**THE RELATIVE EFFECTIVENESS OF A HOMOEOPATHIC COMPLEX (Calcarea carbonica 15CH, Calcarea phosphorica 15CH, Chamomilla 30CH, Kreosotum 30CH and Pulsatilla 30CH) COMPARED WITH A HERBAL TEETHING GEL (Plantago tincture, Verbascum tincture and Kava Kava tincture) IN TERMS OF CLINICAL MANIFESTATIONS OF PROBLEMATIC TEETHING IN INFANTS**

Dissertation / thesis submitted in partial compliance with the requirements for the Master's degree in Technology in the Department of Homoeopathy at Technikon Natal.

I, Julia Eldridge, do hereby declare that this dissertation represents my own work in both conception and execution.

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## DEDICATION

I would like to dedicate this dissertation to my family and friends for their continuos love and support, especially my Mother who has been my tower of strength and guiding light.

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## ABSTRACT

The purpose of this study was to evaluate the relative effectiveness of a Homoeopathic complex (Calcarea carbonica 15CH, Calcarea phosphorica 15CH, Chamomilla 30CH, Kreosotum 30CH and Pulsatilla 30CH) compared to a herbal teething gel (Plantago tincture, Verbascum tincture and Kava Kava tincture) in terms of the clinical manifestations of problematic teething in infants.

For this study 30 infants, between the ages of four months and three years, were required. These infants were obtained through advertising, a nearby homoeopathic clinic and a childrens home.

Infants were included into the study if they exhibited signs and symptoms of teething, namely: *irritability, drooling, waking at night, chewing / biting, a decreased appetite, an increased thirst, diarrhoea, swollen gums, red gums, flushed cheeks* or *a circumoral rash.* Those infants that were included were randomly divided into two groups. These groups were "Experimental A" group (homoeopathic complex) and "Experimental B" group (herbal teething gel), each of which contained 15 infants. A follow-up consultation was scheduled for seven days after the initial consultation, making the total treatment period one week.

The data was obtained by means of a questionnaire which was completed by the researcher during the initial and follow-up consultations and the parent / guardian on Days 1, 2, 3 & 5 of the treatment. Due to the small sample size, this data was analysed by means of non-

parametric methods namely Mann-Whitney Unpaired Test and Wilcoxon's Signed Rank Test. The statistical package SPSS was used for the data entry and analysis.

Two Mann-Whitney Unpaired Tests were performed in order to compare the two groups of treatment with each other. The first used the data obtained from the questionnaire completed by the researcher while the second used the data obtained from the questionnaire completed by the parent / guardian. The results from the first Mann-Whitney Unpaired Test only showed a significant difference in *waking at night*. The second Mann-Whitney Unpaired Test only showed a significant difference in *waking at night* between Days 3 and 5 of treatment. These two tests were performed at $\alpha = 5\ \%$ level of significance.

Four Wilcoxon's Sign Rank Test were used for the study in order to compare the data within each individual group of treatment. Per treatment group, 2 tests were performed. The first test used the data obtained by the researcher during the initial and follow-up consultations while the second used the data obtained from the parent / guardian during the week of treatment. In the "Experimental A" group the first Wilcoxon's Sign Rank Test showed a significant improvement in *irritability, drooling, waking at night, chewing / biting, decreased appetite, increased thirst* and *redness of gums.* The second Wilcoxon's Sign Rank Test compared each day of treatment with the other, with the greatest significant improvement being seen to occur between Days 1 and 5 of treatment, where *irritability, drooling, waking at night, chewing / biting, decreased appetite* and *redness of gums* were alleviated. In "Experimental B" group the first Wilcoxon's Sign Rank Test showed a significant improvement in *irritability, drooling, waking at night, decreased appetite,*

*swelling* and *redness of gums*. The second Wilcoxon's Sign Rank Test compared each day of treatment with the other. The greatest significant improvement being seen to occur between Days 1 and 5 of treatment, where *irritability, drooling, decreased appetite, diarrhoea, swelling* and *redness of gums* were alleviated. These tests were performed at $\alpha = 5\ \%$ level of significance.

From the results obtained it was apparent that overall the homoeopathic complex was more effective than the teething gel. This was because a greater number of disturbances showed a significant improvement and the amelioration of these was seen to occur earlier than with the herbal teething gel.

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## DEFINITION OF TERMS

***Law of Similars***: "…. any substance which can produce a totality of symptoms in a healthy human being can cure that totality of symptoms in a sick human being." (Vithoulkas, 1980: 98)

***Teething***: " Teething is the process by which an infant's first deciduous (baby) teeth erupt through the gums. Teething normally begins between 6-8 months of life…" (Zand, Walton and Rountree, 1994: 385)

# CHAPTER ONE: INTRODUCTION

Teething is an event that occurs in everyone during infancy which can result in not only distress and disturbed nights for the infant, but for the parents as well (Tanner and Kitchen, 1964). For some infants, this period of their life is easy as they teethe with no pain or fuss at all, while for others however, it is a nightmare (Castro, 1990: 224), which can begin weeks before their first tooth actually erupts (Gorrie et al., 1994: 604).

According to Ramirez et al. (1994), the parents often place a great importance on the eruption of their child's primary teeth as they often see this as being a general indicator of their child's growth and development. Since there is, however, considerable variations in the age at which primary teeth are seen to erupt, the use of this as a developmental milestone is useless (Illingworth, 1991: 77).

