GROWTH AND DEVELOPMENT OF ABANDONED BABIES AT KENYATTA NATIONAL HOSPITAL AND SOME CHILDREN HOMES IN NAIROBI

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A DISSERTATION PRESENTED IN PART FULFILMENT FOR THE DEGREE OF MASTER OF MEDICINE (PAEDIATRICS) AT THE UNIVERSITY OF NAIROBI
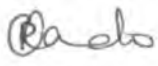
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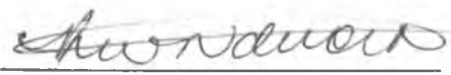### DR. PHELGONA APONDI OTIENO

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DECLARATION

This is my original work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to God who provides wisdom, knowledge and strength and to my parents James and Truphosa Olando who laid the foundation of my education.

CONTENTS

LIST OF ABBREVIATIONS

1. CNS - Central Nervous System.

2. GRF - Growth Releasing Factor.

3. GH - Growth Hormone.

4. ACTH - Adrenal Cortico Trophic Hormone.

5. DNA - Deoxy Ribo Nucleic Acid.

6. RNA - Ribo Nucleic Acid.

7. O.D - Ornithine Decarboxylase.

8. FTT - Failure To thrive.

9. RAD - Reactive Attachment Disorder.

10. AIDS - Acquired Immune Deficiency Syndrome.

11. KNH - Kenyatta National Hospital.

12. NBU - New Born Unit.

13. CWS - Child Welfare Society.

14. KMWA - Kenya Medical Women Association

15. LUMAC - Left Upper Mid Arm Circumference.

16. Wt - Weight.

17. Lt - Length.

18. H/C - Head Circumference.

19. Kg - Kilogrammes.

20. Cm - Centimeters.

21. NGOS - Non Governmental Organizations.

22. PDU - Paediatric Demonstration Unit.

23. Aba - Abandoned Infant.

24. Moth - Mothered Infant.

25. DDST - Denvers Development Screening Test.

26. RDDST - Revised Denvers Development Screening Test.

27. G.K - Government of Kenya.

28. Wt/Age - Weight for Age.

29. Lt/Age - Length for Age.

30. Lt/Wt - Length for weight.

31. RTI - Respiratory Tract Infections.

32. G/E - Gastro Enteritis.

33. ARI - Acute Respiratory Infections.

34. OR - Odds Ratio.

35. H.I.V -Human Immunodeficiency Virus.

36. I.Q _ Intelligence Quotient.

37. KEC - Kenyatta estate community

1. STAFF/INFANT RATIO:

This was defined as the average number of staff per shift, divided by the average number of infants in the given unit. The staff who were included in this definition were those who normally interact with the infants such as nurses, physiotherapist, patient attendants and child care takers.

2. PRETERM:

Infant born before 37 completed weeks of gestation from the first day of the last menstrual cycle.

3. MEDICAL AILMENT:

This was defined as any symptom or sign that led to the child receiving medication.

4. CORRECTED AGE:

This was obtained by the weeks of prematurity subtracted from the chronological age[1].

5. THE DENVER DEVELOPMENT SCREENING TEST

This is a standardized screening test used to provide a simple method for screening for evidence of slow development in infancy and pre-school years. It was standardized on 1,036 presumably normal children aged 2 weeks to 6 years, whose families reflected the occupation and ethnic population of Denver. The test covers 4 functions namely; gross motor, fine motor, speech and hearing and personal social. A total of 105 tasks have been selected which are easy to administer and interpret. An age line is constructed on the chart and all the tasks crossed and those immediately to the left and right of this age line are screened for

personal social. A total of 105 tasks have been selected which are easy to administer and interpret. An age line is constructed on the chart and all the tasks crossed and those immediately to the left and right of this age line are screened for and marked as pass or fail [2,3]. Also see Appendix H.

(a) PERCENTAGE OF CHILDREN PASSING

Each task is graduated in a bar giving an age range, and percentage number of children expected to perform the task at each given age as illustrated below.

25%   50%   75%   90%
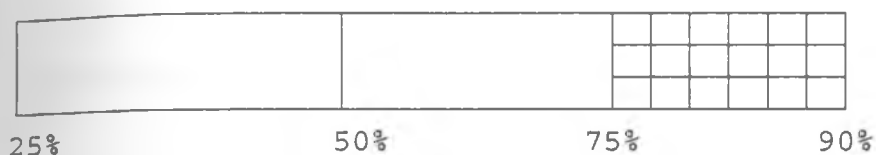
(b) THE REVISED DENVER'S DEVELOPMENT SCREENING TEST

In the Revised Denvers Development Screening Test, the scoring modality was revised and this has been found to increase the validity and test-retest stability of the Test [4,5,6]. See below for actual scoring.

DELAY:

In this study this was defined as a task failed which is completely to the left of the age line (> 90% level). Implying that more than 90% of the standard population are expected to perform the given task by that age.

SCORING BY THE RDDST

ABNORMAL   (1) If 2 or more of the four sectors each has at least 2 tasks delayed.

OR

(2) If 1 sector has at least 2 tasks delayed and one other sector has one delay and in that same sector, the other tests passed are mainly above the 50% level (implying that more than half of the standard population are expected to be performing the tasks at the given age).

QUESTIONABLE

(1) If any 1 sector has at least 2 tasks delayed.

OR

(2) If 1 or more sectors each has 1 test delayed and in the same sector the other tasks passed are mainly above the 50% level (implying that more than half of the standard population are expected to be performing the tasks at the given age).

NORMAL

(1) If performance is not questionable or abnormal.

OR

(2) If only 1 sector has 1 test delayed.

OR

(3) If in 1 sector the tasks passed are mainly above the 50% level.

6.PAEDIATRIC AIDS:

The diagnosis of Paediatric AIDS in this study was based on the WHO Clinical Case Definition of AIDS in Children. Paediatric AIDS is suspected in an infant

with 2 major signs associated with at least 2 minor signs in the absence of known causes of immunosuppression.

Major signs:

    (1) Weight loss or failure to thrive.

    (2) Chronic diarrhoea (>1 month).

    (3) Prolonged fever.

Minor signs :

    (1) Generalized lymphadenopathy.

    (2) Oropharyngeal candidiasis.

    (3) Repeated common infections.

    (4) Persistent cough.

    (5) Generalized dermatitis.

    (6) Confirmed maternal H.I.V infection. [7]

7.ABANDONED BABY:

This was defined as any baby in an institution, motherless due to known or unknown circumstances, without a primary relative caretaker and subject to the general conditions of the institution.

LIST OF TABLES

LIST OF TABLES (Contd)

SUMMARY

A cross-sectional survey was conducted on abandoned babies aged 1-18 months at KNH and 7 Children's homes in Nairobi from December 1993 to January 1995. A total of 82 abandoned babies were recruited. Each abandoned child was matched for age and sex with 2 mothered babies. There were 116 males and 130 females giving a ratio of 1:1.1. Abandoned babies were compared to mothered babies for nutritional and developmental status.

Most of the abandoned babies, (78%), in this study were in institutions managed by NGOs. The institutions were characterized by a low staff/infant ratio with 6/8 having ratios of 1:5 -1:10. The institutions were also categorized into "home type", "hospital type" and "mixed hospital and home type" and it was found that 83% of the babies recruited were from "hospital type " institution.

