

Characteristics of the Infants

Variable	N	Mean	SD	Range
Birth weight (grams)	37	3,507.81	623.22	2,500-5,938
Age on enrollment (days)	37	65.59	32.01	21-135
Breastfed prior to enrollment (days)	34	62.97	45.96	1-135
Formula intake prior to enrollment (ml)	31	644.55	396.69	180-1,440
Age, introduction of solids (days)	22	92.01	38.20	9-165

Feeding Methods

The average length of time the infants were breast fed prior to enrollment was approximately two months (Table 4). Twenty-eight (76%) of the infants had been breast fed to some extent prior to enrollment in child care. Mothers reported that 11 (30%) of the infants had been totally breast fed, 17 (46%) had been combination, breast and bottle fed, and 9 (24%) had been bottle fed prior to enrollment in child care.

Five (14%) of the mothers reported that they expressed their breast milk for use at child care. Of these mothers, one expressed her milk by hand, two used manual pumps and two others used electric pumps. These mothers reported storing the expressed milk in plastic containers for a mean of 1.50 ± 0.50 days with a range of 1-2 days. All five mothers transported their milk to the child care site in baby bottles. Four of the five mothers reported that prior to use, their frozen milk was thawed at room temperature and the fifth mother stated that her frozen milk was thawed in warm water.

The amount of formula consumed per 24 hours at the time of enrollment in child care was reported for 31(84%) infants. Of these 31 infants, 10 (32%) consumed a standard iron fortified formula, 7 (23%) a standard low iron content formula, 12 (38%) a soy formula and 2 (7%) received a special formula. The mean amount of formula consumed per 24 hours exceeded 600 milliliters (Table 4). Formula consumption varied widely among the infants combination fed and those receiving solely formula.

Twenty-two infants had been introduced to foods or liquids other than milk

at the time they began attending child care. Three months was the approximate mean age reported for the introduction of these supplemental foods, although, again, a large variability among infants was found (Table 4). Supplements given included juice to one infant (5%), water to three others (14%), cereal to four (18%), combinations of these to ten (45%) and other foods or liquids to four more (18%).

Over the five-week period the infants, on the average, were combination fed with a graduated infant feeding scale value of 2.50 indicating that they received 12 ounces of supplement in addition to human milk (Table 5). It appeared that over the five-week period the average amount of human milk consumed decreased. Of note is that the entire range of the scale was used throughout the study period.

Table 5

Ratings of Intake from the Graduated Infant Feeding Scale

Week	Mean	S D	Range
1	2.70	3.85	0-10
2	2.48	3.77	0-10
3	2.46	3.71	0-10
4	2.43	3.72	0-10
5	2.33	3.69	0-10
Σ 5*	2.50	3.71	0-10

N = 37

Note.

Σ 5* = 35 day composite.

In addition, it was of interest to note that the infant feeding scale was highly correlated with prior breast feeding experience, $r = .66$, ($p < .001$), $N = 37$. Previous breastfeeding or breastfeeding rate, was defined as the number of days breastfed prior to enrollment divided by the age in days of the infant on enrollment. The supportive frequency data are given in Table 6.

Table 6

Distribution of Mothers in Terms of Infant Feeding Mode to Prior Breastfeeding

Breastfeeding Rate	Scale Average for Five Weeks				
	0.0	0.1-5.0	5.1-9.9	10.0	
0.0	9				9
0.1-5%	2				2
5.1-10%	4				4
10.1-20%	5	1			6
20.1-100%	3	3	6	4	16
	23	4	6	4	**37**

Child Care Policy and Exclusion

Exclusion due to illness from child care was similarly stated for all sites (Appendix C), although some child care providers appeared to adhere more strictly to their written guidelines than others. Providers reserved the right to refuse admittance to any infant exhibiting signs of being ill. At some sites care givers called the infant's parents at the first indication of illness. Others waited to see if the condition would subside. A few of the care givers indicated that, on occasion, they retained sick infants in isolation. However, they reported that keeping an ill infant under constant visual observation generally was not feasible due to limited staffing and/or lack of space required for the separation of sick infants. None of the 18 sites reported any outbreaks of infection at their location throughout the study period.

Space allocation for infants at each site and the ratio of the number of infants per child care worker (4:1) were similar across sites and followed guidelines set by the State of California Health and Welfare Agency (1988).

Policy at all child care sites required tuberculosis testing for employees, but did not require other staff immunization. All site directors claimed that infant immunization was a prerequisite for infants attending child care, but 22 infants less than two months of age were enrolled without immunization. These exceptions occurred since immunization normally begins at two months of age.

Several factors deemed possible contributors to infant illness, thus exclusion from child care and subsequent lost work/school time by the mother, were examined to answer the investigation's three research questions.

Research Question 1.

To what extent is the method of infant feeding related to the exclusion rate, due to illness, by infants less than six months of age attending child care?

Exclusion for illness

The mean number of hours that infants were excluded weekly during the five-week period was lowest during the first week of enrollment and increased throughout the following three weeks, and a slight decline was demonstrated during the fifth week (Table 7). The mean number of hours excluded over the five-week period was 7.19 ± 10.80 with a range of 0-42. In 12 cases, alternate care takers cared for the excluded infant rather than causing the mother to miss work. In three cases (25%), the grandmother cared for the infant; in eight cases (67%), the infant's father; and in one case (8%), a friend cared for the infant.

The mean number of child care hours scheduled for the five weeks was 168.27 ± 54.54 with a range of 45-250. The average number of hours that the infants were scheduled to be at child care closely coincided with the mothers' planned work and/or school time. The mean number of hours scheduled to be worked, plus or minus the standard deviation, for the five weeks was 180.08 ± 43.09 with a range of 74-250 hours per week.

Infant exclusion due to illness had an average value of five percent (Table 7) with peak values occurring during the third week of enrollment. The exclusion rate due to infant illness for the infants was significantly correlated with the infant feeding scale values $r = .33$, ($p = .0448$), $N = 37$. This association was supported by the frequency data in Table 8.

Table 7

Exclusion Rate Due to Infant Illness

Week	Hours excluded			Hours to be at child care			Exclusion rate from child care		
	M	S D	R	M	S D	R	M	S D	R
1	0.00	0.00	(0-0)	33.73	11.37	(9-50)	0.00	0.00	(0-0.0)
2	1.65	4.46	(0-19)	32.70	11.18	(9-50)	0.05	0.13	(0-0.4)
3	2.92	6.26	(0-24)	33.92	10.30	(9-50)	0.12	0.27	(0-1.0)
4	1.92	5.76	(0-30)	34.90	10.90	(9-50)	0.06	0.19	(0-1.0)
5	0.70	2.12	(0-8)	34.65	10.75	(9-50)	0.03	0.09	(0-0.4)
Σ 5*	7.19	10.80	(0-42)	168.27	54.54	(45-250)	0.05	0.08	(0-0.3)

N =37

Note.

Exclusion rate = hours excluded divided by hours to be at child care.

Σ 5* = 35 day composite.

Table 8

Distribution of Mothers in Terms of Infant Feeding Scale Values and Exclusion Rate Due to Illness in Infants

Exclusion Rate	Scale Average for Five Weeks: 0.0	0.1-5.0	5.1-9.9	10.0	
0.0	11	2	4	4	21
0.1-5%	2	1	1		4
5.1-10%	3	1	1		5
10.1-20%	4				4
20.1-100%	3				3
	23	4	6	4	37

The null hypothesis 1. was therefore rejected and the alternative hypothesis accepted. *Study results revealed that there is an association among feeding methods and the rate of exclusion for illness in infants less than six months of age attending child care.*

Research Question 2.

To what extent is the infant's exclusion rate associated with hours lost at the work site or school by the mother?

The number of hours lost by mothers closely paralleled the number of hours that the infant was excluded from child care: a mean loss of 6.87 ± 10.13 hours with a range of 0-42. The mean lost time rate was four percent with peak values occurring during the third week of enrollment. (Table 9) The lost time rate from the mother's employment and/or school was also correlated with the infant feeding scale values, $r = .33$, ($p = .0430$), $N = 37$.