Throughout history, many disturbances have been put down to teething due to the fact that the actual origin of the disturbances, is unclear (Leung, 1989). Three main schools of thought are seen to exist with regards to the relationship between these disturbances and the eruption process. Firstly, there are those who claim that teething will produce teeth and nothing else, while others ascribe many local and systemic disturbances to the teething process itself, known as pathological dentition – *dentitio difficilis.* (Seward, 1971.) Lastly, there are those that see teething as being a normal physiological process, necessary to prepare an infant for the chewing of food once its maternal supply ceases (Ring, 1994). As a result of this way of thinking, only a few mild disturbances, as opposed

to many, are seen as being common and expected consequences of the teething process (Seward, 1971). The uncertainty about the association between disturbances and teething continues to exist as most of the information gathered on the subject is often contradictory and unscientific (Swann, 1979). According to Honig (1975), the reason for this is that the majority of the information obtained, is parental opinion.

Many mothers today still consider teething to be an ailment (Dally, 1996). Conventional medicine uses local and / or systemic forms of treatment in an attempt to ease the pain that may be experienced. A major problem with this however, is that most of these treatments contain substances, which if misused, can be harmful to the infant. These substances include
salicylates which results in salicylate poisoning (Parkin, 1991 : 171) and analgesics which can result in toxic conditions (McDonald and Avery, 1994 : 139).

Steinlechner (1984) claims that homoeopathy is useful in the dental treatment of inflammation, redness and swelling of the gums, as well as herpes labialis, all of which can be found in a teething child. Homoeopathy is also known to quickly ease the pain and distress of teething with minimum fuss (MacEion, 1994: xv). In a clinical trial conducted by Lever (1998), it was found that a homoeopathic complex consisting of Belladonna 30CH, Chamomilla 30CH and Scutellaria lateriflora D6 was effective in the treatment of problematic dentition. This complex was compared to that of placebo treatment.

This study differs with that of Lever's (1998) in that it is using a more comprehensive

complex consisting of Calcarea carbonica 15CH, Calcarea phosphorica 15CH, Chamomilla 30CH, Kreosotum 30CH and Pulsatilla 30CH. All of these remedies were chosen due to their indication for problematic / difficult teething in children (Murphy, 1993: 234). This complex is being compared to a herbal teething gel consisting of Plantago tincture, Verbascum tincture and Kava Kava tincture, and not a placebo as in Lever's study. The treatment period for this study is one week and not 3 days as in Lever's, allowing for a more detailed study. Research on this complex has never been done. A clinical trial would therefore help substantiate and offer credibility to this treatment as well as the above claims.

## CHAPTER TWO: REVIEW OF THE RELATED LITERATURE

### 2.1 Historical Overview

Many ideas on the causes and treatment of teething and dental pain have been noted throughout history. As the years have passed, so too have ideas which have seen to evolve according to the time.

One of the earliest theories that can be found on teething problems is in the Sumerian literature, dating back to 3000 BC. During this time it was believed that the cause of dental pain was due to a worm eating away at the tooth. This was treated by applying a local medication to the painful area, as well as praying to the gods and goddesses responsible for the caring of their teeth to help rid them of their dental pain. (Radbill, 1965.)

The Atharva-Veda (1000 BC) however, compared tooth eruption to "two tigers on the rampage". The ancient Hindus also associated tigers with teething. However, in their culture, tigers were seen to symbolise death. (Radbill, 1965.)

Despite these earlier ideas and theories it was the work of Hippocrates (460-377 BC) that formed the basis for teething literature (Radbill, 1965). In his book on Aphorisms, Hippocrates wrote: "teething children suffer from itching of the gums, fevers, convulsions [and] diarrhoea, especially when they cut their eye teeth, and when they are very corpulent

and costive." (Leung, 1989). It was subsequent to this that these signs and symptoms became associated with teething (Radbill, 1965).

Hippocrates also claimed that tooth development began while the embryo was still in the uterus, from where they were seen to derive their nourishment. After birth, teeth erupted and obtained their nourishment from mother's milk, hence known as "milk teeth". (Radbill, 1965.)

Before the Middle Ages, children were not given much attention as many of them died at an early age. During the Middle Ages however, all of this changed. People started to pay more attention to children as well as ways in which to increase their survival rate. This change occurred, as they could no longer afford for their children to die while they were "teething", as heirs for thrones were needed. (Kowitz and Loevy, 1993.)

In 1839 in England and Wales, 5016 deaths were attributed to teething (Dally, 1996). According to the Registrar General's report, in 1842 teething was the registered cause of death in 4.8% of all infants who died in London under the age 1 year and 7.3% of those between the ages of 1 and 3 years (Jaber et al., 1992). In 1910 however, the number of deaths in England and Wales was seen to diminish to 1600 (Dally, 1996).

In the early 1800's dentists began to make progress in the treatment for teething in children. It was only in the last century however, that the emphasis changed from treating the dental pain to helping the tooth to erupt. This occurred since the process of tooth eruption was

seen as being a dangerous obstacle in the child's life. (Ring, 1994.) The older procedures that were used for treating teething problems namely blistering, bleeding, placing leeches on the gums or applying cautery to the back of the child or infant's head, were violent. A more professional form of treatment namely lancing of the gums later replaced these. A French surgeon Ambrose Paré (1510-1590 AD), who got the idea after he examined the autopsy of a baby, introduced this treatment. (Dally, 1996.)