Sixty six (80.5%) of babies were abandoned in the first month of life. Abandoned babies had similar birth weight and types of illness experienced with the mothered group, however babies who were abandoned in the hospital had a significantly higher prevalence of illness (p = 0.01).

Abandoned infants were lighter, shorter, had lower head circumference and had a significantly small LUMAC compared to mothered group (p = 0.02). Abandoned males aged 1-3 months were significantly lighter (p = 0.01) shorter (p = 0.06) and had a smaller head circumference (p = 0.05). Abandoned males

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aged 3.5-6 months were thinner as measured by mean LUMAC (p = 0.000) and had lower mean weights (p = 0.07) and length (p = 0.06). Female abandoned infants were essentially comparable to mothered group except in the 6.5-12 months where they were thinner by mean LUMAC (p = 0.05). Abandoned babies compared to mothered babies were likely to be wasted (p = 0.001) and stunted (p < 0.001) as indicated by Z scores. Babies in " hospital like" institutions had increased risk of stunting (OR 3.3) and wasting (OR 3.5) compared to the other institutions.

Mothered babies were more alert and interested in their surrounding compared to the abandoned babies (p = 0.001). Abandoned babies had significant developmental delay, as measured by the RDDST, compared to mothered babies (p = 0.000). In all 4 functions of gross motor, fine motor, speech and hearing and social and personal tested, abandoned babies were more delayed compared to mothered babies (p = 0.000 in all 4 sectors). Most delays in abandoned babies, were recorded in social personal sector 25/73(34.2%), followed by gross motor 21/73 (28.8%)and speech and hearing also 21/73 (28.8%).

Age at admission was not associated with developmental achievement, however, infants abandoned over longer periods had higher rates of delayed development (p = 0.007). Babies in the hospital had the highest risk of developmental delay (OR = 3) compared to the other institutional types.

Preterms abandoned compared to mothered infants had lower birthweights, weight, length, head circumference and significantly lower LUMAC (p = 0.0006). For chronological age, preterm abandoned babies were significantly delayed in development compared to mothered babies (p = 0.03).

This study has shown that mothered infants have significant advantage over abandoned ones in terms of physical growth, nutritional status and development and that institutions managed like a hospital are significantly disadvantaged. There is an urgent need to address the results of this study with managers of these institutions and authorities concerned with child care in Kenya.

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INTRODUCTION AND LITERATURE REVIEW

Child abandonment is on the increase in Kenya. It is a common form of child abuse and neglect here. Muita, reporting on Battered Baby Syndrome at KNH in 1990. found 46% of the cases as abandonment. [8] In the traditional African society the strong cohesive extended family provided a safety net for children. Orphaned children were readily absorbed into the family and severe sanctions against premarital sexual relationships as well as integration of widows into existing families discouraged existence of single parenthood. Today modern education and employment away from home has led to erosion of family ties. This, together with the increasing economic demands, increase in teenage pregnancies, unemployment and lack of adequate education on family planning, has resulted in increasing numbers of unwanted children. [9]

Growth and Development

Growth can be defined as an increase in physical size of the whole or part of the whole, whereas development is used to indicate increase in complexity of function. Development is a continuous process and not merely acquisition of milestones. It depends on the maturation and myelination of the nervous system. Until this has occurred, no amount of practice can make a child learn a specified skill. On the other hand, the ability to perform a skill lies dormant when practice is denied. For maturation of the CNS adequate nutrition is important thus, slow growth implies slow development. Development parallels growth but it is not the same as growth. [10,11,12]

Apart from adequate supply of food and stimulation from the external environment, the baby needs an intact digestive system and internal urge to perform tasks. Man is the slowest animal in development, and has a protracted period of infancy and childhood in preparation for adult life. Any adverse event during infancy and childhood has the potential to affect the future life. [10,11,12]

Factors which influence growth include; nutritional supply, hormonal balance, emotional factors, genetic constitution, infections, congenital defects, socio-economic status of the parents. Other factors include, genetic, secular trends, socio-economic status of the parents, antenatal insults, seasonal variations and secular trends among others. [10,11,12]

Hormonal factors: An intact endocrine system is essential for growth and appropriate interplay of hormones brings about growth. The chief hormone GH released under the influence of GRH acts on specific target cells to increase cell growth. Other hormones which influence growth are insulin, thyroxine, adrenaline, glucagon and parathomone. The thyroid hormone plays a role in cell multiplication and cell size in infancy. Insulin increases the synthesis of DNA and RNA in target tissues such as muscle and bone. [12]

Nutrition: Nutrition is a major determinant of growth. Adequate supply of nutrients and an intact digestive system are important for growth. The needs of a child varies with age and nutritional requirements are highest in the first year of life whereby the requirement is three times more per unit body weight

compared to that of adults. Improper food intake or poor dietary habits and food faddism may lead to malnutrition. Brain development is complete by 18 months and nutritional deprivation during infancy has been shown to have adverse effect on brain development and ultimate I.Q. [10,12,13]

Emotional factors: Emotional disturbance is a common cause of failure to grow. The real mechanism is not known however it is speculated that hypothalamic growth centre and metabolism are disturbed and increased amount of steroids produced during stress. In America 50% of children diagnosed as FTT have no specific organic etiology. In 1980, American Psychiatric Association termed Non-Organic failure to Thrive as (RAD) Reactive Attachment Disorder of Infancy. Adequate caloric intake in unfavourable psychological environment has been shown to be insufficient for sustained physical growth. [14] In older children, neuroendocrine changes have been reported to occur due to stress or neglect. Growth hormone deficiency can be reversed by change of residence alone. Stress leads to excess somatostatin and thus inhibition of growth factor. There is irregular sporadic production of GH during stress as opposed to the usual synchronous manner. ACTH production is also low in stressful situations. [11]

Infections: Infective illness has an eroding effect on lean tissue mass with breakdown of tissue protein, and diversion of protein synthesis of antibodies towards fighting infection. At the same time during an infection there is reduced intake due to anorexia and other losses like diarrhoea and vomiting.

Thus with infection there is associated growth faltering. [15]

Development is divided into four main sectors namely: gross motor, fine motor, speech and hearing and personal-social sectors. Some factors only affect specific sectors of development whereas others have a more global effect on development.

Environmental factors

Environmental factors have a profound influence on development. The interaction of appropriate stimulus and the ability of the individual to respond accordingly is needed for learning to take place. There is a "sensitive period" at which learning in response to appropriate stimulus is easier than other times, and a "critical period" beyond which learning or adaptation is impossible. Thus, for appropriate development to take place, the child needs appropriate, adequate stimulation or challenge from the environment at the right time and also endowment to respond appropriately. The amount of contact and attention that a child receives are very important and it has been noted that emotional deprivation in first three years of life can lead to both physical and mental retardation. Other factors which influence development include, parental way of life, neonatal diseases, congenital defects and intrauterine insults. [11]

Effects of maternal deprivation and institutionalization

Maternal deprivation or a bad home have long-term negative effects on a child and although attempts may be made to substitute the contributions of the

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mother, it is often not possible to do this sufficiently. Abandoned children are thus prone to have poor growth and poor development. Survey done in six children homes in Nairobi revealed that most abandoned children suffer some form of malnutrition, physical and emotional neglect [16].