Table 9

Lost Time Rate Due to Infant Illness

Week	Hours forfeited			Hours to be worked			Lost time rate		
	M	S D	R	M	S D	R	M	S D	R
1	0.00	0.00	(0-0)	35.68	9.33	(10-50)	0.00	0.00	(0-0.0)
2	1.68	3.97	(0-16)	35.43	9.11	(16-50)	0.05	0.11	(0-0.4)
3	2.68	6.19	(0-24)	36.14	8.20	(16-50)	0.08	0.19	(0-0.6)
4	2.30	5.72	(0-30)	36.92	8.40	(16-50)	0.06	0.15	(0-0.7)
5	0.22	1.32	(0-8)	36.70	8.56	(16-50)	0.01	0.03	(0-0.2)
Σ 5*	6.87	10.13	(0-42)	180.08	43.09	(74-250)	0.04	0.06	(0-0.2)

N =37

Note.

Lost time rate = hours forfeited divided by hours to be worked.

Σ 5* = 35 day composite.

The association between the infant feeding scale values and lost time rate is supported by the frequency data given in Table 10. Thus, 11% of the variance in the exclusion rate and 11% of variance in the lost time rate can be ascribed to the mode of infant feeding.

Table 10

Distribution in Terms of Infant Feeding Scale Values and Lost Time Rate for Mothers from Employment/School

Lost Rate	Scale Average for Five Weeks				
	0.0	0.1-5.0	5.1-9.9	10.0	
0.0	10	2	4	4	20
0.1-5%	3	2	1		6
5.1-10%	5		1		6
10.1-20%	4				4
20.1-100%	1				1
	23	4	6	4	37

The association between the exclusion rate and the lost time rate was $r = .86$, ($p = .0001$), N = 37. The correlation analysis thus indicated that 74% of the variance in the lost time rate can be explained on the basis of the infant's exclusion for illness from child care.

The null hypothesis 2. was therefore rejected and the alternative hypothesis accepted. *Study results revealed that there is an association between exclusion rate due to illness among infants less than six months of age and the lost time of employment forfeited by the mother either because of her absence from work and/or time spent in making alternative arrangements.*

Research Question 3.

Do other selected variables impact on the exclusion rate of infants less than six months of age enrolled in child care?

Other variables

Only one of 13 variables at the interval level examined was significantly correlated to the exclusion rate for illness; i.e., formula consumption, $r = .40$ (Table 11). However, both formula consumption and the intake of other foods and liquids were associated with the lost time rate, $r = .40$, ($p = .014$) and $r = .43$, ($p = .0160$), respectively. A separate table for these latter two correlations was not warranted because these relationships were not germane to the hypothesis.

Table 11

Variables With and Without a Relationship to Exclusion Rate Due to Illness

Variable	Pearson's r	p
Maternal Age	- .12	.493
Infant Birth Weight	.22	.184
Number of Persons in Home	.01	.964
Number of Persons with Allergies	- .18	.298
Number of Persons < 12 years	.12	.484
Mean Age of Children < 12 years	.21	.682
Number of Cigarettes Smoked Daily	- .13	.440
Number of Pets Δ in Home	.01	.978
Total Supplements Taken (ml)†	.25	.164
Total Formula Taken (ml)	.40*	.021
Number of Infants in Child Care < 3 Months	- .13	.437
Number of Infants in Child Care 3-6 Months	- .12	.475
Number of Infants in Child Care > 6 Months	- .27	.113

N = 37

Note.

Δ = Pets (dogs and cats)

† = Formula excluded from supplements

* Significant at p = .021

Categorical variables

Only one of the categorical variables examined influenced the exclusion rate; i.e., accessibility to the infant during child care. During a preliminary analysis (n = 31), the mothers were subdivided into: (a) mothers with access (n = 9); (b) teenage mothers (n = 6); (c) mothers without access (n = 16). Analysis revealed that the mean exclusion rates, plus or minus the standard error for these groups, were respectively, 7.02 ± 2.40; 7.67 ± 3.74; and 0.00 ± 0.00, $F_{df\ 2,\ 28}$ = 2.58, (p = .0937).

Since, in the primary analysis, the mean of the teenage group was similar to the mean of the mothers without access, and the F value for this statistic was not significant, the two groups, teenage mothers and mothers without access, were combined, for the final analysis, into one group and then compared to the maternal group with access. The group with access included two child care directors, one child care giver, one child care franchise district manager, three hospital nurses, one switchboard operator, and one husband/wife student pair.

The final analysis revealed that mothers *with* access had lower exclusion rates than mothers *without* access. The means and standard errors were 0.00 ± 0.00, and 0.06 ± 0.02, ($F_{df\ 1,\ 35}$ = 5.3, p = .0273) respectively. None of the other nine categorical variables examined showed any significant influence on the exclusion rate (Table 12).

Table 12

Variables Without Impact on Exclusion Rate Due to Illness

Child Care Site	n	M	SE	F	p
Center	22	0.06	0.02	0.91	.4475
Home	5	0.03	0.02		
School	6	0.08	0.04		
Hospital	4	0.00	0.00		
Infant Age on Enrollment (days)	n	M	SE	F	p
< 42	6	0.05	0.04	0.30	.7448
42-84	22	0.04	0.01		
≥ 85	9	0.07	0.03		
Immunization on Enrollment	n	M	SE	F	p
No	22	0.04	0.02	0.28	.6013
Yes	15	0.06	0.02		
Sex of Infant	n	M	SE	F	p
Male	19	0.07	0.02	1.63	.2101
Female	18	0.03	0.01		
Marital Status	n	M	SE	F	p
Married	31	0.04	0.01	1.11	.3000
Single	6	0.05	0.01		

(Table continues)

Table 12 (continued)

Variables Without Impact on Exclusion Rate Due to Illness

Ethnicity	n	M	SE	F	p
Hispanic	7	0.08	0.05	1.09	.3488
White	25	0.05	0.01		
Other	5	0.01	0.01		
Education	**n**	**M**	**SE**	**F**	**p**
8-12 Years	9	0.05	0.03	0.22	.8031
College	25	0.05	0.02		
Post Graduation	3	0.08	0.04		
Maternal Occupation	**n**	**M**	**SE**	**F**	**p**
Professional	27	0.03	0.01	1.11	.3408
Non Professional	2	0.03	0.03		
Student	8	0.07	0.03		
Household Income (thousands)	**n**	**M**	**SE**	**F**	**p**
< 29.9	6	0.04	0.03	0.60	.5537
30-59.9	21	0.06	0.02		
≥ 60.0	10	0.03	0.02		

From correlational and ANOVA findings, the graduated infant feeding scale values, formula consumed, and the maternal accessibility to infants were factors considered to be independent variables for a multiple regression analysis, with the dependent variable, exclusion rate due to illness. Similarly, the amount of formula consumed, and the amount of supplements (minus formula), were considered to be independent variables for a regression analysis, with the dependent variable, lost time rate. However, due to the high intercorrelations among the feeding scale, the amount of formula consumed, the amount of total supplements, and access to the infant, the contribution of these latter three variables negated the contribution of the scale. Thus the regression analyses were rendered meaningless; e.g., the infant feeding scale (n = 31) was correlated with the amount of formula consumed, $\underline{r} = .89$; scale with access, $\underline{r} = .57$ and formula consumed with access, $\underline{r} = .48$.

The null hypothesis 3. was therefore accepted. *Study results revealed that variables other than the infant feeding scale values did not contribute additional explanation as to why infants in this study sample were excluded from child care. Results from the regression analysis indicated that the predictive value of formula consumption and the access to the infant may be limited due to their high correlation with the infant feeding scale values.*

Summary

Thirty-seven mother infant-pairs from 18 child care sites in the San Diego regional area were enrolled in the study to examine the impact of infant feeding methods on the exclusion from child care due to illness, to determine the extent to which the infant's exclusion was associated with forfeited time by the employed/student mother, and to investigate whether or not other selected variables influenced the exclusion and lost time rates. Data revealed that the exclusion rate due to illness was significantly correlated with the feeding scale values, indicating that exclusion from child care could be explained to some extent by the mode of infant feeding. In addition, the exclusion rate due to illness and the lost time rate by the mother were highly correlated, indicating that time forfeited by the mother could be attributed to the exclusion rate due to illness.

Results revealed that aside from the infant feeding scale values, other variables examined in this study sample did not show a substantial impact on the exclusion rate due to illness in infants, nor on the lost time rate by the mothers.