By the middle of the nineteenth century however, not everyone was seen to share this view of teething being the cause of serious disease and death. As a result of this, it led to a division in opinions. Lancing of the gums eventually began to decline since the elaborate knives and lancet cases that were being used became seen as being potentially dangerous. This was due to the adoption of the germ theory and the development of antisepsis and asepsis in surgery. (Dally, 1996.)

From all of the above we can see that teething has progressed from being regarded as a major cause of death and disease to a normal everyday event. So too has the treatment evolved from being harsh, to lancing of the gums, to a now more subtle unobtrusive form of treatment.

## 2.2 Tooth Development: -

During the first eight weeks of intra-uterine life, the initiation and growth of oral structures from the ectoderm and mesoderm occurs. This is known as the embryonic period of development. (Richardson and Barton, 1970: 113.) It is during the sixth week of embryonic life however, that the primary teeth begin to develop (McDonald and Avery, 1994: 53). The process of tooth development is seen to consist of various stages namely initiation, proliferation, differentiation, apposition and calcification (Richardson and Barton, 1970: 160).

### 2.2.1 *Initiation*: -

Tooth development, known as odontogenesis, begins when the basal layer of cells in the oral epithelium begins to proliferate faster than the adjacent cells. As a result of this, bands of thickened epithelium, known as the dental lamina, develop along the entire free margin of the jaws. Ten ovoid swellings occur in each dental lamina in positions that are later occupied by the primary teeth. (McDonald and Avery, 1994: 53.)

### 2.2.2 *Proliferation*: -

Each of these ovoid swellings continues to proliferate, resulting in the formation of a tooth germ or bud (Richardson and Barton, 1970: 113). Each tooth germ consists of both ectodemal and mesodermal cells and is composed of three parts namely the enamel organ, the dental papilla and the dental sac or follicle (Ibsen and Phelan, 1996: 214).

2.2.3 *Differentiation*: -

Cell differentiation occurs within the tooth germ, resulting in the production of ameloblasts from the enamel organs, odontoblasts from the dental papilla and cementum from the dental sac. The ameloblasts and the odontoblasts are responsible for the production of dental hard tissues namely enamel and dentin respectively. (Ibsen and Phelan, 1996: 214.)

2.2.4 *Apposition*: -

It is only in the fifth month of gestation however, that these dental hard tissues are produced (Ibsen and Phelan, 1996: 214). From these an organic matrix is formed which is necessary for the reception of calcium and phosphorus salts (Richardson and Barton, 1970: 160).

2.2.5 *Calcification*: -

This stage is also known as mineralization. During calcification the matrix becomes hardened due to the precipitation of calcium and phosphorus salts within the matrix. The initial precipitation is small and is known as a nidus. Around this nidus further precipitation occurs, resulting in the fusion of these layers and a homogeneously mineralised layer of tissue matrix. (McDonald and Avery, 1994: 55.)

Chronology of human dentition of deciduous dentition (McDonald and Avery, 1994: 187).

| Tooth | Hard tissue formation begins | Amount of enamel formed at birth | Enamel completed | Eruption | Root completed |
|---|---|---|---|---|---|
| ***Maxillary:*** **Central incisor** | 4 mo in utero | 5/6 | 1 ½ mo | 7 ½ mo | 1 ½ yr. |
| **Lateral incisor** | 4 ½ mo in utero | 2/3 | 2 ½ mo | 9 mo | 2 yr. |
| **Cuspid** | 5 mo in utero | 1/3 | 9 mo | 18 mo | 3 ¼ yr. |
| **1st molar** | 5 mo in utero | Cusps united | 6 mo | 14 mo | 2 ½ yr. |
| **2nd molar** | 6 mo in utero | Cusps tips still isolated | 11 mo | 24 mo | 3 yr. |
| ***Mandibular:*** **Central incisor** | 4 ½ mo in utero | 3/5 | 2 ½ mo | 6 mo | 1 ½ yr. |
| **Lateral incisor** | 4 ½ mo in utero | 3/5 | 3 mo | 7 mo | 1 ½ yr. |
| **Cuspid** | 5 mo in utero | 1/3 | 9 mo | 16 mo | 3 ¼ yr. |
| **1st molar** | 5 mo in utero | Cusps united | 5 ½ mo | 12 mo | 2 ¼ yr. |
| **2nd molar** | 6 mo in utero | Cusps tips still isolated | 10 mo | 20 mo | 3 yr. |

2.3 Tooth eruption: -

Once the crown formation is complete, an upward movement of the primary tooth away from the base of the follicle occurs. This is due to the growth of pulp tissue at the basal end of the tooth. Other factors that have been noted to influence this upward movement are various hormones as well as growth changes that occur in the jaws. Growth hormones are seen to stimulate the basic growth process that occurs, while thyroid hormones control the differentiation and maturation processes. (Leung, 1989.)

As a result of this upward movement of the tooth, a whitish area develops in the oral mucosa, which corresponds to the keratinization of the fused oral and dental epithelium. A few days after this development, the tooth erupts through the gums. (Koch et al., 1991: 272.)

At this time of upward movement of the primary tooth, there is a downward growth of Hertwig's epithelial root sheath which is responsible for controlling root formation (Leung, 1989). Due to this simultaneous movement, tooth eruption takes place before the root is fully formed. It therefore takes 2-3 years after the tooth has erupted, for the root to be formed and calcified. Cementum, which is responsible for covering the roots and providing a place of attachment to the gums (Richardson and Barton, 1970: 99, 113, 160), is only produced once the crown formation is complete (Ibsen and Phelan, 1996: 214).