The mother during infancy supplies milk to the infant by breast feeding in which case the feed is supplied readily, hygienically and cheaply. During suckling, the mother-child relationship is further enriched. Ribble M.A. in her book, 'The Rights of infants' puts it that "A breast fed baby is better nourished and better emotionally developed". As the child grows, the mother is responsible for weaning and also taking care of the child without pay. Contact is an important stimulus to sensory growth and awareness. The acts of loving, fondling, caressing, singing and speaking to the infant have a deep impact on emotional development and growth. Speech development is faster in mothered children than others. An abandoned child is deprived of all these free benefits. [17]

In an attempt to identify specific social and environmental factors that influence child development, Pollack demonstrated that close family ties and parental involvement in play were contributory. [18] Work done in animals has repeatedly shown that maternal deprivation or absence of appropriate stimulus can lead to abnormal growth and development. In 1987, Schanberg et al reported that rat neonates separated from their mothers had low levels of ornithine decarboxylase in the liver and other tissues. But with return to the

mother or adequate tactile stimulus, the activity of ornithine decarboxylase increased again. (O.D. is fundamental for polyamine synthesis and increases with increased growth rate [19].

In 1954 Levine et al subjected infant rats to various degrees of stimulation and noted that the ones who were handled least behaved in a peculiar manner when they reached adulthood. Animals stimulated earlier, had immediate and appropriate response of adrenal steroids during stress. The non stimulated had a slower response but sustained high levels of steroids, which is a maladaptive way of response to stress [20]. Monkeberg studied families of severely marasmic children who were mostly maternally deprived, or unwanted or of single mothers. He noticed that the severely malnourished children who were managed out of hospital with psychomotor and affective stimulation and good nutritional support, did better than those managed in hospital. He was able to demonstrate that stimulation was responsible for increase in both height and weight, better psychomotor development, reduction in infection rates and mortality rates [21].

Musoke and Jitta showed that growth rate of abandoned preterms was significantly slower compared to mothered controls of similar birth weight [22] In Embu Kenya, a significant association was found between home rearing factors and cognitive performance of infants. Infants who had mother care takers were better socially oriented and more explorative compared to babies who had no specific primary care taker [23]. This implies that a mother figure

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is very important for proper growth and development.

There is existence of need to care for children without mothers and the existence of different approaches by which this need is met. In most institutions, interchange is intermittent, with fluctuating groups of attendants and this can be disastrous to physical and mental development. The amount and depth of interchange is often inadequate in most institutions. Spitz was able to demonstrate that institutionalized infants displayed marked deceleration in perceptual and motor development and were socially withdrawn. Even with good nutrition and hygiene, the mortality rate remained high [24]. Goldfarb concluded that the absence of the mother results in a basic defect in the total personality and the child remain fixated at an extreme immature level [25]. A study carried out in Ibadan by Dorojaiye in 1974 on babies indicated that children without mothers kept in children homes lost their developmental age, however when tested later after leaving the homes, they regained developmental age. He noted that there are particular human relations necessary for adult-child interaction if emotional problems are to be solved [26]. Freud in 1942 had also found a similar thing, that children who remained with their mothers regardless of harassment of air attacks developed better than those who were evacuated to children homes [27]. Similar reports on the devastating effects of early absence of the mother and institutionalization has been reported from studies done by Bowlby in 1951 and Wayne in 1960 [28,29].

Studies on the motherless are inherent of some weakness as has been observed

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by several authors, such as Casler, Fischer, Lowrey, Reingold and Musoke [30,31,32,33,34]. It is often difficult to determine the actual events surrounding birth, maternal details may be missing altogether and it has been difficult to prove whether the effects on development are due to rupture of an already existing bond or complete lack of establishment of a bond. However at best it is important to determine the outcome and the progress of these babies in the institutions. The most urgent issues to address include how to curb the act and how to give optimal care in the alternatives that are existent.

In this study the author endeavours to investigate the outcome of growth and development of these babies in some institutions in a sophisticated city.

STUDY JUSTIFICATION AND LIMITATIONS

Justification

There is always a false feeling of safety whenever an abandoned baby is placed in an institution. Though the baby may be removed from a hostile environment like the street or the hospital, we do not know how they fare in terms of growth and development.

Each institution has its own lay out programme, with no specific guidelines as to the care given in these institutions. Hence the quantity and quality of care is haphazard. Since these institutions rely on voluntary financial support, they may from time to time be short of staff and supplies. All these factors may have an influence on the child's growth and development.

It is hoped that this study will reveal how these children fare, with a view that if they are not doing well, an intervention programme can be designed to improve on the aspects of care that are not being addressed at the time of the study.

Limitations

(i) The study of growth and development would be better as a longitudinal study, but due to time limitations for the study, a cross-sectional survey

with a comparative group was carried out. Several infants are given for adoption and would be lost to follow up if a longitudinal study was carried out.

(ii) Circumstances surrounding birth could not be determined in most cases and the ages of the abandoned babies were often approximated especially in cases where the babies were not born in hospital. Age was obtained from the following sources; hospital discharge notes, immunization cards, cord or skin condition at admission and approximation by the staff.

(iii) There is always a wide age range for expected performance of children, thus in this study a comparison with normal mothered infants was relied upon to control for environment, race and culture differences of children used to standardize DDST.

(iv) One home was closed down during the study, in one consent was withdrawn in the middle of the study and in another consent was delayed due to the procedural steps. These factors hampered the continuity of the study and selection of cases in the study area.

(v) Daily caloric intakes of babies could not be assessed because in most units there were no feeding charts. It was also difficult to estimate quantities of the various components in mixed foods. This information was therefore not analysed.

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OBJECTIVES   OF THE STUDY

1. To determine   whether   the growth of abandoned   infants   in institutions differs from that of infants living with their mothers.

2. To compare   the development   pattern   of abandoned   infants   in institutions   with that of infants living with their mothers.

STUDY   MATERIALS   AND   METHODS

A cross-sectional   survey of abandoned   babies   aged 1 to 18 months   was carried

out   at   KNH   and   seven   children   homes   in   Nairobi.   All   abandoned   babies

identified   within   the   study   areas   were   recruited   consecutively   if they fulfilled

the   selection   criteria.   For   each   abandoned   child,   2 mothered   controls   were

selected,   matched   for age (plus   or minus   2 weeks)   and sex. Preterm   infants   had

corrected   ages   calculated   [1].

The   investigator   visited   each   study   area   at least   once   in a month.   The   rate   of

admission   in these   institutions   is quite   low.   Using   the notes   available,   inquiry

and physical   examination,   the babies   who qualified   were   recruited.   History   of

ailment   over   the past   one month   was obtained   from notes   or the staff   who

normally   take   care   of the babies.

Study   Areas

The   study   was carried   out at KNH,   and seven   children's   homes   in Nairobi

namely;   Mama   Fatuma,   Sunrise   baby wing,   Mama   Ngina   Kenyatta,   Dagoretti,

Missions   of Charity,   Kabete   and Barnados.