CHAPTER FIVE

Conclusions, Implications, and Recommendations

Introduction

The increasing number of employed women with infants has accelerated demand for available infant-child care that is both quality and affordable. Concurrently, the incidence of illness attributed to child care attendance is causing concern, especially within the medical community (Aronson, 1989). The ramifications of such illnesses for the infant, family, organization, and society presented a rationale for conducting this investigation.

Whenever a mother is faced with the decision of leaving her infant in child care, she must also plan for the feeding of her child during the hours that the two of them are separated. Although there is a vast amount of research available regarding infant feeding and well being, there remain many controversies, and thus confusion for those involved in the care of the infant. It is universally agreed that with very few exceptions, the mother's own milk is the best possible nutrition for young infants. This claim is particularly endorsed for infants in developing countries where breastfeeding is considered protective against infection. While most authors recognize this protective effect in developing countries, many do not acknowledge that there is protection afforded infants in populations with a high

standard of living (Rubin, Leventhal, Krasilnikoff, Kuo, Jekel, et al., 1990). Others, however, continue to argue that breastfeeding does offer protective factors to infants from all socio-economic backgrounds (Cunningham, 1988, Howie, 1990, Lawrence, 1989b).

To date, no researchers have investigated the possible relationship between infant feeding methods and the exclusion rate, due to illness, from infant-child care. Therefore, this study was undertaken to investigate the extent to which the infant's exclusion rate, due to illness, is associated with the selected feeding mode. 0 If the infant does become ill, is time subsequently forfeited by the mother from her employment and/or schooling in making alternate child care arrangements? In addition, the investigator included an examination of the relationship between the exclusion rate and other selected variables that might have an impact on the exclusion rate, due to illness, in infants attending child care.

This study was conducted in regional San Diego with 37 mother-infant pairs. All participants were informed of their rights and responsibilities and anonymity was maintained throughout the investigation. A five-part instrument, including a graduated feeding scale, was designed and validated for this study. Data generated from the study were analyzed quantitively and qualitively utilizing Pearson's product moment correlation, ANOVA, step wise regression, and cross tabulation, with a selected a priori alpha level of .05.

The results of this study revealed that the exclusion rate, due to illness, was correlated with the graduated infant feeding scale values, indicating that the

exclusion rate from child care could be explained in part by the selected mode of infant feeding.

Therefore **the null hypothesis 1. was rejected in favor of the alternate hypothesis:**

There is an association among feeding methods and the rate of exclusion for illness in infants less than six months of age attending child care.

Findings also indicated that the exclusion rate due to illness and the lost time rate were highly correlated, indicating that employed/school time forfeited by the mother can be attributed to the exclusion rate due to illness.

As a result, **the null hypothesis 2. was rejected in favor of the alternate hypothesis:**

There is an association between exclusion rate due to illness among infants less than six months of age and the time forfeited by the mother at the work site.

Other than the graduated infant feeding scale values, the results of the data generated from the other potential confounding variables studied in this sample did not demonstrate a significant impact on the exclusion rate due to illness.

The null hypothesis 3. was, therefore, accepted:

With the exception of formula intake and maternal access to infant, the exclusion rate could not be further explained by other selected variables.

Discussion of the Research Findings

Sample characteristics.

The total of 18 child care sites that participated in the investigation was subcatergorized into four groups: infant-child care centers; family child care homes; schools; and one hospital. Although there were several sites included in the study, and each site was distinctly different from each of the others, results from ANOVA, determining effect of site on exclusion rate, indicated no significant contribution of site to the exclusion rate. A site related variable; e.g., the age distribution of the other infants enrolled at the site (those less than three months of age, those three to six months of age, and those over six months of age), on correlation analysis did not show an impact on the exclusion rate.

The following descriptive information adds another perspective and a deeper understanding of the subtle differences observed. From the onset, child care providers expressed interest and a desire to cooperate with the study. However, most of these same providers were obviously too busy with the many demands of their jobs to follow through with the recruitment process. They were always eager to assist, but it required constant follow up on the part of the researcher to enroll new mothers in the study. Many of the providers conducting a for-profit business displayed hesitancy in inviting mothers to participate in the study unless the providers anticipated that the mother would appreciate the invitation. Because of this limitation, the number of sites had to be expanded in order to acquire a large enough sample to complete the study. Obtaining home infant-child care sites was even more difficult because the addresses and phone

numbers of these locations were primarily obtained by word of mouth. Generally, organizations working in child care referral services do not supply lists of family child care providers for fear that such lists might be used inappropriately.

Maternal, household, and infant characteristics.

Eighty-four percent of the sample was composed of educated, well paid professional women with one or two children. The remaining sixteen percent were teenage mothers from economically advantaged families. Some of these young mothers had part-time jobs after school but reported that little supplemental income was earned from their employment.

Maternal characteristics were examined in terms of their possible contribution to the explanation of the exclusion rate. ANOVA results on maternal ethnicity, education, occupation, and marital status failed to contribute significantly. Similarly, correlational analysis did not support maternal age as a contributing factor. Since this was a highly uniform group, further study concerning the effect of these factors on exclusion is warranted in a more divergent population.

The mothers who chose to participate and who qualified for the study demonstrated a high degree of cooperation and genuine interest in the topic. Every one of them relayed that time was a valuable commodity for them, but in spite of being extremely busy, they believed that it was worthwhile taking time to participate in this study. They expressed appreciation that someone was researching a child care issue.

The following qualitative observations showed that motivation and good support systems prevailed within this total group. For the majority of the mothers, support came from their husbands. The main concerns expressed by the mothers in the study included the following comments:

"There is not sufficient affordable infant care in San Diego."

"I had to return to work before I would have liked."

"I wish separation from my baby was not necessary at this time."

"It is much more difficult juggling all my roles than I ever anticipated. No one told me it was so hard or that it took so much time."

Such support systems may not be so evident in a sample from a lower socio-economic status. The major support offered five of the six teenagers came from their parents, although it appeared that some of these young mothers did not recognize this support so fully as their parents intended. There were some obvious conflicts within these families, but from my brief observations, the family members were striving to make the best of their situations. The teenage mothers also added some interesting comments including the following:

"My mom tries to help me with the baby but she works too."

"The teachers at school have been nice and helped us a lot."

"It isn't easy trying to finish school when you have a baby."

In general these same young mothers, and the one other mother living in a group home, received strong support from the teachers and personnel working in their schools and from the on-site school child care facility workers. These staff

members assisted the teenage mothers in building self-esteem, provided classes in homemaking and infant care, and simultaneously encouraged them to complete their high school education. This school program, offering teenage pregnant mothers the opportunity to complete their high schooling in hopes that they will increase their opportunities for a better future, is a valuable contribution to the San Diego community. Presently there are five schools in San Diego County participating in this state supported project. All of the study sub-group of mothers 18 years of age and under belonged to the student group of teen mothers attempting to complete their high school education. ANOVA conducted on mothers under 18 years of age with mothers over 18 years of age did not reflect any significant difference between the groups regarding exclusion rate from child care, suggesting that the type of support was not an influential factor.

The greater portion of the mother-infant pairs was from relatively small households with a mean annual income of $48,650. Household factors commonly credited with increasing sensitivity or the spread of disease were examined to evaluate their possible impact on exclusion. These included: the number of persons living in the home, the number of persons with known allergies, the number of children under 12 years of age, the number of persons who smoked, the number of cigarettes smoked, and the number of pets. No significant correlation was noted for any of these variables and exclusion rate. The variations in household composition and environmental factors were relatively limited, suggesting that further investigation would be required to assess adequately their impact on exclusion rate in more diverse settings.

Throughout the course of study the individual infants showed satisfactory weight gains regardless of how they were fed. A number of infant characteristics was also examined to determine any possible contribution that they might have to exclusion rate. These included: sex of the infant, age on enrollment, and immunization status. None of these factors added significantly to the explanation of exclusion.

Child care sites.