2.4 Complications: -

Through various cases and clinical observations, both systemic and local complications have been noted to occur.

2.4.1 Systemic: -

Shapira et al. (1996) describes two episodes of severe graft versus host disease (GVHD) that developed in a 5-month-old girl who was being treated with bone marrow transplantation (BMT) for severe immunodeficiency (SCID). Both episodes were seen to take place while the infant was teething, with a dramatic improvement occurring once the eruption was complete. As a result of this, it was suggested that the triggering mediator for the GVHD was the release of interleukin-1, which is released when the gum tissue is traumatized. Since the role of GVHD in post BMT patients with SCID is relatively low, it is believed that the occurrence of these episodes was related to tooth eruption.

2.4.2 Local: -

2.4.2.1 *Self inflicted gum injuries*: -

These injuries are self-inflicted lesions, which most frequently involve the gum margins or papilla. Their most commonly noted cause is the use of an infant's fingernail or other sharp object in an attempt to gain relief. (Andlaw and Rock, 1996: 187.) This type of injury has also been noted to occur as a result of psychological factors, such as an unhappy emotional background, or secondary to thumb sucking and the use of a pacifyer (Vaughan, 1993).

Vaughan (1993) describes a case in which self inflicted gum injuries, also termed "factitial gingivitis" or "gingivitis artefacta", was seen to occur in a 15-month-old child. This child was seen to have a habit of forward posturing of the mandible. On intra-oral examination, two areas of marked ulceration were noted on the lingual aspects of the mandibular incisors. The position and size of these two areas were seen to correlate precisely with the opposing central incisors. Due to this, Vaughan (1993) suggests that these injuries were irritated by the teething process since the habit was seen to cease and the ulceration to heal completely, once the teeth had erupted.

2.4.2.2 *Eruption cysts*: -

An eruption cyst is a specific type of soft tissue cyst (Nunn, 1993). These cysts most frequently occur over the primary molars as slightly raised, painless, bluish swellings, which become painful only when infected or traumatized (Andlaw and Rock. 1996: 136-137). Since this condition is local, no inflammatory changes are usually seen to occur in the surrounding tissue (Holloway and Swallow, 1982: 142). According to Anderson (1990), eruption cysts may be remnants of the dental lamina or epithelial coils, rise from the enamel organs after the occlusal enamel is formed, or simply by the accumulation of fluid and blood in an enlarged follicular space. In this case it is referred to as an eruption haematoma.

Most eruption cysts are seen to resolve themselves by means of spontaneous rupture. If this does not happen however, the underlying crown may need to be surgically uncovered. (Andlaw and Rock, 1996: 137.)

Some controversy exists however, over how common the occurrence of eruption cysts are (Nunn, 1993). In a study done by Anderson (1990), it was found that eruption cysts were uncommon with the eruption of primary teeth, since the highest occurrence was noted in the 6-12 year olds.

2.4.2.3 *Pyrogenic granulomas*: -

A pyrogenic granuloma is a localised mass of fleshy tissue found mainly on the gum margins or dental papilla situated in the anterior part of the mouth. These occur due to local irritation resulting in minor injury to the gums. As a result of this, infection due to the presence of oral bacteria occurs. This in turn leads to chronic inflammation and proliferation of granulation tissue. (Andlaw and Rock, 1996: 197.) Due to the vascularity of this granulation tissue, the colour ranges from deep red to purple. If the granuloma does not spontaneously resolve, surgical excision may be needed. (Ibsen and Phelan, 1996: 96.)

Nunn (1993) observed in a 2 year-old boy, a mass of fleshy tissue overlying the erupting tooth. The opposing tooth had ulcerated the mass. As a result of this, a provisional diagnosis of a traumatized eruption cyst was made. After 3 weeks of treatment, it was decided that excision of the mass was needed since it had occasionally bled during the previous 2 weeks. The excision of this mass however, led to profuse bleeding, necessitating the admission of the boy into hospital. On receiving the histopathology report on the excised tissue, it was seen that the mass was in fact a pyrogenic granuloma and not a eruption cyst as was previously thought.

2.4.2.4 *Operculum gingivae:* -

Operculum gingivae are pieces of soft tissue that remain after eruption in the distal part of the occlusal surface of the tooth. The tendency for these to persist is greater if eruption of the tooth occurs early in relation to the growth of the jaw. Should this occur, it indicates partial eruption of the tooth into the mucosa behind the molar. This mucosa is seen as being more resistant to resorption than future gum tissue. If any mechanical trauma or plaque accumulation should occur at the operculum gingiva, it may result in inflammation and considerable swelling. (Koch et al., 1991: 272-273.)

## 2.5 Signs and Symptoms

A diversity of opinions is still seen to be held by many practicing pediatricians, with regards to the signs and symptoms associated with teething (Honig, 1975). This is because over the centuries a variety of symptoms and illnesses have been ascribed to teething (Goldbloom, 1992: 31), not only by doctors but by parents as well (Swann, 1979). Leung (1989) suggests that this diversity exists since it is unclear as to whether the signs and symptoms are of a development origin, related to tooth eruption itself, or a result of the need for parents to explain behavioural changes occurring in the child with an anxiety-reducing diagnosis. Goldbloom (1992: 36) on the other hand claims that there are no clinical manifestations associated with teething at all.

