CHAPTER –II

PROBLEMS & HYPOTHESES

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CHAPTER II

PROBLEMS AND HYPOTHESES

2:1 PROBLEMS: THEIR STATEMENTS

In the vast ocean of knowledge, a “Problem” must strike the mind of a research fellow, trying to study any event. In any field of study, without a problem in view, no research can make its beginning. Hence the formulation of a problem must be the first step of any research. It may so happen that the problem is of very general natural having dimensions and cross linking. But as the research goes on, the problem gets its proper dimension and become more and more precise. It has therefore been maintained that “a large part of the solution of a problem lies in knowing what it is one is trying to do” Kerlinger (1973).

A problem always strikes the mind of a research fellow in the state of ignorance and doubt. While posing a problem, the researcher has to keep in view that the problem is such that it can be amenable to empirical testing. By testability it is meant that it is possible to make a probability statement about the answer, that is, to determine empirically a certain degree of probability about its being true or false Mc Guigan (1960).

A problem is an interrogative statement that asks the question regarding the relationship between two or more variables. A problem always has two or more variables. One being the dependent variable and the other are the
independent variables. In order to arrive at a conclusion answer to the problem, the researches has to accept a hypothetical answer and then empirically test its correctness. “A researcher observes an event, wonders about it, formulates some tentative ideas, about it and set out to test the accuracy of these ideas” Bachrach (1972).

**THE PROBLEMS**

In the light of the above mentioned discussion, the following problems have been set forth to seek their scientific solutions:-

1) The first problem undertaken in the present study was to examine whether subjects show significant differences in their physiological and neurobehavioural parameters before and after intervention of oil massage.

2) The second problem undertaken in the present study was to examine whether subjects show significant difference in their physiological and neurobehavioural parameters before and after intervention of kangaroo mother care.

3) The third problem undertaken in the present study was to examine whether kangaroo mother care and oil massage together in a position to influence jointly or in interaction with each other in showing significant difference in physiological and neurobehavioural parameters of low birth weight babies before and after intervention.
Considering the above mentioned statements of problem, it is clear that there exist two dependent variables, i.e., physiological and neurobehavioural parameters of low birth weight babies and two independent variables namely kangaroo mother care and oil massage.

Several research methodologists and behavioral scientists like Kerlinger (1978, 86), Goode and Hatt (1981) and many others have pointed out that the best way to obtain a scientific solution for a research worthy problem is to formulate coherent research worthy hypothesis, where the variables concerned with the problem should be operationally specified through a logical deduction system. Hence, in the following steps, an attempt has been made to operationally specify the nature of variables involved in the present study, as far as possible.

2:2 VARIABLES OF INTEREST: THEIR SPECIFICATION

Variable are characteristic of the participants or a situation in a given study that has different values or levels. Before arriving at the research worthy hypotheses, it is better to understand the operational characteristics and properties of the dependent and independent variables involved in the present investigation.

B) Dependent Variables:
A dependent variable reflects any effect associated with the manipulation of the independent variable (s). The selection of an
appropriate dependent variable should be based on theoretical and practical considerations, which is determined by a consideration of the sensitivity, reliability and practicability of the possible dependent variable. In selecting a dependent variable, it should also be noted that the observations within each treatment level (or combination of treatment levels) are normally distributed (Kirk, 1969). Here, in the present piece of work physiological & neurobehavioral is the dependent variable.

OPERATIONAL DEFINITION OF PHYSIOLOGICAL & NEUROBEHAVIORAL PARAMETERS OF LOW BIRTH WEIGHT BABIES

Definition of Physiological Parameter: Infant grows quickly; bodily changes are rapid and profound. Physiological development refers to biological changes that children undergo as they age.

Physiological parameters includes

a. **Weight** – A normal weight at birth is about 2500 to 3500 gm. Low birth infants weigh less than 2500 gm at birth and tend to lose weight about 10 -15% in the first 7 days of life. They regain their birth weight by 10 – 14 days thereafter weight gain should be at least 15-20 gm per kg per day till a weight of 2.5 kg is reached after this a gain of 20-30 gm per day is considered appropriate. The normal birth weight of baby lies between 2500 to 3500gm at birth and the infant gains 1.5lb (680 gm) for month whereas the birth weight of low birth weight baby is less
than 2500 gm. Between 0 and 6 months, the infant gains 1.5lb (680 gm) per month. Birth weight doubles by 5 months. Average weight gain per month of 6 months infant is 16 lb (7.257 gm). Between 6 and 12 months the infant gains 0.75lb (340 gm) per month. Birth weight triples by 12 months. Average 12 month and old baby weight is 21.5lb (9752 gm)

b. **Height** - The normal length of the baby at birth is between 45 to 50 cm and the infant grows 1 inch (2.5 cm) per month whereas in case of low birth weight babies the length is usually less than 44 cm. Between 0 and 6 months, the infant grows 1 inch (2.5 cm) per month to an average size of 25.5 inches (64.8 cm). Between 6 and 12 months, the infant’s birth length increases 50% to an average size at 12 months of 29 inches (73.7 cm) by 12 months.