There was a wide variation seen in the child care facilities. Differences were observed in environment and personnel at the individual sites. The major contrast seen in the physical facilities was observed between those sites operating for profit; i.e., the infant-child care centers and the family infant-child care homes, and those others providing a social service; i.e., the two churches and the hospital. The for-profit facilities were on the whole more spacious with separated areas, better equipped, and attractively decorated. The facilities operated by the churches seemed more friendly and appeared not so preoccupied with the overall orderliness of their centers, as with their concern for the happiness of the enrollees. The hospital had no specific place designated for child care, and the infants were left in various locations with fellow employees who were willing to participate in their care.

There were varying levels of professional expertise observed at all sites. This, in part, could be attributed to trainees working at the different centers. Some of these trainees had recently completed high school and obviously lacked

experience. Many of the providers were highly qualified professionals; i.e., child development specialists, teachers, nurses, although several other care givers reported little training for their positions. All the providers demonstrated a love for the children in their care and obviously enjoyed their work. In some of the centers, several staff members were involved in the care of each infant; whereas, in others, the infants were separated from the older infants/children and primarily cared for by one or two individuals. The teenage mothers provided some of the infant care given in the school sites. Each of these mothers was required to spend a certain number of hours weekly in the center assisting the professional care giver. This arrangement allowed these centers to meet the State licensing ratio requirements of one care giver to every four infants enrolled, without having to hire additional employees.

Each child care site had some obvious advantages and disadvantages, but all of the centers that participated in this study demonstrated provision of quality care even though the care givers appeared to have heavy demands on their time. Although my observations were limited, I did not encounter a single care giver who was not endeavoring to do a good job. This was an interesting observation in view of the literature which substantiated that there is a high turnover among child care workers due to low pay and stress (Dalton, 1987; Fitzsimmons, 1989a, Trotter, 1987). As a result of my observations, I acquired additional respect for these devoted, hard working individuals.

All sites appeared to follow the manual of policies and procedures in child day care established by the State of California, Health and Welfare Agency,

Department of Social Services (1988). This manual gives some guidelines for infant care but leaves considerable room for provider interpretation and discretion. The manual contains no stipulated policy regarding exclusion for infant illness, but the study revealed that all the child care providers basically used the same criteria (Appendix C). Some care givers adhered to their policy very closely, whereas others appeared to individualize each case on its own merit and excluded accordingly. Overall, the care givers in the church supported centers appeared to be the least strict about exclusion for illness compared to the care givers from the other sites.

It was surprising to discover so many (60%) of the infants attending child care without immunization, because immunization was repeatedly stated as a prerequisite to enrollment. In general, this absence of immunity did not seem to create a greater incidence in the infection rate of these infants. No diseases, normally prevented by immunizations, were reported. This possibly could be attributed in part to the fact that several of the infants were or had been breastfed and/or retained some natural acquired immunity from their mothers.

Determination of infant intake and absenteeism.

The nutritional intake of the infants within this study was calculated using the graduated infant feeding scale, the diary, and questionnaires and interviews with the mothers and child care providers (Appendix A, Section V). The scale appears to be a satisfactory method for determining an estimate of breastmilk consumption in a non-clinical setting when test weighing (Matheny et al., 1986) is

not a feasible option. The validation of the instrument by professional confirmation provided supportive evidence that the feeding scale is an acceptable tool for this purpose.

The mothers as a group exhibited very little difficulty with keeping the diary which in turn provided the researcher data to determine the scale values. It must be recognized that this sample was a sophisticated maternal population. Even the teenage mothers kept their records at school where the teacher could oversee and assist with any problems in recording. It was noted, however, having teacher assistance was simultaneously an advantage and disadvantage. The researcher could be confident that the diary entries accurately reflected infant intake due to teacher supervision, but could not be so certain about the reported absenteeism. There appeared to be some discrepancies in the number of hours missed from school. Even though two of these young mothers hinted that they stayed home for reasons other than their infant's illness, they reported to their teacher that infant illness was the excuse for their absence.

Feeding practices.

The selected feeding methods practiced by the mothers differed considerably. Seventy-six percent of the mothers had breastfed their infants to some extent, but only 14 mothers continued to do so and to provide a significant contribution of their infant's caloric intake until the time of enrollment. The extent of breastfeeding prior to enrollment was highly correlated with the graduated infant feeding scale [$r = .66$, ($p < .01$), $N = 37$] indicating that the degree of

previous breastfeeding influenced continuance following enrollment. Since the prior breastfeeding experience had not been documented on the basis of the graduated feeding scale, the impact of how long and to what extent prior breastfeeding experience has on exclusion rate remains an issue for further investigation.

Five of the 14 mothers took their infants to work with them and continued to breastfeed at the work site. These five women all said that this was not an easy task, but thought that they were very fortunate to have jobs where administration approved the practice. None of these five infants became ill, was excluded, nor were any one of these five women ever absent from work during their five-week periods. One mother was a child care director and the other four were employed at the hospital site. Both the hospital director and immediate supervisor of four of these mothers related that, contrary to being a detriment to their work, the work of the mothers having their infants with them was enhanced. These superiors perceived the presence of these dyads as a contribution to making the total work site a more congenial place for all of the hospital employees. The hospital director adamantly proclaims that this breastfeeding practice has been instrumental in improving overall employee esteem and cooperation. In addition, contrary to what was first anticipated, he claims that it has also contributed to better employee-employer relationships. Two of the teenage mothers continued to breastfeed their infants upon returning to school. This was relatively easy for them since the child care facility was located near their classrooms. Two other breastfeeding mothers elected to have their infants formula fed during child care

hours.

The five remaining lactating mothers elected to express their milk for use during child care. While one of these mothers went to the site during lunch hour to breastfeed her infant, most left additional formula to meet their infant's needs during separation. It has been suggested that the method of expression and handling of expressed breast milk; i.e., storage, transportation, and heating, might reflect some of the variance seen in illness (Sosa and Barness, 1987; Sigman, Burke, Swarner and Shavik, 1989). Some differences in the expression methods utilized by these mothers were noted; however, all of the these five participants practiced similar storage methods and used their milk within 48 hours of expression. No statistical analysis was conducted to ascertain the effect of handling and storage of breast milk on the exclusion rate, but this procedure would be advisable in a future study with a larger sample size.

Over the five-week period the average graduated feeding scale values for the intake of breast milk declined. On close examination this decline was primarily attributed to increased supplementation given to five of the 14 breastfed infants and included: one infant whose mother discontinued breast feeding during the third week of child care, the two infants who received only formula during separation, and two of the other infants that received both expressed breast milk and formula at child care. This decrease in intake agrees with international research findings over the past decade. It was recently described by Rubin, et al. (1990) in their study conducted in Denmark to examine the relationship between infant feeding and infectious illness. These investigators

reported that 88% of their mothers breastfeeding at one month of age but only 20% continued the practice at 12 months of age. Ryan and Martinez (1989) also reported a decrease in breastfeeding by mothers in the United States during the first six months of life. Their findings revealed that breasfeeding incidence was similar in the hospital following delivery, (55%), but decreased at six months to 24% for non-employed mothers and to only 10% in employed mothers.

Maintaining an adequate milk supply during long term separation, coupled with the many demands of employment, often requires strong support systems from the family, fellow employees, employers, and/or professionals (Auerbach, 1988). None of the mothers in this current study endeavoring to maintain their milk supply reported having professional help in the mechanics of continuing lactation nor did they know such assistance was available. Several mothers with infants commented, *"I really wanted to breastfeed this baby but it just got to be too great a hassle and so I quit."* Some carried this even further with, *"My doctor said my baby will grow just as well with formula so I decided not to bother."* However, within this study sample, nine of the infants showed no increase in intake of supplements during their study periods. It appeared that the mothers of these infants maintained an adequate milk supply, possibly attributable in part to the forementioned support systems.

Eighty-four percent (31) of the study infants were receiving some commercial formula at the time of enrollment to child care. The mean amount of formula consumed, 644 milliliters, had a wide range in intake, from 180 to 1,440 milliliters. Some of the difference in range was due to the fact that some of these

infants were being breastfed in addition to their formula consumption, whereas others received their total intake from formula. However, the mean formula intake fell within what is considered normal for age and is in agreement with the mean levels reported by Matheny, Volken, Jones, Spindler, Bastides and Dirige (1990).

The limited sample size in this study prohibited an analysis of the exclusion rate with types of formulas given the infant even though it appeared that some of the formulas were being used inappropriately; i.e., extended use of soy formulas following minor digestive upsets, or the use of specific formulas for parent anticipated but undiagnosed allergy.