2.5.1 Systemic / General Disturbances: -

Tasanen (1969) conducted a study involving 233 infants in order to determine the disturbances associated with teething. The result from this study showed that teething does not cause diarrhoea, sleep disturbances, and increase infection rate or temperature. Teething was however, found to cause an increase in daytime restlessness, drooling, finger sucking as well as a loss in appetite.

In a study carried out by Seward (1972) involving 224 infants, in whom 4,480 eruptions were observed, it was found that 87% of the infants experienced at least 1 general disturbance. Five disturbances were noted to occur more frequently than others did namely irritability, disturbed sleep, drooling, a decrease in appetite and an increase in thirst. It was also found that the disturbances tended to occur more frequently with posterior tooth eruption than with anterior tooth eruption. In posterior tooth eruption irritability was seen to occur in 96.8%, disturbed sleep in 82.1%, drooling in 90%, a decrease in appetite in 91.5% and an increase in thirst in 87.5%. Even though in anterior tooth eruption irritability was only seen to occur in 69.2%, disturbed sleep in 62.5%, drooling in 53.5%, a decrease in appetite in 49.5% and an increase in thirst in 44.2%, these five disturbances were still seen to be the most common.

Other general disturbances that have been attributed to teething are a slight elevation in temperature, crying (Tanner and Kitchen, 1964), nasal congestion, colds and ear infections (Zand et al., 1994) as well as loose stools and diaper rashes (Gorrie, 1994: 604). According

to Illingworth (1982: 390) however, there is no evidence that supports that bronchitis, diarrhoea, rashes and fever are caused from teething.

Due to the wide range of general disturbances attributed to teething, controversy exists over some of their association with teething, perhaps the greatest being that of the relationship between teething and fever (Bennett and Brudno, 1986).

2.5.1.1 *Fever:* -

In a study done by Jaber et al. (1992), the mothers of 46 healthy infants were requested for a certain period of time, to examine and record their daily findings of their infant's rectal temperature and gums for evidence of dental eruption. From these recordings an association between an increase in temperature and the day of tooth eruption was found.

Bennett and Brudno (1986) conducted a study in which a virus, known as the Human Teething Virus (HTV), was isolated by means of electron microscopy from more than 99% of the febrile infants participating in the study. From these findings it was concluded that the HTV was the elusive agent responsible for the fevers associated with eruption, accounting for at least 84% of the fevers developed in infants during teething.

Honig (1975) conducted a survey involving 70 practicing pediatricians in the metropolitan Philadelphia area in order to determine the signs and symptoms attributed to teething. Of the 64 responding pediatricians, 12 felt that teething could cause a temperature elevation up to 39°C.

Despite this however, Gorrie (1994: 604) claims that fevers are not seen to be a normal symptom of teething, but may instead be associated with an increase in susceptibility to illness due to poor eating and sleeping. If teething is therefore used as an explanation for fevers, it may result in the failure to diagnosis a serious disease (Swann, 1979).

2.5.1.2 *Diarrhoea:* -

Teething diarrhoea is another symptom over which there has been some debate. In a study done by Tasanen (1969), in which 233 infants were used, diarrhoea was only seen to occur in infants in the febrile eruption group and not in those in the non-febrile eruption group. This warranted the conclusion that eruption does not cause diarrhoea.

Coreil et al. (1995) conducted a cross-cultural mail survey involving 215 practicing pediatricians in Florida, USA. The purpose of this study was to investigate the popular belief in the association between teething and frequent loose stools known as teething diarrhoea (TD). The results from this study confirmed that this belief still exists today, and has in fact increased since the 1970's. The most likely explanations that were given for this association were an increase in salivation, the infants eating habits as well as stress. An agreement on the local perceptions of increased stool frequency, volume or liquidity as being a normal part of growing up was also noted. Due to this, TD was viewed as being less serious than other types of diarrhoea, with both pediatricians and parents managing it accordingly.

2.5.2 Local Disturbances: -

Seward (1971) conducted a longitudinal study in which 224 infants were observed, in order to determine the local disturbances attributed to primary dentition. From this study it was found that there were 5 local disturbances that most commonly occurred namely inflammation of the gums, cheek flushing, mouth ulcers, circumoral rash and eruption cysts. Inflammation of the gums was the most commonly noted disturbance. The duration of this, however, was seen to vary from 2-10 days depending on the oral hygiene and general health of the infant. Flushing of the cheeks was most commonly seen to accompany the eruption of the canines and the molars. Mouth ulcers were seen to occur due to sucking or placing of objects in the mouth, while a cheek rash, lasting for several days, was noted on one or both cheeks.

2.5.3 Physiological and Psychological Development: -

Some of the previously mentioned signs and symptoms, practitioners put down to physiological and psychological development which occurs during the same developmental period as teething (Swann, 1979). Due to this simultaneous development, it is difficult to distinguish those that are related to teething from those of a normal developmental origin (Leung, 1989).

At the age of 3-4 months, drooling and infantile eczema are seen to occur, both of which are seen to be normal for an infant of this age (Swann, 1979). Drooling occurs due to the newly matured salivary glands producing an increase in salivary flow, which the infant fails

to swallow. As a result, the saliva accumulates in the facial folds resulting in a moistened environment, which encourages the development of a circumoral rash. (Seward, 1972.) Mouthing and biting of objects at the age of 6 months, as well as upper respiratory tract infections between the ages of 6 months and 3 years are also seen to be normal physiological developments (Swann, 1979). According to Gorrie et al (1994: 604), this association between various infections and teething is coincidental since the antibodies the infant received in utero are seen to be low during this period due to their disappearance, resulting in the infant being more susceptible to infections. Wakefulness which is experienced at 6-9 months may be a result of separation anxiety and /or less need for sleep (Honig, 1975). Illingworth (1991: 78-79) claims however, that crying and sleep disturbances are in fact related to bad habit formation and parental mismanagement.