Kenyatta   National   Hospital:

Kenyatta   National   Hospital   is the only   national   public   referral   hospital   in

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Kenya. It is the teaching hospital for the University of Nairobi and also serves as a provincial hospital for the residents of Nairobi and its environs. There is one New Born Unit where infants who need special care are admitted soon after delivery. Babies are abandoned either in the NBU, the maternity wards or the paediatric wards. The highest number of abandoned infants in the hospital are in the NBU. In 1991, there were 85 cases of abandoned babies in the hospital. Infants abandoned on the streets or elsewhere in the city are also brought to the hospital by the police for screening for any medical problems and for sheer lack of alternatives. These infants stay in the hospital for a long time awaiting either adoption or transfer to the children homes. They are therefore taken care of by the same staff that are taking care of the sick children.

Children's Homes:

There are several children's homes in Nairobi run by either religious, philanthropic organizations or individuals. The voluntary organizations which sponsor these homes are either local or international organizations. Local organizations include CWS, local Churches and personal voluntary groups. International organizations include The Barnardos Foundation, SOS International and Missionary Churches. The government of Kenya sponsors only one home in Nairobi.

The Children's homes included in the study were; Sunrise baby wing and Mama Ngina Children's home which are under Child Welfare Society, Dagoretti Children's Center and Missions of Charity under Missionary Churches, Mama

Fatuma under local voluntary groups, Barnados Children's Home under Barnados Foundation and Kabete Children's Home under The Children's Department. All these homes admit babies from either the hospitals, the police through the children's Department or those given up for adoption. The infants are taken care of with a hope for adoption but those who are not taken up are cared for until they reach teen age and become independent.

All the homes have engaged staff who work as house mothers. However the degree of interaction with the infants vary from one institution to the other. In Sunrise, Mama Ngina, Missions of Charity Kabete and Dagoretti, the staff/baby interaction tended to be hospital like, with the babies kept in a common room, the staff working in shift with no specific allocation to particular babies. There are regular feeding times and observation times.

In Mama Fatuma the care is more home like with specific house mother attached to particular babies directly and continuously as well as other older children. Barnados has an intermediate arrangement. The staff work on shift with common care of babies during the day but at night the babies are assigned to specific house mothers in their cubicles. Most of these institutions have few staff caring for the babies. Only one home had a staff/infant ratio <1:5. The rest had more babies per staff.

The choice of the homes was based on the following criteria:
(1) Home registered or known to the Childrens Department Ministry of

Home Affairs.

(2) Home that admits babies.

(3) Consent given by the mother organization.

Selection Criteria

Babies selected were between 1 and 18 months of age inclusive. The child was required to have been abandoned for at least 2 weeks. Abandoned babies were excluded from the study if they had congenital malformations or defects, evidence of brain damage, chronic or recurrent illness (such as convulsions, tuberculosis, bronchial asthma, heart disease and any malignancies). Those with AIDS or the very low birthweight ($< 1500gm$) were excluded from the study.

A list of the cases was made and with this list, visit was made to the Well Child Clinic (KNH PDU) where the first control was selected. The first baby in the queue who matched the case for age plus or minus 2 weeks and sex and fulfilled the selection criteria was selected. The second control was selected in the same manner from Kenyatta Estate Community Clinic (Anderson Hall). However, for the preterms, the controls were selected from either NBU or Ward. Preterm control were selected if they matched the case for gestational age (plus or minus 1 week), sex and chronological age (plus or minus 2 weeks).

The control babies were selected if they were accompanied by the natural

mother, had no evidence of brain damage and did not have chronic or recurrent illness (such as convulsions, tuberculosis, bronchial asthma, heart disease or any malignancies). Those with AIDS or the very low birthweight (<1500gm) were also excluded.

Anthropometric measures

Anthropometric measurements of weight, length, head circumference and LUMAC were taken on all babies who qualified to be in the study.

Weight: Using a salter weighing scale, the weight of naked baby was taken to the nearest 0.1Kg. The scale was adjusted before every other consecutive weighing.

Length: Using a stadiometer, recumbent length of the infants were taken. With the help of an assistant, the head was held against the board with the chin vertical and the baby fully extended before reading the length. Length was recorded to the nearest 0.1 cm.

Head circumference: Using an un-stretchable tape measure, occipital frontal diameter was taken to the nearest 0.1 cm.

Left upper mid-arm circumference: Using an un-stretchable tape measure, the mid-arm circumference of the upper left arm was taken to the nearest

0.1cm. The mid site was taken between the most distal point of the acromion process and the most prominent point of the olecranon.

Length, head circumference and mid-arm circumference measurements were taken three times and the mean obtained in order to increase accuracy.

Z scores were obtained for Wt/Age, Lt/age and Lt/Wt by the anthrop-software package. Indicators of malnutrition were derived as scores below -2 s.d of any of the parameters.

Development

With the assistance of the staff who normally take care of the infant, or the mother among the control children a short developmental history was taken and after observation, each infant was be subjected to the (DDST) Denver Development Screening Test. [2] (See appendix II). Examination was carried only while the baby was alert and quiet. Examination was deferred on infants who were asleep or irritable and another visit was made within the week in order to complete the examination. A vertical line was drawn from the age mark of each infant and all the items on both sides and those crossed by the line in all the four sectors; gross motor, fine motor, speech and hearing, and personal social were screened for. The items passed or failed were marked accordingly on the test sheet. Scoring was done as in Revised Development Screening Test. [5]

Sample size

Sample size was calculated as n = 81

$$n = \frac{Z^2_{1-\alpha/2} \; P(1-P)}{d^2}$$

Where n =   Minimum sample size
  p =   Anticipated prevalence of poor growth or development
  α =   Significance level (0.05)
  d =   Degree of precision
  p = 0.3
  d = 0.1
 Z1 -a/2   =   1.96

Ethical   consideration

Approval to carry out the study was sought from the Ethical Committee   KNH.
Clearance   was obtained   from the Office of the President   before carrying out
the study in the homes.   Consent was obtained from each of the institutions
directly.   A verbal consent was obtained from the mothers of the control group
before examining the babies.   All the information   obtained was treated with
maximum confidentiality.

The examination and measurements   done during the study were
non-invasive.   During the study, any child noted to be ill was started on
treatment or referred for investigations and further treatment.

Data   management   and   analysis

Data entry: SPSS/DE package was used for data entry. Data was entered as

the study was carried out to facilitate verification of information and cleared before commencing analysis.

Data analysis: The SPSS/PC computer package was used. Anthropometric Software package was used to analyse the anthropometric data. Means and independent t-test were used to analyse continuous variables and Chi square or Fisher exact test to analyse categorical variables. Most of the results were represented in tables.

Demographic   characteristics

A total of 246 babies ranging from 1 month to 18 months were recruited in the study from December 1993 to January 1995. Of these 82 babies were abandoned and 162 were mothered.   There were 116 males and 130 females giving a ratio of 1:1.1.

The mean age was 5.5 months, the median being 3.5 months and age range of 17 months.   Most of the babies, (171/146)   69.6%, were 6 months old or younger. See table 1.