Twenty-two infants received foods or liquids other than milk at the time of enrollment in child care. Three months was the mean age for the introduction of these foods. Other than water given to infants receiving formula, this initiation of foods was on the average one month younger than the current recommendations from The American Academy of Pediatrics, The American Dietetic Association and, universally, WHO. More specifically, Milla (1986) stated that the infants less than six months of age, by virtue of their state of development, have very vulnerable digestive, absorptive, and immune processes, and the introduction of solids should be delayed until 4-6 months of age. The introduction of supplemental foods has also been reported to impact on the duration of breastfeeding and may have contributed to the decrease found in the infant feeding scale values in this study from a mean value of 2.70 ± 3.85 to 2.33 ± 3.69 for the total five-week period. Quant (1984) reported that exclusively breastfed infants younger than four months of age showed a decrease in the number of

breastfeedings compared to infants introduced to solids at a later age. In her study the introduction of solids at the later age was associated with stable or increased feeding frequency.

Since formula and supplementation were integral to the feeding scale, their independent contribution to explaining exclusion could not be adequately assessed.

Exclusion from Child care

Exclusion rate.

For the purpose of this study, the hours that an infant was excluded from attending child care, due to illness, divided by the number of hours that the infant was scheduled to be at child care, yielded the exclusion rate. The mean number of hours excluded from child care was 7.19 over the five-week period, or 1.44 hours per week, which is approximately one hour and 26 minutes. The mean number of hours that the infants were to be at child care was 168.27 ± 54.54 or approximately 34 hours per week.

The mean number of hours excluded increased from zero during the first week of enrollment to approximately three hours per week by the third week and then decreased to 42 minutes at five weeks. The mean exclusion rate for the five weeks was approximately 5%.

All reported infant illnesses were respiratory related. This could, in part, be seasonal since the study period took place from September through April when the incidence of respiratory illness is normally more prevalent than during

summer months. An extended sample would likely yield additional diagnoses. In addition, allergies are often confused with respiratory problems and may have played a greater role than was determined by this small sample. The decision to exclude infants from child care was made by the child care providers, the mother, or physician. Even though the majority of infants were taken to the doctor when a noted deviation in the infant's normal physical state was seen, it would have been an advantage to have had all infant illnesses physician verified to ascertain the diagnosis and severity. Since duration of exclusion was not always physician directed, that is a limitation of the study.

The severity of the illness was to some extent indirectly measured by the length of time (in hours) excluded. However, if an infant was ill over the weekend, or at some time not scheduled to be at child care, then the severity of the illness was not accurately reflected. The results of this study, indicating that breast feeding afforded protection against illness, are supported by a study in progress conducted by Dewey, Heinig, Nommsen, and Lönnerdal at the University of California, Davis. The purpose of their study is to compare the incidence of illness in breastfed versus formula fed infants during the first year of life. Preliminary data from their longitudinal study are showing that both groups have a similar number of reported illnesses but that the breastfed infants have demonstrated a five-day shorter duration of illness. This ongoing investigation of Dewey et al. expands on the previous work of Leventhal, Shapiro, Aten, Berg, Egerter et al. (1986), who reported that breastfeeding protected infants less than three months of age from hospitalization rather than from infections.

In my study the exclusion rate was correlated to the infant feeding scale r = .33 (p = .0448), N = 37. This finding revealed that the more exclusively the infants were breastfed (the higher the scale values), the less likely they were to be excluded due to illness from child care. Conversely, the infants who were partially breastfed or were formula fed demonstrated a greater likelihood to be excluded. This is supported by a study completed in Scotland conducted by Howie, Fortsyth, Ogston, Clark and Florey (1990). These researchers assessed the relationship between breastfeeding and illness during the first two years of life. Their results showed that infants who were breastfed for 13 weeks or more had significantly less gastrointestinal illness than those who were formula fed. The reduction in illness was also maintained beyond the period of breastfeeding and was accompanied by a reduction in the rate of hospital admissions.

In this present study of mine, an interesting finding was observed in mothers over 18 years of age having access to their infants during child care site; i.e., the nine mothers with access had a significantly lower exclusion rate than mothers without access. The means and standard errors were 0.00 ± 0.00, and 0.06 ± 0.02, F_{df} 1, 35 = 5.3, (p = .0273). The demonstration of wellness in these infants was seen regardless of the feeding mode, although it is noted that 6 (66%) of these infants ratings were high on the feeding scale. The results raise a question. Does stress from leaving an infant in child care influence depression of the immunological system resulting in a greater tendency toward illness? This possibility presents an interesting challenge for future research.

Lost time rate.

The lost time rate was calculated by dividing the number of hours forfeited by the mother divided by the number of hours to be worked. In the present study, a high correlation [$r = .86$, ($p = .0001$), $N = 37$], was observed between the exclusion rate and the lost time rate. Because all mothers did not stay home and care for their infants when ill, the amount of time that the mothers forfeited was similar, (6.87 hours), but not identical to the hours excluded, (7.19 hours). The average amount of time forfeited was approximately 1.37 hours per week or 1 hour and 22 minutes. This lost time reported was actual time not present at the work/school site. It did not reflect lost time in productivity during work hours due to maternal concern for the infant's illness or the fact that the infant was being cared for by an alternate care giver. Three mothers indicated that concern for their excluded infant had been a problem, and caused consternation that could have been considered lost time or, possibly, lower productivity. Loss of productivity could have been extended to the fathers of these infants for, although not recorded, they too, forfeited valuable time to care for their infants. Therefore, a record of parental time forfeited due to exclusion of infants from child care could expand the scope of a future study.

Economic consequences.

If leaders do not consider that the prior arguments given justify on-site child care as a valid contribution to society, they should consider the possible business benefits or, "the bottom line." To put this into perspective, the following

hypothetical model is presented.

Hypothetical model

If a mother losses an average of 1.37 hours per week as a result of illness incurred during child care, and she works 50 weeks per year, this means that she loses an estimated 69 hours per year. This loss, in certain positions, might be considered unimportant because any losses are covered by sick time, etc. In some instances, perhaps most, it results in an expense to the organization. If this same mother is from a household with a yearly income of $48,000 and her contribution to this total is 50% or $24,000, then she is earning approximately $12 per hour. This is really a conservative estimate for the group of professionals who participated in this study. If it is valid, then 69 hours lost time at $12 an hour equals approximately an $828 deficit in a year. I believe most leaders would find this result significant.

Burud (1988) describes how today's work force is experiencing the consequences of social changes that have occurred in the past two decades and that one of the more important aspects is the need for child care. Individuals and organizations are becoming increasingly aware of the need. The U.S. Chamber of Commerce has predicted that child care will be one of the fastest growing benefits offered employees. Peterson (1988) reported that companies that have made child care services available to their employees are beginning to relate positive results, including the advancement of corporate aims and tangible benefits. Burud's (1984) study showed that of the 415 companies reporting positive benefits, 65% of the companies reported improvement in employee

turnover, 53% in absenteeism, 85% in recruitment, 85% in public relations, and 90% in morale. Other additional benefits positively affected by the provision of on-site child care included scheduling flexibility, quality of products, employee work satisfaction, commitment and motivation. Burud's (1989) results support the findings from this current study of the nine mothers who had on-site child care.

Although Burud (1984) does discuss the problems encountered by parents of sick children, she does not address any possible relationship of infant feeding to illness. Therefore, this present study indicates important trends and offers leadership a further step to reduce maternal absenteeism and subsequently improve morale and productivity.

Important Research Findings

Although this study contained a small sample and the findings can not be generalized to all populations, important trends were demonstrated. Most importantly, the more exclusively the infants were breastfed, the less likely they were reported ill and subsequently excluded from child care. This showed that within this study group, breastfeeding had a positive impact. This is of particular interest because this is one of the *first* studies to report this afforded protection in an economically advantaged population, in contrast to the conclusions stated by most researchers stating that breastfeeding has at most a minimal effect in industrialized countries. This study had a population with a mean annual household income of approximately $49,000 and nearly 60% of the mothers had three or more years of college education. Such a population is considered to

practice good hygiene, have provision of adequate foods and access to quality medical care, all factors generally recognized as important to an infant's well being. This means that it is probable that the findings would be even more significant in a sample from a diversified population from a lower socio-economic status.