2.6 Age of Eruption: -

Primary tooth eruption usually begins at the age of 6 months, with a new eruption occurring approximately every month, until the infant is 30 months of age (Leung 1989). Despite this however, the age at which infants are seen to teethe can vary greatly. This is because some infants are seen to be born with teeth whilst others only teethe at 13-14 months of age. (Illingworth, 1991: 77.)

In a study carried out by Ramirez et al. (1994) in order to determine the age and order of primary tooth eruption, the following ages for eruption were noted.

Ages of eruption in months for the total population (means with standard deviations)

| Primary tooth | Right | Left | Pair |
|---|---|---|---|
| ***Maxilla: -*** | | | |
| Central incisor | 9.48±2.13 | 9.37±2.10 | 9.42±2.11 |
| Lateral incisor | 10.74±2.11 | 10.58±2.29 | 10.66±2.20 |
| Canine | 18.78±3.07 | 18.62±3.01 | 18.70±3.03 |
| First molar | 15.27±1.91 | 15.28±1.97 | 15.28±1.93 |
| Second molars | 26.88±3.96 | 26.66±3.94 | 26.77±3.93 |
| ***Mandible: -*** | | | |
| Central incisor | 7.19±1.76 | 7.21±1.80 | 7.20±1.78 |
| Lateral incisor | 12.06±2.92 | 12.46±3.08 | 12.26±3.00 |
| Canine | 19.01±3.23 | 19.05±3.36 | 19.03±3.28 |
| First molar | 15.79±2.21 | 15.61±2.21 | 15.70±2.20 |
| Second molar | 25.65±3.60 | 25.29±3.48 | 25.47±3.53 |

Eruption times between the two sexes were also compared in this study, and it was found that boys tended to have an earlier eruption time than girls.

Difference in eruption times (in months) between boys and girls. Positive sign indicates earlier eruption in boys.

| **Primary tooth** | | **P≤** |
|---|---|---|
| ***Maxilla*** | | |
| Central incisor | +0.56 | ns |
| Lateral incisor | +0.96 | 0.05 |
| Canine | +0.80 | ns |
| First molar | +0.24 | ns |
| Second molar | +1.14 | ns |
| ***Mandible*** | | |
| Central incisor | +0.75 | 0.05 |
| Lateral incisor | +1.95 | 0.0001 |
| Canine | +1.66 | 0.05 |
| First molar | +0.21 | ns |
| Second molar | +0.03 | ns |

2.7 Order or Eruption: -

According to Heese (1992: 176-177), the usual order of eruption is incisors, first molars, canines and second molars.

Ramirez et al. (1994) carried out a longitudinal study involving 114 Spanish children in order to determine the age and order of eruption in primary teeth. In this study it was noted

that the mandible had a tendency to earlier eruption of the central incisors and second molars, whilst the maxilla had a tendency to earlier eruption of the lateral incisors, first molars and canines. The order of eruption was determined by observing 35 boys and 25 girls from the time of their first tooth eruption until their last tooth eruption. When each jaw was looked at individually, the most frequent order of eruption was central incisors, lateral incisors, first molars, canines and second molars. In the maxilla, this order of eruption was found to occur in 87.5% of the boys and 84% of the girls, while in the mandible it occurred in 84.3% of the boys and 76% of the girls. When the eruption of the two jaws was looked at simultaneously, the most frequent order of eruption observed was mandibular central incisors, maxillary central incisors, maxillary lateral incisors, mandibular lateral incisors, maxillary first molars, mandibular first molars, maxillary canines, mandibular canines, mandibular second molars and maxillary second molars. This order of eruption was seen to occur in 28% of the boys, 20% of the girls or almost 25% of this total group in which full dentition data was obtained.

2.8 Conventional Treatment: -

Conventional treatment for a teething infant can consist of either topical and / or systemic medication. Regardless of what type of treatment is being used however, parental reassurance is essential (Leung 1989).

2.8.1. Topical / local forms of treatment: -

This form of treatment can involve one or more of the following, namely teething toys, teething foods and / or topical medications (Andlaw and Rock, 1996: 135-136).

2.8.1.1 *Teething toys*: -

These toys are designed to satisfy the natural tendency of the infant to chew or bite. From the pressure of biting or sucking on these toys, infants are able to gain some relief from the pain that they may be experiencing. They come in a variety of shapes, e.g. rings, keys or rattles. It is important to ensure that there are no rough surfaces, as these can cause an irritation in the mouth. (Andlaw and Rock, 1996: 135-136.) To prevent this, parents must ensure that the toys are clean, hard and smooth (Parkin, 1991: 170). According to Gorrie et al. (1994: 604), if these teething toys are refrigerated before being used, they soothe the inflammation that may be present in the gum. It is also advised that only reputable brands of teething toys be used as some of the cheaper imported ones can contain dyes with high levels of lead (Leung, 1989).

2.8.1.2 *Teething foods:* -

Teething foods e.g. rusks and hard biscuits are seen to work in the same way as teething toys. Even though these foods consist mainly of flour and fat, it is important to ensure that they do not contain sugar or sweetening. (Andlaw and Rock, 1996: 136.)