c. **Head circumference or occipital frontal circumference** - The head circumference lies between 33 cm to 35 cm at birth in case of normal birth weight babies however it is less in low birth weight babies and head circumference increases 0.6 inch (1.5 cm) per month between 0 and 6 months, head circumference increases 0.6 inch (1.5 cm) per month to an average size of 17 inches (43.2 cm). Between 6 and 12 months, head circumference increases 0.2 inch (0.5 cm) per month to an average size of 18 inches (45.7 cm). By 12 months, head circumference increases by one-third and brain weight increases 2.5 times from birth.
The head circumference disproportionately exceeds that of the chest. (Normally, the head circumference is greater than the chest circumference at birth and the difference is about 2 cm)

d. **Chest Circumference**: Chest circumference is normally about 1 inch (2 cm) less than head circumference. However it is less in low birth weight babies.

**Definition of Neurobehavioural parameter**: Having to do with the way the brain affects emotion, behaviour and learning. (Source: NCI cancer.gov dictionary)

**Neurobehavioral parameters include** neurobehavioural organization, neurologic reflexes, motor development and active passive tone as well as signs of stress. Neurobehavioral parameters of low birth weight babies such as habituation (response decrement to light & sound), posture, skin colour, skin texture, movement, response decrement to tactile stimulation of the foot, lower extremity reflexes (plantar grasp, Babinski, leg resistance, leg recoil, power of active leg movement), upper extremity and face reflex (scarf sign, power of active arm movement, rooting, sucking, grasping of hands), upright responses (placing and stepping), orientation (inanimate visual, inanimate auditory, animate visual & animate auditory), motor maturity, consolability with intervention were assessed by using the **Neonatal intensive care unit network neurobehavioral scale**.
(A) Independent Variables

The selection of an appropriate independent variable and its levels should be based on results of previous experiment, concerned research literature and on theoretical and designing considerations.

In the present study two independent variables, namely, oil massage and Kangaroo Mother care were undertaken.

1. OIL MASSAGE

Oil massage is widely prevalent in India since time immemorial. Trials on effect of massage on growth in preterm infant have used either massage alone as a form of tactile stimulation or massage with vegetable oil. Oil may act as a source of warmth and nutrition.

Dabi et al (2000) reported a significantly higher standardized weight gain in the oil massage group compared to control group.

Solkoff N et al (1973) demonstrated beneficial role of massage in improving neurobehavioral parameters of preterm low birth weight babies.

Baby massage is an ancient child care practice i.e. still practiced all over the world. Recent medical research has proven the benefits of oil massage. Studies have been shown that low birth weight babies when regularly massaged require minimum hospitalization. All newborns show healthy growth more weight gain if they are massaged well and regularly. A good oil massage soothen and calms the baby helps him to relax and sleep better.
and makes him more alert during waking hours. It is a good exercise and promotes motor activity and emotional security in a child. Besides a healthy body and muscular development, it stimulates digestion and helps the baby pass gas (olive oilindia.com). A standardized massage technique (as detailed below) was used for the study. Prior to the onset of study, the technique was standardized by one of the investigators in a sample population of stable low birth weight neonates. During the study, the message was done by the investigator as far as possible. Each mother was also trained in use of the technique by the investigator. The initial messages performed by the mothers were supervised till they had acquired the massage skills. During hospital stay, mothers’ compliance was checked regularly by the investigator.

**Technique of oil massage**

Technique of oil massage includes the following three phase:

**Phase I** This was done in prone position. Four firm strokes with palms of the hands of 5 seconds each, were provided in three areas (a) head for forehead hairline over scalp down to neck with alternate hands; (b) neck from mid line outwards with both hands simultaneously; (c) shoulders from midline outwards with both hands simultaneously; and (d) back from nape of neck down to buttocks with firm, long stroke with alternate hands.
**Phase II** This was done in the supine position. Four firm strokes with palms of the hands, of 5 seconds each, were provided in each area (a) forehead – from midline, outwards with both hands simultaneously; (b) cheeks – from side of hands with both hands simultaneously in rotating and clockwise direction; (c) chest, “butterfly” stroking from midline upwards, outwards and inwards back to initiating point; (d) abdomen – from the appendix, in a clock wise direction around abdomen avoiding the epigastrium and probes, with gentle strokes, (e) upper limbs (each separately) – from hips to ankles using alternate hands for stroking; (g) palms from wrist to finger tips using alternate hands for stroking; and (h) soles- from heel to toe tips using alternate hands for stroking.