I believe that the results obtained in this current study were primarily due to the contribution of data generated from the use of the graduated infant feeding scale. The scale was graduated in sufficient detail to allow the estimation of differential intake of supplemental foods and liquids. Concurrently, these scale values enabled the researcher to approximate the displacement of human milk consumption. In addition, the scale values reflected a possible dilution effect of supplemental intake on the immunological protective factors received in the consumed human milk.

The use of the scale, in conjunction with the diary, (Appendix A, Section I) should allow other researchers, scholars, and educators an opportunity to better define exclusive and partial breastfeeding. To date, the absence of this ability has contributed to the controversy surrounding the relationship between infant feeding method and the incidence of infection. Additionally, the acquired information helps support existing rationale for the delayed introduction of supplemental foods to young infants.

Recommendations for Future Research

The results of the present study offer a contribution to the literature. They

show important trends in the relationship of infant feeding mode to the exclusion rate, due to illness, for infants and in the lost time rate for mothers from their work/school. However, the sample size was limited and further study utilizing a larger population is warranted.

To this end the following three suggestions are offered:

1. Replication of the study using a larger divergent population and extending the period of observation throughout the first year of life. This would make a prospective longitudinal inquiry. Such a population could be obtained through prenatal classes and/or seminars. This approach in recruiting participants would eliminate the need for child care providers to partake in study enrollment. The process would allow the researcher direct access to future mothers at a time when they are not so overwhelmed with their multiple roles, and this plan would provide an opportunity for the establishment of rapport between the researcher and the mother or child care workers.

A source of additional participants could be obtained from a national chain of child care centers. This too would provide a more heterogeneous population with structured franchise policies controlling some of the variation in exclusion for illness commonly found in different child care facilities. The San Diego district manager of one of these chains has expressed interest in such a study to assist in improving the image of child care which is currently being cited for the spread of disease.

2. Replication of the study is suggested with additional parental parameters including the impact of exclusion and the subsequent lost time rate incurred by

the fathers. Twenty-two percent of the infants' fathers in this present study forfeited time to care for their sick infants. This lost time should be recognized in future studies as an important contribution to the total financial losses. As difficult as it might be, losses in productivity should be estimated and included in any calculations of financial loses. In addition, the expense of often having to pay for contract child care, even when the infant is excluded, should not be overlooked.

3. Future research employing an expanded population should examine the possible connection between exclusion rate and parental access to the infant as a possible contribution to wellness.

In addition to the recommendations offered for future research I believe a second group of recommendations are warranted. These suggestions, however, are targeted for leadership.

Recommendations for Leadership

It can be concluded from the study results that nutrition, specifically breastfeeding, does contribute to well being. However, beyond basic research the lessons shown must be recognized and subsequently translated to the population. Herein lies the greatest challenge to leadership. Palmer (1988, p. 1) stated;

> *If a multinational company developed a product that was a nutritionally balanced and delicious food, a wonder drug that both prevented and treated disease, cost almost nothing to produce and could be delivered in quantities controlled by the customers' needs, the very announcement of*

their find would send their shares rocketing to the top of the stock market...

Although women have been producing this miraculous substance since the beginning of human existence, invariably more artificial infant formulas are currently being produced and utilized under the guise that they are nutritionally equivalent to human milk. Over four billion dollars of these substitute milks are sold annually in the U.S. alone (Palmer, 1988). We truly need more educators to communicate the differences between milks and the consequences of their use.

The majority of women, regardless of social class, still retain the primary responsibility for their infants' care. If these women are also employed or endeavoring to continue their education, they are expected to leave their infants in the care of others and arrange for infant feeding during separation. Many people believe that breastfeeding is merely a matter of personal preference and any separation of mother and infant should not be considered an impediment to the infant or society. Even individuals and organizations that acknowledge the superiority of breastfeeding usually do not support breastfeeding at the work site. Therefore, the subject of infant nutrition can present political, economic, and social concerns.

To date, many valuable programs have been initiated in attempts to meet these concerns; e.g., The Surgeon General's Workshop on Breastfeeding and Lactation (1984) made significant recommendations that are presently being implemented throughout parts of the U.S. However, it will take larger concerted efforts to augment the education of individuals in administrative positions

concerning the potential benefits of breastfeeding in competition with profit driven industry.

As a result of reviewing the literature related to this topic, and from the results of this investigation, the following recommendations for all leaders and policy makers are presented:

1. The establishment of a national nutrition policy encompassing infant feeding with an emphasis on *promoting* breastfeeding practices.

2. The establishment of a national child care policy encompassing infant nutrition with an emphasis on *protecting* breastfeeding practices.

The development of these two aforementioned policies should be compatible and synergistic. Both of the policies should stress the WIC program in their targeted populations.

3. The establishment of a national maternity leave policy with priority given to keeping mothers and infants together postpartum for as many weeks as possible.

4. All governmental bodies and organizations need to recognize the importance of infant nutrition through their actions and modeling; e.g., adherence to the International Code of Marketing Breastmilk Substitutes (WHO, 1981), and the control of unethical practices through monitoring and evaluation.

5. Procedural and structural supportive measures at work/ school sites need to be extended to mothers returning to work/school and desiring to breastfeed their infants. These need to include adjustments of working hours to accommodate infant feeding.

6. Increased education in the long range benefits of infant feeding practices need to be targeted to business executives and organizations. These populations should have this information in making strategic planning decisions.

7. Educational resources should be readily available to educators, leaders, and policy makers. The use of such aids is needed to prevent problems created by early supplementation and discontinuation of breastfeeding.

Concluding Comments

This present study indicates important trends and offers leaders and participants a further step in their practice of leadership in health care. It provides another reason for on-site child care, one that should further reduce infant illness, thus maternal absenteeism, and subsequently improve morale and productivity. In essence, it presents an ethical opportunity to respond to the needs of children through the moral conscience of adults in the construction of a communitarian society.

Policy should include measures that support a mother's informed choice to breastfeed and to combine employment or student roles. Thus, mothers may receive the benefits of a more rapid recovery following childbirth, quality interactive time, and relaxation while feeding their infants. Subsequently, their infants will receive optimal nutrition for growth and development plus added protection against disease. Ensuing benefits to society will be realized from improved maternal fulfillment, self-esteem, and stronger family bonding.

In total, a mission targeted at social and economic development, through

the implementation of maternal-infant nutrition policy, will require increased on-site child care with allowances for employed/student mothers desiring to continue breastfeeding their infants. Thus, an extremely valuable natural resource, human milk, will not be wasted. Further family benefits will be attained from the reduction of guilt and stress related to separation, including the high costs of illness.

To accomplish this endeavor, leadership is an axiom, with visionary leaders and participants recognizing today's reality, and employing their imagination to transcend that reality into provisions for the education of employers, employees, and all others presently affected by child care concerns. Ultimately, leadership in action, resulting in an exemplary investment in the future, through social improvement for mother-infant pairs is of the essence.

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Appendix A: Section I

Diary

DIARY

MONTH:______________	Baby's Birthdate_____	Please call if you have any questions Betty Jones (619) 479-5555

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note

1. Ounces of breast milk (Untreated=fresh) or (Treated=heated or frozen) (1 cup = 8 oz.)
2. Ounces of supplement or formula, baby food, water, juice etc. (2 tablespoons = 1 oz.)
3. Hours at Child Care
4. Hours excluded from the Child Care
5. Hours Mom is absent from work or school
6. Hours lost looking for alternate Child Care
7. Note if Baby is sick

NOTES or QUESTIONS?
Please note below or reverse side

Appendix A: Section II

Child Care Center Information

The Child Care Center staff will provide the following information:

- Space allocation for infants in the center_____
- Number of infants at the center_____
- Ages of infants at the center_____
- What immunization has the staff received _____
- Has there been any reported outbreaks of infection yes no
  If yes, dates_____
- Number of workers per infant _____
- Policy guidelines for exclusion

_____
_____
_____
_____
_____
_____
_____

- How is frozen milk stored and thawed

_____
_____
_____

Appendix A: Section III

Questionnaire

QUESTIONNAIRE

PLEASE ANSWER THE FOLLOWING QUESTIONS;

FAMILY HISTORY

Baby's Birthdate_____ __

Mother's Age_____

Martial status Please circle.