Table 1: Age distribution   of babies in the study

Age in months	Abandoned (f)	Mothered (f)	Total	%
1 - 3.4	40	77	117	47.6
3.5 - 6.4	17	37	54	22
6.5 - 9.4	8	16	24	9.8
9.5 - 12.4	7	16	23	9.3
12.5 - 15.4	3	7	10	4.1
15.5 - 18	7	11	18	7.3
Total	82	164	246	100

The mean birthweight   in abandoned   infants was 2807 grammes (s.d. 737.3) and 3073 grammes   (s.d. 670) in mothered   group.   This difference   was not

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statistically significant, p = 0.237. However, only 44 (53.7%) abandoned babies had records of their birth weight while the mothered group, 137 (84%) had the records.

Most of the babies 60/82 (73.2%), were abandoned in the first week of life and cumulatively 66/82 (80.5%) were abandoned in the first month of life. Only 16 (19.5%) were admitted in an institution later than 30 days of life. The median age at admission was 2 days and a range of 359 days. The duration of abandonment was obtained at the time of recruitment and it was found that duration of abandonment of the babies recruited ranged from 3 - 77 weeks, with a median of 12 weeks and a mean of 18 weeks. See table 2.

Table 2: Some Characteristics of abandoned babies

Characteristics	Mean	Median	Range
Duration of abandonment in weeks at the time of review	18	12	74
Age at admission in days	38	2	359

There were three characteristics that were evaluated for each institution. These were: The sponsor organisation, staff/infant ratios and the type of care given in the institution. See table 3.

Most babies 46(56%) were cared for in institutions under locally sponsored

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NGOs, whereas both the international NGOs and the government institutions had 18(22%) of the babies that were recruited. These figures were partially influenced by the time of initiation of the study in the various institutions. Most of these units 6/8 (78%) had a staff infant ratio of 1:5-1:10. One had a ratio of >1:11 and the other had a ratio of 1:2 - 1:4. Sixty eight (82.9%) of babies were in institutions with staff infant ratio of 1:5 - 1:10. Depending on the kind of care given to the babies, one unit was labelled "homelike", 5 were "hospital like" and 1 somehow "intermediary".

Table 3: Characteristics of the institutions in the study

Characteristic	Institutions	No of Babies	Percentage
SPONSOR Local NGO	6,7,8	46	56
International NGO	1,2,3	18	22
Government	4,5	18	22
STAFF/INFANT RATIO 1:2-1:4	2	6	7
1:5-1:10	3,4,5,6,7	68	83
> 1:11	8	8	10
TYPE OF CARE GIVEN Homelike	8	8	10
Intermediate	2	6	7
Hospital Like	3,4,5,6,7	68	83

Key below:

Key for institutions:

1=Missions of Charity	2=Barnados	3=Dagoretti	4=KNH
5=Kabete	6=Sunrise	7=Mama Ngina	8=Mama Fatuma

Medical condition

Table 4 shows distribution of medical conditions among the children in the study. It was found that 50/82 (61%) of abandoned babies had some medical ailment compared to 89/164 (54.3%) of the mothered babies. This difference was not significant, p = 0.17. Respiratory tract infection was the commonest

clinical condition 68/139 (48.9%), Diarrhoeal diseases 39 (28%), and other
ailments 32(23.1%) which included malaria, anaemia and skin conditions.

Table 4: Distribution of babies by medical condition

Medical Condition	Abandoned	Mothered	Total
RTI	21	47	68
G/E	19	20	39
Others	10	22	32
No Ailment	32	75	107
Total	82	164	247

Babies in Children's homes had prevalence of ailments of 35/65 (53.8%) which
was significantly lower than 15/17 (88.2%) for hospital babies (p = 0.01). See
Table 5.

Table 5: Medical condition of babies in various institutions

Institution	Medical Ailment	No Medical Ailment	Total
Hospital	15	2	17
Children's Home	35	30	65
Total	50	32	82

$x^2 = 6.7$ $p = 0.01$

Prevalence of illness was not correlated to age at admission, into the children's institutions as shown in Table 6.

Table 6: Comparison of age at admission with the medical condition of the children

Age at admission (days)	Medical Ailment	No Medical Ailment	Total
≤ 30	42	24	66
≥ 31	8	8	16

$x^2 = 1.0$ $p = 0.32$

Duration of abandonment was categorised into intervals of 10 weeks and the medical conditions in the various groups obtained and compared with each other. There was no statistical significance in the differences, $p = 0.53$. See table 7.

Table 7: Comparison of the duration of abandonment of babies with their medical condition

Duration of abandonment in weeks	Medical Ailment	No Medical Ailment	Total
$\leq$ 10	27	12	39
11 - 20	9	6	15
21 - 30	7	7	13
> 30	49	31	82

$x^2 = 2.2$ $p = 0.53$

Anthropometry of term babies

(a) **Mean anthropometric measurements for all term babies in the study:** Term mothered and abandoned babies were compared for nutritional status and anthropometric measurements taken as shown in table 9. (Preterm infants were excluded from this group and their measurements analysed separately.) Abandoned compared to mothered babies were on average lighter, shorter, thinner and had a smaller head circumference. However only the difference in the mean LUMAC achieved statistical difference (p=0.02).

Table 8: Mean weight length head circumference and left upper mid arm circumference   of the babies

Mean Measurements	Abandoned n=73	Mothered n=146	T-value	P-value
Weight (Kg)	5.03 s.d 2.2	6.48 s.d 2.09	1.40	0.24
Length (cm)	57.41 s.d 9.40	60.48 s.d 8.34	3.69	0.06
Head Circumference (cm)	39.40 s.d 4.3	41.53 s.d 4.02	1.70	0.19
LUMAC (cm)	10.83 s.d 1.95	12.31 s.d 1.66	5.28	0.02

(b)   Mean anthropometric   measurements   at various   age categories   and gender   of babies   in the study

Babies   were categorised   by age groups   and gender.   Mean   anthropometric measurements   were then compared   between   abandoned   and mothered   babies. See table 9.

1 - 3.4 month   old babies

Abandoned   males were significantly   lighter than mothered   ones, p = 0.01, and a significantly   smaller head circumference,   p = 0.05. Abandoned   female   infants also were lighter,   shorter,   had a smaller   head circumference   and left upper mid-arm circumference   but these   differences   did not achieve   any statistical significance.

3.5 - 6.4 month   old babies

In this age group,   the abandoned   males were significantly   thinner   than

mothered males, with left upper mid-arm circumference means of 11.01 cm (s.d 2.4) and 13.27 cm (s.d 0.9) respectively, p = 0.00. They were also lighter and shorter with p values of 0.07 and 0.06 respectively. Females in this age group were on average lighter, shorter and thinner, however there was no statistical significance in the differences in this age group.

6.5 - 12.4 month old babies

In this age group both the male and female mothered babies had higher mean weight, length, head circumference and left upper mid-arm circumference than abandoned babies. But there was no statistical significance in these differences.

12.5 - 18 month old babies

In this age group both the male and female mothered babies had higher mean weight, length, head circumference and left upper mid-arm circumference than abandoned babies. However there was only a significant difference in the mean left upper mid-arm circumference of the females, p = 0.049.