**Phase III** This was done in the supine position and consisted of passive flexion and extension movement of the limbs at each large joint (shoulder, elbow, hip, knee and ankle) as 5 events of 2 seconds each in each area.

The duration of each massage was ten minutes performed two times a day (one is at morning and other is at evening). Infants in the oil massage group received massage with 10 ml/kg/day of olive oil (wherein 1 ml oil contains 500 mg of linoleic acid) divided equally between each of the four applications. If babies were discharged from the hospital before completing the trial, mothers were given measured amounts of oil so as to last till their next visit.
Axillary temperature was recorded both before and after the massage to check the occurrence of hypothermia during the intervention.

All neonates stayed in the hospital for at least ten days after enrolment. In those who were discharged before the completion of the study, the mother continued the intervention at home and they were followed up twice a week until the end of the trial. At discharge, mothers were explained the usual symptoms of hypothermia including the touch technique of detecting difference between peripheral and trunk temperature.

**Precautions taken during massage**

- It is a good practice to keep all needed things ready, before starting rubbing the oil on the baby’s body. This includes the baby massage oil, tissues, clean diapers and clothes.
- Baby’s skin is very soft and bracelet rings and long nails might hurt child accidentally. So, keeping fingernails short and keeping aside the jewellery worn on hands when massaging the baby.
- Spreading a changing mat or a soft towel on a flat surface and undress the baby. Putting the baby down with his or her face up.
- Rubbing only about half-a-teaspoon of oil at a time on palms, so that they glide easily on the baby’s body and applying more oil later as needed.
- Warming the palms before handling the baby by rubbing the palms against each other.
• Using smooth, gentle but firm strokes with palm or fingers. Light circular movements on chest and stomach, stroking across the shoulders, downward movement on the arms and legs and upward movements on the back are the best.

• Avoiding too much pressure on the baby’s fragile body and avoid the spine area.

• Keeping the baby engaged while massaging him or her by talking or singing to the infant.

• Eye contact with the baby ensures him or her undivided attention.

• Sudden break in contact of hands may cause alarm to the baby. Therefore, care taken to be gentle while stopping the massage.

• Avoiding applying oil on baby’s palms or fingers as these little ones tend to put them in their mouths or eyes often, which may cause irritation.

• Wrapping the baby in clean and warm towel after the massage and cuddle him or her.

• Avoiding massaging the baby just before and after feeding, or when the baby is ill.

• Avoiding waking the baby up for a massage purpose.

• Avoiding rashes, wounds or areas where the baby has got his injections or vaccines as it may hurt.
2. **THE KANGAROO MOTHER CARE**

**Definition:** Kangaroo mother care (KMC) is a special way of caring for the low birth weight (LBW) babies. It improves their health and well being by promoting effective thermal control, breastfeeding, infection prevention and bonding.

In kangaroo mother care, the baby is continuously kept in skin to skin contact with the mother and breastfed exclusively. Kangaroo mother care is initiated in the hospital and continued at home.

**The two components of Kangaroo Mother Care are:**

i. **Skin to skin contact**

   Early, continuous and prolonged skin-to-skin contact between the mother and her baby is the basic component of Kangaroo Mother Care. The infant is placed on her mother’s bare chest between the breasts.

ii. **Exclusive breastfeeding**

   The baby on Kangaroo Mother Care is breastfed exclusively. Skin to skin contact promotes lactation and thus facilitates exclusive breastfeeding. *Paul Vinod (2009)*

A universally available and biologically sound method of care for all newborns, but it is more beneficial particularly for premature and low birth weight babies, with three components:
• Skin to skin contact.
• Exclusive breastfeeding.
• Support to the mother infant dyad. (Asha P. Shetty, 2007)

Kangaroo Mother Care was first suggested in 1978 by De. Edgar Rey in Bogota, Colombia. The term kangaroo care is derived from practical similarities to marsupial care giving, i.e. the premature infant is kept warm in the maternal pouch and close to the breasts for unlimited feeding. To overcome the inadequacies of neonatal care in developing countries the mothers are used as “incubators” and as the main source of food and stimulation for low birth weight infants while they mature enough to face extra uterine life in similar conditions as those born at term. The method is applied only after the low birth weight infant has stabilized introduction of Kangaroo Mother Care results in early hospital discharge of low birth weight infants (AIIMS NICU Protocols 2008).