Married
Divorced/separated
Single
Not married, living with partner
Widow

Ethnic group Please circle.

Hispanic
White
Black
Asian
American Indian or Alaskan Native
Pacific Islander
Portuguese
Filipino
Indochinese

Highest level of education completed? Please circle.

Elementary
Masters
High School
Doctorate
College 1 2 3 4 5 or more years

Mother's occupation_____

Number of hours spent in occupation per week _____

Income currently within household(after taxes)? Please circle closest value.

$60,000. & above
$50,000. to $59,999.
$40,000. to $49,999.
$30,000. to $39,999.
$20,000. to $29,999.
$ 10,000. to $19,999.
Less than $10,000.

Number of people living in the house?_____

Number of children under 12 years in the house?_____ please list ages _____

Number of family members with a history of allergy?_____

Number of persons that regularly smoke in the house ?___Total No of cigarettes / day?___

Number of pets in the house?_____ dogs _____ cats _____ birds _____ none_____

INFANT CHARACTERISTICS

Birth weight_____ Weight on enrollment to center _____

Any doctor visits for illness since birth? yes no if yes, how many times?_____

At what age did your baby start attending child care_____

Average number of hours your infant spends at this center per week ?_____

Has your baby been in **another** child care center before this one? yes no

INFANT FEEDING

Did you ever breast feed your baby? yes no if yes, for how many days?____

How you are feeding your baby now? Please circle

Breastfeeding Bottle feeding Both

If bottle feeding, what milk are you using? _____

Is this milk fortified with iron? yes no

How many ounces are you giving your baby in a 24 hour period?_____

What other foods or liquids are you giving your baby? Please circle

Water, juice, tea, cereal, purees, eggs, if other please specify_____

How many ounces of the above are you giving your baby in a 24 hour period? _____

note: 1 cup = 8 oz. 2 tablespoons = 1 oz.

BREAST MILK EXPRESSION AND STORAGE

If you are expressing breast milk; Please circle your method

The milk is expressed by hand, manual pump, electric pump

If milk is stored; Please circle or indicate your method

In a refrigerator, freezer, thermos, if other specify_____

How many days is the milk stored? _____Is it stored in a glass or plastic container?

At home frozen milk is thawed at room temperature, in warm water, on the stove, microwave?

Is the milk taken to the center in the bottle, a thermos, packed in ice, if other, specify? ____

Thank you!

Appendix A: Section IV

Final Review Questionnaire

Final Review Questionnaire

Code number_____Date_____

Weight of infant_____

Review of diary by the investigator and the mother.

If infant was excluded from child care due to illness, who cared for the infant?

If infant was excluded did illness require a physician visit?

If infant was excluded did illness require hospitalization?

Thank you presented to the mother for her participation.

Appendix A: Section V

Graduated Infant Feeding Scale

GRADUATED FEEDING SCALE: from exclusively breast fed to formula fed

Code	Intake	scale
EB/b	Exclusively breastfed since birth	10.0
EB/d	Exclusively breastfed since discharge, primary or subsequent	9.5
Bu 0	Breastfeeding & untreated breast milk +0 oz supplement	9.0
Bt 0	Breastfeeding & treated breast milk +0 oz supplement	8.5
Bu 2	Breastfeeding & untreated breast milk +2 oz supplement	8.0
Bt 2	Breastfeeding & treated breast milk + 2 oz supplement	7.5
Bu 4	Breastfeeding & untreated breast milk + 4 oz supplement	7.0
Bu 4	Breastfeeding & treated breast milk + 4 oz supplement	6.5
Bu 6	Breastfeeding & untreated breast milk +6 oz supplement	6.0
Bt 6	Breastfeeding & treated breast milk + 6 oz supplement	5.5
Bu 8	Breastfeeding & untreated breast milk+ 8 oz supplement	5.0
Bt 8	Breastfeeding & treated breast milk + 8 oz supplement	4.5
Bu 10	Breastfeeding & untreated breast milk + 10 oz supplement	4.0
Bt 10	Breastfeeding & treated breast milk + 10 oz supplement	3.5
Bu 12	Breastfeeding & untreated breast milk + 12 oz supplement	3.0
Bt 12	Breastfeeding & treated breast milk + 12 oz supplement	2.5
Bu 14	Breastfeeding & untreated breast milk + 14 oz supplement	2.0
Bt 14	Breastfeeding & treated breast milk + 14 oz supplement	1.5
Bu 16	Breastfeeding & untreated breast milk + 16 oz supplement	1.0
Bt 16	Breastfeeding & treated breast milk + 16 oz supplement	0.5
Ff	Combination and/ or Formula fed	0.0

Footnote:
•primary: initial hospital discharge following delivery
•subsequent: second hospital discharge during first three weeks of life
•treated breast milk: expressed breast milk that has been frozen or heated
•untreated breast milk: fresh expressed breast milk
•supplement: any liquids or solids other than breast milk
•combination and or formula fed: an infant receiving more than 16 ounces of formula per 24 hour intake

Appendix B: Section I

Case Study 1

DIARY

MONTH: Sept/Oct Baby's Birthdate 3-15-89 Please call if you have any questions Betty Jones (619) 479-5555

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
						1	Breastmilk U or T
						2	Supplement/Formula
						3	Hours at Child Care
						4	Hours excluded
						5	Hours Mom absent
						6	Hours lost work/sch.
						7	Note
	3 4T	4 4oz T	5 4oz T	6 4oz T	7 4oz T	8 — 1	Breastmilk U or T
	4oz	4oz	0	4oz	4oz	— 2	Supplement/Formula
	8	8	8	8	8	— 3	Hours at Child Care
						4	Hours excluded
						5	Hours Mom absent
						6	Hours lost work/sch.
						7	Note
9 —	10 4T	11 4T	12 4T	13 4T	14 4T	15 1	Breastmilk U or T
—	4oz	6oz	4	4oz	4oz	— 2	Supplement/Formula
—	8	8	8	8	8	— 3	Hours at Child Care
						4	Hours excluded
						5	Hours Mom absent
						6	Hours lost work/sch.
						7	Note
16 —	17 4T	18 4T	19 4T	20 4T	21 —	22 4T 1	Breastmilk U or T
—	4oz	4oz	0	8oz	8oz	4 2	Supplement/Formula
—	8	8	8	10	2	— 3	Hours at Child Care
					6	4	Hours excluded
					2	5	Hours Mom absent
					2	6	Hours lost work/sch.
						7	Note
23 —	24 4T	25 4T	26 4T	27 4T	28 4T	29 — 1	Breastmilk U or T
—	4	4	4	6	4	— 2	Supplement/Formula
—	8	—	—	—	8	— 3	Hours at Child Care
		8	8	8	—	— 4	Hours excluded
						5	Hours Mom absent
						6	Hours lost work/sch.
						7	Note
30 —	31 4T	1 4T	2 4T	3 4T	4 4T	5 — 1	Breastmilk U or T
—	4	4	—	4	4	— 2	Supplement/Formula
—	8	8	4	8	8	— 3	Hours at Child Care
						4	Hours excluded
						5	Hours Mom absent
						6	Hours lost work/sch.
						7	Note

1. Ounces of breast milk (Untreated=fresh) or (Treated=heated or frozen) (1 cup = 8 oz.)
2. Ounces of supplement or formula, baby food, water, juice etc. (2 tablespoons = 1 oz.)
3. Hours at Child Care
4. Hours excluded from the Child Care
5. Hours Mom is absent from work or school
6. Hours lost looking for alternate Child Care
7. Note if Baby is sick

NOTES or QUESTIONS?
Please note below or reverse side

Appendix B: Section II

Case Study 2

DIARY

MONTH: Aug/Sept Baby's Birthdate 8-5-18 Please call if you have any questions Betty Jones (619) 479-5555