Table 9: The mean anthropometric measurements at various age groups. (Rows: 1; Wt (kg), 2; Lt (cm), 3; H/C (cm), 4; LUMAC (cm))

	FEMALES				MALES			
	Abandoned (S.D)	Mothered (S.D)	T Value	P Value	Abandoned (S.D)	Mothered (S.D)	T Value	P Value
	3.4 (0.7)	5.23 (0.7)	0.3	0.60	3.4 (0.4)	5.23 (0.9)	7.5	0.01
	50.6 (3.5)	55.8 (2.7)	0.66	0.42	50.6 (1.9)	55 (3.5)	3.67	0.06
	36.1 (1.4)	39.4 (1.6)	0.17	0.68	36.9 (1.1)	39.4 (1.7)	3.98	0.05
	9.8 (0.8)	11.9 (0.7)	0.31	0.58	9.9 (0.9)	12.0 (1.1)	1.94	0.17
	5.63 (0.7)	6.8 (1.0)	0.97	0.34	5.2 (1.7)	7.34 (0.96)	3.58	0.07
	58.5 (3.6)	61.8 (3.0)	0.93	0.35	58.3 (5.2)	62.3 (2.2)	3.7	0.06
	40.3 (1.2)	42.4 (1.9)	1.99	0.17	40.7 (2.4)	42.76 (1.3)	2.76	0.11
	11.9 (1.5)	13.1 (1.1)	0.36	0.56	11.01 (2.4)	13.27 (0.9)	20.15	0.00
	6.78 (1.4)	8.4 (1.1)	1.04	0.32	7.9 (0.8)	8.52 (0.8)	0.11	0.92
	66.6 (4.6)	68.5 (3.0)	2.94	0.10	68.8 (2.3)	68.4 (2.3)	0.09	0.77
	42.14 (3.9)	44.92 (1.66)	2.4	0.13	45.18 (1.1)	46.3 (1.12)	0.04	0.85
	11.88 (1.33)	13.06 (0.92)	1.09	0.31	12.63 (1.25)	13.56 (1.06)	0.03	0.86
	7.97 (0.92)	9.23 (1.33)	1.3	0.27	9.7 (1.22)	9.0 (1.4)	0.018	0.90
	70.9 (4.1)	72.96 (3.6)	0.14	0.67	75.8 (2.93)	74.5 (3.48)	0.24	0.64
	44.6 (1.9)	47.0 (1.6)	0.57	0.47	46.94 (1.14)	47.5 (2.3)	0.58	0.48
	12.6 (0.88)	13.34 (1.53)	4.44	0.05	14.1 (1.2)	12.98 (1.25)	0.24	0.65

(c) Anthropometric Z-scores

Anthropometric measurements of weight and height of babies were analysed by anthropometric software. Indicators of poor growth were Z scores below -2 s.d for weight/age, length/age and length/weight.

Prevalence of stunting, wasting and both stunting and wasting were noted to be higher in abandoned babies compared to mothered babies as shown in table 10 below, p < 0.0001. The commonest form of malnutrition was stunting 38(52.1%) in abandoned and 22 (15.1%) in the mothered babies followed by wasting 31(42%) in abandoned and 7(4.8%) in mothered babies.

Table 10:   Nutritional status of babies in the study

Nutritional status < -2 s.d	Abandoned n=73	Mothered n=146	X2	P
Weight/Age	31 (42%)	7 (4.8%)	48.2	<0.00001
Length/Age	38 (52.1%)	22 (15.1%)	38.3	<0.00001
Length/Weight	8 (11%)	0 (0%)	F	<0.00001

(F) =Fischer's exact test

Nutritional status of abandoned babies in various institutional types was compared as in table 11. Babies in hospital like institutions were at a higher risk of developing malnutrition compared to those in home like and intermediate type institutions (O.R 3.3 for stunting and 3.5 for wasting).

There was a slight increased risk of poor growth in hospital babies compared to home like and intermediate type babies (O.R 2.2 for wasting). There were too few children in the intermediate type institution so that an independent analysis could not be carried out. "Homelike" and intermediate type were grouped together and hospital like and hospital institutions compared to them.

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Table 11: Comparison of Nutritional Status with institutional type

Type of Institution	Children with Z score < -2 s.d	Children with Z score > -2 s.d	OR(95%CI)	P
LENGTH/AGE Homelike Intermediate	5	9	1.0	
Hospital like	33	18	3.3(0.8,13.6)	0.05
Hospital	0	8	*	
WEIGHT/AGE Homelike + Intermediate	3	11	1.0	
Hospital like	25	26	3.5	0.06
Hospital	3	5	2.2	0.4

(* Unrefined figures, O.R not calculated)

Development of Term Babies

(a) Observation and history

As shown in table 12, abandoned and mothered babies did not differ in acquisition of swallowing and chewing and they had similar prevalence of irritability. However, abandoned babies were significantly more likely to be withdrawn and show no interest in their surrounding ($p = 0.000$).

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Table 12:   Developmental achievement by history and observation of the babies

EM	Abandoned n=73	Mothered n=146	X^2	P
coordinate allowing	0 (0%)	0 (0%)	-	-
normal ewing	1 (1.3%)	0 (0%)	2.05	0.36
tability	10 (13.6%)	17 (11.6%)	0.19	0.66
thdrawn	9 (12.3%)	0 (0%)	18.8	0.000
ck of interest in rounding	17 (23.3%)	0 (0%)	13.9	0.000

Revised Denver development Screening Test Scores

lopmental scores by the RDDST of the babies in the study are

sented in table 13. Prevalence of abnormal, borderline and normal developmental

s was in abandoned infants 20/73 (27.4%), 17/73 (23.3%) and 36/73 (49.3%)

ared to 2/146 (1.3%), 9/146 (6.2%) and 135/146 (92.5%) in the mothered infants

ctively.   Abandoned babies were significantly more delayed in development

ared to mothered babies, p=0.000.

13: Developmental scores by the RDDST of term babies in the study

DST	Abandoned n=73	Mothered n=146	TOTAL
rmal	36 (49.3%)	135 (92.5%)	171 (78.1%)
estionable	17 (23.3%)	9 (6.2%)	26 (11.9%)
normal	20 (27.4 %)	2 (27.4%)	22 (10%)

= 56.4   p = 0.000

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(c) Sectoral delays

Delays in any of the four functions was screened for and the results were as indicated in table 14. Abandoned babies had significant developmental delays in all the four areas, gross motor, fine motor, speech and hearing and social personal, p = 0.000. Most delays were in social personal sector 28/73 (34.2%), followed by gross motor and speech and hearing each constituting 21/73 (28.8%).

Table 14: Developmental performance of babies in various sectors

	PROPORTION WITH DELAYED PERFORMANCE			
Sector	Abandoned n=73	Mothered n=146	X^2	P
Gross Motor	21 (28.8%)	7 (4.8%)	25	0.000
Fine Motor	14 (19.1%)		23	0.000
Speech and Hearing	21 (28.8%)	3 (2.1%)	36	0.000
Social Person	28 (34%)	3 (2.1%)	45	0.000

(d) Other factors

Infants who were in institutions for longer duration were more likely to have delayed development compared to those who had been abandoned over short periods. This difference was statistically significant, p = 0.007. Table 14.