2.8.1.3 *Topical medication*: -

This type of treatment comes in a variety of ointments or jellies, of which the most common ingredients are salicylates, local analgesics and antiseptics. Salicylates are used since they combine the properties of local counter-irritants and anti-inflammatories with anti-pyretic and general analgesics. Local analgesics provide a rapid yet short-lived relief from the pain whilst the antiseptics control any infection that could occur at the site of eruption. (Andlaw and Rock, 1996: 136.) According to Parkin (1991: 171), the excessive use of medications containing salicylates should be avoided as it can lead to salicylate poisoning. Gorrie et al. (1994: 604) suggests that the use of rubbing alcoholic beverages onto the gums should be avoided as infants can swallow the alcohol.

Tanner and Kitchen (1964) found that a salve compounded of equal parts of 2.5% Xylocaine ointment, a topical anesthetic, and Orobase, an adhesive vehicle composed of gelatin, pectin, methylcellulose, and plastibase was effective in controlling the pain associated with teething. This ointment was seen to offer relief 4-15 minutes after application until the next application was indicated 4-6 hours later.

McDonald and Avery (1994: 139) suggest that the use of local anesthetics in infants must be exercised with caution as they have a rapid systemic absorption of them. If ointments containing local anesthetics are therefore misused, it can result in toxic doses for the infant.

Seward (1969) carried out a controlled double blind clinical trial for one year, in order to determine the effectiveness of a teething solution. The results from this trial showed that a

teething solution made from a lignocaine mixture was effective in the relief of pain and discomfort associated with teething. It was also noted that this solution produced no side effects.

2.8.2 Systemic forms of treatment: -

This form of treatment should only be considered if local treatment has been ineffective. If that is the case, there are two main types of drugs that are used, namely general analgesics and hypnotics. (Andlaw and Rock, 1996: 136.)

2.8.2.1 *General analgesics*: -

These drugs, e.g. acetaminophen or ibuprofen, can be used in order to provide relief from the discomfort that may be experienced by the infant during tooth eruption, provided they are used in small amounts, i.e. age-appropriate doses (Zand et al. 1994: 386).

2.8.2.2 *Hypnotics and sedatives*: -

This type of treatment is occasionally used in conjunction with local and systemic analgesics. There is much reluctance however in using this type of medication in young children, but it may be necessary in order to restore normal sleeping patterns. (Andlaw and Rock, 1996: 136.)

## 2.9 Homoeopathic Treatment: -

### 2.9.1 Background: -

Homeopathy is derived from the Greek words *homeo* and *pathos*, meaning "like can cure like". It is based on the principle of *similia similibus curentur*, which is the Law of Similars. (Lockie and Geddes, 1995: 14.) What this means is that whatever is seen to harm an individual can also cure them (Hayfield, 1993: 9). This is possible since the similarity between the drug presentation and the patient's symptom picture cancel each other out, allowing the patient to be restored back to health (Lockie and Geddes, 1995: 14).

Homoeopathy is a gentle, holistic form of treatment, which respects each patient as being a unique individual. It therefore treats the individual and not the disease, which results in cure on a mental, emotional and physical level. (Hayfield, 1993: 9.) Homoeopathy works by stimulating the body's own self healing capacity to deal with the disease as opposed to conventional treatment, where the organism responsible is simply identified and eliminated by means of the appropriate drug or "magic bullet". As more parents become worried about the excessive use of antibiotics in their young and the side effects, so more people are turning to homoeopathy as an alternative form of treatment. (MacEion, 1994: xiv, 9.)

Homoeopathy has been seen to be successful in treating minor and common ailments in children (Jacobs, 1994), since they are unaware of any social convictions and many of their symptoms have not yet been suppressed by excessive courses of antibiotics (MacEion,

1994: xiii). In a clinical trial done by Lever (1998), homoeopathy was seen to be successful in the treatment of problematic dentition. For this study, 30 infants were required of which 15 were given a homoeopathic complex consisting of Belladonna 30CH, Chamomilla 30CH and Scutellaria lateriflora D6, while the remaining 15 received placebo treatment. Those infants that received the homoeopathic treatment exhibited fewer signs and symptoms. These were of a lesser degree than those experienced by infants that received placebo treatment.

2.9.2 Homoeopathic Remedies: -

2.9.2.1 *Calcarea carbonic (Calc carb)*: -

According to Morrison (1993: 82), a large percentage of the population requires Calc carb from birth. Vithoulkas (1990: 263) is seen to concur with this, stating that this applies to approximately 40% of babies. Those infants requiring Calc carb during teething, have a delayed, painful teething process often associated with sour diarrhoea and a profuse sour perspiration located on the back of the head and neck. These infants are also seen to be strong-willed and obstinate. (Morrison, 1993: 83-85.) According to Vermeulen (1994: 210), Calc carb is a remedy that can be repeated often in children.

2.9.2.2 *Calcarea phosphoric (Calc phos)*: -

Calc phos is a remedy that is especially indicated in tardy dentition as well as the troubles associated with this period of development (Vermeulen, 1994: 222). These teething troubles include diarrhoea and lots of wind (MacEion, 1994: 78). Infants requiring Calc phos are usually irritable, whiny and demand to be carried about just like Chamomilla

infants. The difference between these two however, is that Calc phos infants are less aggressive. (Morrison, 1993: 89.)