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
			1 8 oz U	2 8 oz U	3 8 U	4 0	1 Breastmilk U or T
			2 oz	3 oz	3 oz	0	2 Supplement/Formula
			6	6	6	0	3 Hours at Child Care
			—	—	—	—	4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
5 0	6 8 U	7 8 oz U	8 8 U	9 8 U	10 8 oz U	11 0	1 Breastmilk U or T
0	2 oz	2 oz	2 oz	2 oz	4 oz	0	2 Supplement/Formula
	6	6	6	6	6		3 Hours at Child Care
	—	—	—	—	—		4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
12 0	13 8 U	14 8 U	15 0	16 8 oz U	17 8 oz U	18 0	1 Breastmilk U or T
0	2 oz	2 oz	2 oz	2 oz	2 oz	0	2 Supplement/Formula
	6	6	2	—	—		3 Hours at Child Care
	—	—	4	6	6		4 Hours excluded
			4	—	—		5 Hours Mom absent
			4	1/2	1/2		6 Hours lost work/sch.
							7 Note
19 0	20 8 oz U	21 8 oz U	22 8 oz U	23 4 oz U	24 4 oz U	25 0	1 Breastmilk U or T
0	4 oz	2 oz	2 oz	0	0	0	2 Supplement/Formula
	6	6	6	6	6		3 Hours at Child Care
	—	—	—	—	—		4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
26 0	27 6 oz U	28 8 oz U	29 8 oz U	30 8 oz T	31 8 oz T	1 0	1 Breastmilk U or T
2 2	6 oz	2 oz	2 oz	2 oz	2 oz	0	2 Supplement/Formula
	6	6	6	6	6		3 Hours at Child Care
	—	—	—	—	—		4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
2 2T	3 8 T	4 8 T					1 Breastmilk U or T
0	2 oz	2 oz					2 Supplement/Formula
	6	6					3 Hours at Child Care
	—	—					4 Hours excluded
	—	—					5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note

1. Ounces of breast milk (Untreated=fresh) or (Treated=heated or frozen)
2. Ounces of supplement or formula, baby food, water, juice etc.
3. Hours at Child Care
4. Hours excluded from the Child Care
5. Hours Mom is absent from work or school
6. Hours lost looking for alternate Child Care
7. Note if Baby is sick

(1 cup = 8 oz.)
(2 tablespoons = 1 oz.)

NOTES or QUESTIONS?
Please note below or reverse side

Appendix B: Section III

Case Study 3

DIARY

MONTH: Oct/Nov

Baby's Birthdate 6-24-89

Please call if you have any questions
Betty Jones (619) 479-5555

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
	1 3 4	2	3	4	5	6	1 Breastmilk U or T
	8 oz	8 oz	8 oz	10 oz	12 oz	4 oz	2 Supplement/Formula
	8	8	8	8	8	2	3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
7 0	8	9	10	11	12	13 0	1 Breastmilk U or T
0	8 oz	8 oz	9 oz	10 oz	12 oz	0	2 Supplement/Formula
0	8	8	8	8	8	0	3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
14 0	15	16	17	18	19	20 0	1 Breastmilk U or T
0	8 oz	8 oz	10 oz	12 oz	12 oz	0	2 Supplement/Formula
0	8	8	8	8	8	0	3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
21 0	22	23	24	25	26	27 0	1 Breastmilk U or T
0	8 oz	8 oz	8 oz	8 oz	8 oz	0	2 Supplement/Formula
0	8	2	—	—	—	0	3 Hours at Child Care
		6	8	8	8		4 Hours excluded
		2	—	—	—		5 Hours Mom absent
		2	1	1	1		6 Hours lost work/sch.
							7 Note
28 0	29	30	31	1	2	3 0	1 Breastmilk U or T
0	8 oz	8 oz	8 oz	8 oz	12 oz	0	2 Supplement/Formula
0	8	8	8	8	8	0	3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note
4							1 Breastmilk U or T
							2 Supplement/Formula
							3 Hours at Child Care
							4 Hours excluded
							5 Hours Mom absent
							6 Hours lost work/sch.
							7 Note

1. Ounces of breast milk (Untreated=fresh) or (Treated=heated or frozen) (1 cup = 8 oz.)
2. Ounces of supplement or formula, baby food, water, juice etc. (2 tablespoons = 1 oz.)
3. Hours at Child Care
4. Hours excluded from the Child Care
5. Hours Mom is absent from work or school
6. Hours lost looking for alternate Child Care
7. Note if Baby is sick

NOTES or QUESTIONS?
Please note below or reverse side

Appendix C:

Example of "Exclusion Policy"

"Example of Exclusion Policy"

The child care provider reserves the right to refuse admittance of any child exhibiting any signs of illness. Parents are required to remove their child from the child care facility should the child exhibit signs of being "ill" during the day.

The following circumstances may prohibit admittance to child care:

1. Fever exceeding 100 degrees;
2. Vomiting and/or diarrhea;
3. Green nasal discharge;
4. Any potentially contagious disease;
5. Any skin rashes;
6. Severe pains or inconsolable crying;
7. Any conditions requiring one-on-one care to the extent that it disrupted or interfered with good quality child care to the other enrollees.
8. If illness is persistent, the child care provider reserves the right to refuse admittance until re-evaluation of evidence from the infant's physician is provided.

Appendix D

Invitation

An invitation, to provide information to create supportive work/school environments for **busy moms with infants.**
Your brief participation will assist moms.

Please read and sign the next page or call
Betty Jones, Pediatric Nutritionist 479 5555

- There will be a "thank you" gift for your contribution: $20.00 & a copy of "Good Nutrition for Your Baby"

Many thanks!

Elizabeth G. Jones, RD, MPH

Appendix E

Consent Form

CONSENT FORM

You are invited to participate in a study designed to examine different infant feeding methods and their impact on wellness during the first five weeks of enrollment in infant-child care.

I believe the study will help us to provide good nutritional advice to mothers leaving their infants in child care, and also suggest guidelines for center employees caring for these infants.

If you decide to participate, you will be asked about the feeding method you are presently using, and a few questions about your work and family history. You will be requested to keep a simple diary sheet for the first five weeks your baby comes to the child care center. At the end of the five week period you will be requested to return your baby's diary and briefly discuss any changes made in your baby's feeding program.

In order to facilitate record keeping your permission to access your baby's file is requested. You are free to decline to answer any questions and may withdraw from the study at any time. All information will be completely confidential.

At the end of the five week period you will be given a copy of "Good Nutrition For Your Baby" as a token of appreciation for your participation.

You are making a decision whether or not to participate. Your signature indicates that you have decided to participate, having read the information provided above.

Sincerely,
Elizabeth G. Jones RD, MPH
Pediatric Nutritionist 479-5555

_____	_____
Signature of Mother	Date
_____	_____
Address (Mother)	Child care center
_____	_____
Phone number (Mother)	Child care center location

Appendix G

Child Care Sites

CHILD CARE SITES

Centers

1.	California Kids College	9855 Erma Road Scripps Ranch P.O. Box 2270 Del Mar, CA 92014-1570
2.	Children's World	480 Corral Canyon Road Bonita, CA 92002
3.	Jewish Community Center	4879 - 54th San Diego, CA 92182
4.	KinderCare Learning Center	6150 Agee St. San Diego, CA 92122
5.	Linda Vista Christian Day	2130 Ulric St. San Diego, CA 92111
6.	Learning Center, Salvation Army	2799 Health Center Drive San Diego, CA 92123
7.	Learning Center, Teenage Program	2799 Health Center Drive San Diego, CA 92123
8.	Pioneer Church Children's Center	2550 Fairfield Street San Diego, CA 92110
9.	Solana Beach Infant Center	309 N. Rios Ave. Solana Beach, CA 92075-1298
10.	YWCA	201 First Street San Diego, CA 92101

Schools

1. Ocean Shores High School	3131 Oceanside Blvd. Oceanside, CA 92056
2. Vista High School	400 E. Bouvier Vista, CA 92083

Homes

1. Ruth Hewitts Day Care	187 Via La Paz San Marcos, CA 92069
2. The Other Mother	La Costa, CA Ph 438 3477
3. Phillips Family Day Care	Clairemont, CA Ph 268 4962
4. Reutzel Family Day Care	North County San Diego, CA Ph 741 2383
5. Pat Trumbels (infants only)	11941F Royal Road El Cajon, CA 92021

Hospitals

1. Hospital ISSSTECALI	Paseo del Pacifico #43 Fracc el Mirador Tijuana, B. C., Mexico