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Table 15: Comparison of developmental perfomance in relation to the duration of abandonment of babies

Duration of Abandonment	RDDST SCORES			Total
	Normal n=36	Questionable n=17	Abnormal n=20	n=73
≤ 10 weeks	23 (63.9%)	5 (29.4%)	2 (10%)	30 (41.2%)
11 - 20 weeks	4 (11.1%)	5 (29.4%)	6 (30%)	15 (20.5%)
21 - 30 weeks	5 (13.9%)	4 (23.5%)	6 (30%)	15 (20.5%)
> 30 weeks	3 (17.7%)	3 (17.7%)	6 (30%)	13 (17.8%)

$x^2 = 17.5$ $p = 0.007$

Table 16: Developmental performance in relation to the age at admission in an institution

Age at Admission (days)	RDDST SCORES			
	Normal n=36	Questionable n=17	Abnormal n=20	Total n=73
≤ 30	30	13	13	57
> 30	6	3	7	16

$X^2 = 2.64$ $p = 0.267$

Age at admission did not have an impact on developmental perfomance as shown in table 16 above.

Developmental scores of abandoned infants in various institutional types was compared as indicated in table 17. There was a higher risk of poor development in babies in hospital like institutions compared to those in home like and intermediate type (OR 2.0). This risk was noted to be even higher in babies in the hospital (OR 3.0).

Table 17: Comparison of infant's developmental score to the type of institution the child is resident in

Type of Institution	Questionable/ abnormal scores N=37	Normal scores N=36	OR(95%CI)	P
LENGTH/AGE Homelike + Intermediate	5 (13.5%)	9 (25%)	1.0	
Hospital like	27 (73%)	18 (67%)	2.0 (0.5, 8.2)	0.2
Hospital	5 (13.5%)	8 (8%)	3.0 (0.4, 27.5)	0.2

Summary OR = 2.3 (95% CI 0.8, 7.2) p = 0.2.

Preterm babies

There were 27 preterm babies included in the study. 9 were abandoned and 18 mothered. The mean gestational age was 33 weeks with a range of 7 weeks. The mean corrected age was -1.5 weeks. The mean birthweight was 1822 grammes.

(a) Anthropometry

Among preterm babies, as in the term babies, LUMAC was significantly smaller in abandoned babies, p = 0.006. The mothered and abandoned had comparable birthweight, weight, length and head circumference as shown in table 18.

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indicated in table 17. There was a higher risk of poor development in babies in

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hweight, weight, length and head circumference as shown in table 18.

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Table 18: Anthropometric measurements of preterm infants in the study

Mean Measurement	-Abandoned (SD)	Mothered (SD)	T-value	P-value
BirthWeightt (Grammes)	1905.6 (284.4)	1780.6 (219.0)	0.57	0.46
Weight (Kilograms)	2.5 (0.63)	2.94 (0.63)	0.02	0.89
Length (centimetres)	46.37 (1.88)	46.82 (2.78)	2.07	0.16
LUMAC (centimetres)	8.24 (0.66)	8.99 (1.06)	3.19	0.006
Head Circumference (centimetres)	33.96 (2.22)	34.31 (1.99)	0.00	0.996

(b) Development

Preterm infants were subjected to the Denvers Development Screening Test. Chronological ages were used, (as corrected ages were mostly negative), and scores of abandoned preterms was compared with that of mothered preterms. There was a significant difference in developmental performance of preterm abandoned compared to mothered babies as shown in table 19 ($p = 0.03$).

Table 19: Developmental performance by the RDDST of preterm infants in the study

RDDST Scores	Abandoned Preterm n=9	Mothered Preterm n=18	TOTAL n=27
Normal	4 (4.44%)	16 (88.9%)	20 (74.1%)
Questionable	4 (4.44%)	1 (5.6%)	5 (18.5%)
Abnormal	1 (11.2%)	1 (5.6%)	2 (7.4%)

$x^2 = 6.75$ $p = 0.03$

Table 20 shows developmental performance in various areas of testing in preterms. Abandoned preterm babies demonstrated significant delay in the area of social personal skills compared to mothered babies $p = 0.003$. In the other areas gross motor, fine motor and speech and hearing abandoned and mothered babies were comparable.

Table 20: Developmental performance of preterm babies in various sectors

Sector	PROPORTION WITH DELAYED PERFORMANCE		X^2	P
	Abandoned n=9	Mothered n=18		
Gross Motor	0 (0%)	0 (0%)	-	-
Fine Motor	1 (11.1%)	0 (0%)	-	-
Speech and Hearing	2 (22.2%)	1 (5.5%)	1.69	0.19
Social Person	5 (55.5%)	1 (5.5%)	8.69	0.003

DISCUSSION

A total of 246 babies were recruited in the study, 116 were males and 130 were females, giving a ratio of 1:1.1. The abandoned cases were matched for age and sex with the mothered group. Most babies recruited were 6 months old or younger (69.6%) and the median age was 3.5 months. These decreasing numbers in the older age groups reflect the fact that most older infants are successfully given out for adoption from these institutions. Most babies were abandoned within the first month of life 60/82 (80.5%) and the median age at abandonment was 2 days. Jinadu, in a report given on abandoned babies also found that 61.1% were abandoned within the first month of life [35]. Musoke also observed that most of the mothers who eventually absconded had unplanned or unwanted pregnancies and they often gave wrong address thus tracing them was impossible [34].

Circumstances surrounding the birth and maternal information of abandoned babies could not be determined. However, previous studies suggest that most of such mothers are single and unemployed [9,22,34]. It was also not possible to determine whether the mothers had taken any drugs during pregnancies but surveys done in Kenya indicate that substance abuse in the female adolescents is quite low [40]. Most of the babies 54/82 (62.9%) were abandoned in a health facility, so presumably both the mothered and abandoned babies had similar perinatal experiences.

Abandoned and mothered infants experienced similar types of illness; respiratory tract infections and diarrhoeal diseases were the commonest. These

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are in fact the chief causes of morbidity in the tropics [36,37,38]. Babies in the hospital had higher rates of morbidity compared to those in the other institutions. Those babies share the rooms with babies who have infectious diseases and thus the incidence of nosocomial infections are un-surprisingly high.

This study did not measure nutritional intake of infants, as indicated in the study limitations. The amount of stimulation the babies were exposed to was also not measured. However it was noted that most institutions had a low staff/infant ratio (1:5-1:10) and in most of the institutions the care for these infants was not individualised. Ongom, in Uganda studying two baby homes, noted that babies in the institution where there were more staff and training programmers for nursery nurses on longer human contact time, developed better than those with fewer staff and no training programme. Human contact time involved picking up playing, talking to, loving and, interacting with the child [39]. Spitz also found a similar thing, that babies taken care of by overworked nursing staff had marked deceleration in perception and motor development and higher mortality rates [24].

In this study there is evidence of a higher risk of malnutrition and poor development in babies in the "hospital like" institutions compared to "home like and intermediate type". This is in keeping with previous reports as indicated above. In the home like institutions there is more individualised care for babies and interchange is likely to be richer and more consistent compared to hospital like setting.