Kangaroo Mother Care is a method of care practiced on babies, usually on a preterm infant, where the infant is held skin-to-skin with his mother, father, or substitute caregiver.
KMC by mother                KMC by father (substitute caregiver)

Kangaroo positioning                              Baby uprights between mother breasts

Suman Rao (2006) stated that Kangaroo Mother Care helps in the growth of low birth weight of infants and have the significant role in protecting the low birth weight infants from hypoglycemia, hypothermia, sepsis and improve the neurobehavioral activities and weight gain

Kangaroo positioning

- Baby is placed between the mother’s breasts an upright position in her bare chest.
• Head is to be turned to one side and in a slightly extended position. This slightly extended head position keeps the airway open and allows eye to eye contact between the mother and her baby.

• Hips are to be flexed and abducted in a “frog” position; the arms should also be flexed, breathing stimulates the baby thus reducing the occurrence of apnea.

• Supporting the baby’s bottom with a sling/ binder.

**Monitoring**

Babies receiving Kangaroo Mother Care should be monitored carefully especially during the initial stages. One should make sure that baby’s neck position is neither too flexed nor too extended, airway is clear, breathing is regular, colour is pink and baby is maintaining temperature. Mother should be involved in observing the baby during Kangaroo Mother Care so that she can continue monitoring at home. Ensure the baby’s neck is not too flexed or too extended, breathing is normal, and feet and hands are warm during Kangaroo Mother Care.

**Feeding**

Mother was explained how to breastfeed while the baby is in Kangaroo Mother Care position. Holding the baby near the breast stimulates milk production. She may express milk while the baby is still in KMC position. The baby could be fed with paladai, spoon or tube depending on the condition of the baby.
Duration

All subjects were given minimum 10 hours of Kangaroo Mother Care in a day as per convenience of the mother.

2:3 HYPOTHESES & THEIR FORMULATIONS:

After the selection of a research problem, researcher formulates the testable propositions to obtain a tentative solution of the problem, which is technically known as hypothesis. According to Mc Guigan (1990), “A hypothesis is a testable statement of a potential relationship between two or more variables”. It is a conjectural statement of the relation between two or more variables in declarative sentence form and relates either generally or specifically variables Kerlinger (1986). A good research hypothesis should be conceptually clear, testable, logical, comprehensive, general and related to the existing body of theory and facts. It should provide maximum deductions and should be related to available scientific tests and apparatuses.

Keeping in mind the above characteristics of the research hypothesis, researchers have suggested to frame a hypothesis in logically derived manner which is based on the previous findings obtained by researchers and is directly or indirectly related to the present research problem.

Keeping in view the specification of dependent and independent variable to be incorporated in this study the following six hypothesis have been proposed for verification.
HYPOTHESES

1) The group of low birth weight babies who received oil massage (Experimental Group I) would have significantly higher physiological (weight, height, head & chest circumference) and neurobehavioural parameters than the group of low birth weight babies who do not receive any intervention (Control Group- IV).

2) The group of low birth weight babies who received kangaroo mother care (Experimental Group II) would have significantly higher physiological (weight, height, head and chest circumference) and neurobehavioural parameters than the group of low birth weight babies who do not receive any intervention (Control Group- IV).

3) The group of low birth weight babies who received kangaroo mother care and oil massage both (Experimental Group-III) would have significantly higher physiological (weight, height, head and chest circumference) and neurobehavioural parameters than the group of low birth weight babies who do not receive any intervention (Control Group IV).

4) The group of low birth weight babies who received kangaroo mother care and oil massage both (Experimental Group-III) would have significantly higher physiological (weight, height, head and chest circumference) and neurobehavioural parameters than the group of low
birth weight babies who received oil massage only (Experimental Group – I)

5) The group of low birth weight babies who received kangaroo mother care and oil massage both (Experimental Group-III) would have significantly higher physiological (weight, height, head and chest circumference) and neurobehavioural parameters than the group of low birth weight babies who received Kangaroo Mother Care only (Experimental Group-II).

6) The group of low birth weight babies who received kangaroo mother care and oil massage both jointly together (Experimental Group-III) would have significantly higher physiological (weight, height, head and chest circumference) and neurobehavioural parameters than the other groups i.e. Experimental Group I, II and Control Group IV.
CHAPTER – III

METHODOLOGY

Research is not merely a research for truth but a prolonged, intensive purposeful search

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