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Mothering is the ideal way of taking care of babies as clearly indicated by the results in this study. Mothered babies were found to have a greater advantage of better growth and development. There is significant malnutrition and developmental delay in abandoned term infants and to lesser extent in preterm babies compared to mothered babies. Poor growth in motherless or inadequately stimulated babies has also been reported by Schanberg etal, working on rat neonates. They noted that separation from the mothers led to reduction of enzymes associated with growth[19]. Musoke et al reported that abandoned preterm infants had significantly slower growth compared to mothered controls of similar birthweight[22]. Introduction of home rearing factors may help to improve the outcome of growth and development in the institutionalised motherless. Dorujaiye demonstrated that motherless children kept in institutions lost their development age but regained it on return to the mother[26]. Newman also found that infants in Embu with mother caretakers were better developed and more explorative compared to those without primary care takers [23]. Monkeberg noted that malnourished children did better when managed outside an institution with psychomotor and affective stimulation on top of nutritional support. There was significant increase in height and weight[21].

Abandoned babies were significantly delayed in all the sectors compared to the mothered. The babies spend most of the time in bed alone or with a few toys around them. They are only picked up for business such as feeding, bathing and changing. The staff hardly have time to offer play, singing, talking, caressing and fondling the way a mother could. It is thus not surprising that these babies lag behind in development in all sectors compared to their counterparts. Ribble reported that a breast fed baby is

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better nourished and developed and that speech is developed faster in mothered babies[17]. This is still in keeping with Ongom's findings where such babies were found to rock themselves[39].

An abandoned baby in an institution in Kenya is under the care of staff who may be employed or voluntary. The institutions which may be voluntary or under the government face a lot of challenges in the care of those individuals. With no definate financial support, no obvious training programme, no supervision and no screening of the activities in these institutions, the outcome in terms of growth and development of babies is likely to compromised.

The staff care for the babies as fulfilment of a duty. They are not compelled to show love to them. On the other hand the work load that the staff face may not allow them to give enough human contact time. Urgent needs like cleaning and feeding are given preference to play and fondling.

The staff may be demotivated due to poor remuneration and lack of encouragement and this will hamper interchange with the babies. Introduction of homelike activities and longer human contact time may be the solution to the problem. If an individual staff knows that she is the primary mother care - taker of a particular baby, she will take more time to play and care for the baby knowing that she will be proud of the good outcome.

CONCLUSIONS

Abandoned babies in institutions in Nairobi have poor growth compared to mothered babies as indicated by the numbers who are wasted, stunted and both stunted and wasted.

Mothered babies are significantly better developed compared to abandoned babies, as indicated by the higher rates of delay in abandoned babies by the RDDST Scores.

There is more or less global development delay in abandoned babies, however social personal sector is affected more frequently followed by gross motor and speech and hearing.

There is better growth and development in institutions with "home like" and intermediate care compared to "hospital like" institution with higher risk of wasting, stunting and poor developmental scores in the latter.

Most children institutions in Nairobi have inadequate staff to interact with each baby. The interaction is commonly intermittent.

Abandoned babies in the study have similar morbidity pattern with mothered babies.

RECOMMENDATIONS

1. Trained health personnel should work together with the staff of these institutions to regularly assess the growth and development of the babies in the institutions, in order to detect any faltering that may need early intervention. This may help to curb the high prevalence of poor growth and delayed development.

2. Children institutions should be encouraged to introduce "home-like" activities, such as specific adult-child interaction, introduction of house-hold units in the institutions, and longer "human contact" time.

3. The main risk factors such as nutritional supply and the nature of stimulation offered should be investigated, in order to determine the ones responsible for poor growth and development in institutionalised babies.

4. The outcome of this study should be shared by agencies that provide care to abandoned babies

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DATA COLLECTION SHEET

1.   Infants particulars: Study number   [   ] [   ]

   Name:..............................

   (a)   Date of birth   ....

   (b) Approximate age (months)   [   ] [   ]
   (c) Corrected age   [   ] [   ]

      (d)   Sex male = 1   Female = 2   [   ]

      (e)   Duration of abandonment (weeks)   [   ] [   ]

      (f)   Age at admission   (days)   [   ] [   ] [   ]
      (g)   Birth weight (gms)   [   ] [   ] [   ] [   ]

   (h) Weight at admission (gms)   [   ] [   ] [   ] [   ]
      (i)   Place of abandonment: [   ]

         Hospital = 1

         Street = 2

         House = 3

         Toilet = 4

   Any other specify...................

2.   Maternal details (where possible)

      (a)   Age Yrs   [   ] [   ]

      (b)   Marital status   [   ]

      Married = 1   Single = 2   Widowed = 3

      Not known = 4

      (c)   Place of residence................................

      (d)   Alive? Yes = 1   No = 0 Not known = 4   [   ]

Institution details:

Name:...

Sponsor:...

Staff/infant ratio ....
   1:2 -1:4 =1   1:5 -1:10=2   > 1:11 =3

Medical details :

Medical ailment over the past 1 month...............[]

(i)Upper respiratory tract infection..........=1

(ii)Lower respiratory tract infection..........=2

(iii) Gastro-Enteritis.........................=3

(iii)Meningitis.............................=4

 (iv)Septicaemia.............................=5

 (V) Local abscess............................=6

 (vi)Others specify..............................

Anthropometric measurements:

   1.   Weight   (kg)   [ ] [ ] . [ ]

   2.   Length   (cm)   [ ] [ ]. [ ]

   3.   Head circumference   (cm)   [ ] [ ].[ ]

   4.   LUMAC   (cm)   [ ] [ ] . [ ]

Developmental achievement

 (a) History

(i) How is the baby feeding?   [   ]

   Incoordinate swallowing = 0

Good swallowing   =1

ii)Ability to chew?   [   ]
   Yes =1

   No =0   N/A =8

i)Irritability?

   Constantly crying =0   [   ]
   Calm =1

Observations:

i)Alert?   Yes =1   No =0   [   ]

)Interested in his/her surrounding?
   Yes =1   No =0   [   ]
ii)Responsive ? Yes =1   No =0   [   ]
                  (c) Denver Development Screening Test(use chart)

Tick items passed   V

Cross items failed   x
G.M - Gross Motor =1   F.N - Fine Motor =2

.H - Speech and Hearing =3   S.P - Social/Personal=4

i)

al no of ns	G.M	F.M	S.H	S.P
sed(V)				
led(X)				
al no. ed				

ector most affected   [   ]

Scores using the Revised Denver Development Screening
Test   [   ]

e Appendix IV

rmal....=1   Questionable...=2   Abnormal....=3

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(iv)List of items failed (delayed)   (see coding above.)

SECTOR

1...[   ]

2...[   ]

3.. [   ]

4...[   ]

5...[   ]

(v) Performance in each sector:

Delay = 1   No delay = 0

(a) Gross motor   ....[   ]

(b) Fine motor   ....[   ]

(c) Speech and hearing ....[   ]

(d) Social /personal...............[   ]

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APPENDIX II

DENVER DEVELOPMENT SCREENING TEST