2.9.2.3 *Chamomilla*: -

Chamomilla is a commonly used children's remedy. This remedy is often indicated in infants that are seen to have painful teething associated with sore gums, one red cheek as well as diarrhoea with a "rotten egg" smell. (Morrison, 1993: 115-117.) These infants are sensitive, irritable, demand instant relief from their pain and yet are inconsolable (Vermeulen, 1994: 284-285). Chamomilla infants have a moody temperament (Steinlechner, 1984). According to Bodman (1990), Chamomilla is not suitable for infants who bear pain calmly. These infants fly into a rage due to their resentment of the pain and would rather die. The only way to calm these children down is by carrying them about (Vermeulen, 1994: 285).

2.9.2.4 *Kreosotum*: -

According to Nash (1995: 371), this remedy has the most marked action on the gums and for this reason should be used more often in cases of difficult teething. These teething infants have bad breath as a result of rapidly decaying teeth due to poor enamel and the quick development of cavities. The infant's gums appear inflamed and bleed easily, giving a "spongy" appearance. (MacEion, 1994: 78). Kreosotum infants exhibit restlessness and irritability along with the pains, and will not go to sleep unless they are caressed. (Vermeulen, 1994: 563-564.)

2.9.2.5 *Pulsatilla (Puls)*: -

According to Hayfield (1993: 49), these infants are opposite to those of Chamomilla and their bad moods. Instead these infants are clingy, pathetic with pain and respond well to sympathy and distraction (MacEion, 1994: 78). Pulsatilla infants have changeable moods, where one minute they can be mild and yielding, and the next they are remarkably irritable. They are very emotional and constantly desire to be carried about slowly. (Vermeulen, 1994: 796-797.)

2.10 Summary: -

Teething is a natural process that occurs in everyone. Even though by some it is still viewed as being an ailment, causing not only irritability and sleeplessness in the infant but the family as well, it is not considered to be a serious pathology.

As more parents are becoming aware of the side effects and long term consequences of conventional treatment, so they are turning to alternative methods. As a result of this, homoeopathy as an alternative form of treatment for this teething process is proving to be a more sought after approach.

## CHAPTER THREE: MATERIAL AND METHODS

The purpose of this study was to assess the response of teething infants to a homoeopathic teething complex compared to that of a herbal teething gel. The relative effectiveness of the teething complex could thus be assessed.

3.1 Study Design and Protocol: -

For this study 30 infants were selected.

These infants were randomly divided into two groups namely "Experimental A" group and "Experimental B" group. This was done in such as way that each patient had an equal chance of being selected for either of the groups.

The medication that was to be used in the study was given to an independent person. A list of numbers ranging from one to thirty was made. Thirty pieces of paper, of which fifteen were labelled "Experimental A" and the other fifteen "Experimental B", were placed into a box. These thirty pieces of paper were drawn out of the box one at a time and allocated to the list of numbers, in order, from one to thirty. The first infant accepted into the study received the first treatment that was drawn from the box by the independent person.

The independent person retained this list until after the trial was completed.

Prospective infants were examined during their initial consultation by the researcher in order to determine whether the infant fulfilled the selection criteria. This was done by means of a *case taking form (Appendix A)* that was filled out during the consultation, where careful attention was paid towards questions regarding the infant's teething, as well as a thorough examination of the oral cavity.

The parents / guardians of the infants that fulfilled the criteria were then required to fill in the *consent form (Appendix B)*.

The researcher then filled in the *teething questionnaire (Appendix C)*.

An independent person then dispensed the medication. The parent / guardian was asked to pay careful attention to the response of the infant to the medication with regards to the infant's irritability, sleep, appetite, thirst, stool consistency, drooling, chewing / biting, cheek flushing, circumoral rash as well as the appearance of the gums. Asking the parent / guardian to fill out a *teething questionnaire (Appendix C)* on days 1,2,3 and 5 of the treatment did this.

A follow up consultation was performed seven days later where once again a *case taking form (Appendix A)* and a *teething questionnaire (Appendix C)* were completed as before.

3.2 Subjects: -

Thirty babies between the ages of five months and two years were selected for this study.

The selection criteria for the study was as follows:

INCLUSION CRITERIA: -

- Infants had to be between the ages of 4 months and 3 years of age.

- Infants had to be in the process of a tooth eruption.

- Infants had to present with both general and local signs and symptoms:

General signs and symptoms: -

Irritability

Daytime restlessness

Waking at night

Decreased feedings / appetite

Increased fluid intake

Loose stool

A temperature less than 39°C.

Local signs and symptoms: -

Increased salivation

Drooling

Circumoral rash

Biting of hard objects / finger sucking

Flushed cheeks

Redness and swelling of the gums.

EXCLUSION CRITERIA: -

The infant was excluded from the study if it was found by the researcher during the initial consultation to be showing signs and symptoms that could not be attributed to teething.

Included in these were: -

Severe diarrhoea

Dehydration

Fevers, i.e. temperature of more than 39°C

Neck stiffness, Kernig's sign, and bulging fontanelles

Lymphadenopathy.

Any infant undergoing any medical or homoeopathic treatment, which may or may not have been related to teething, was excluded from the study.

Any infant undergoing more than one tooth eruption was excluded from the study.

3.3 Treatment

The treatment for the "Experimental A" group consisted of a homoeopathic teething complex in which the carrier substance was lactose granules. These granules were impregnated with the following remedies: -
Calcarea carbonica 15CH, Calcarea phosphorica 15CH, Chamomilla 30CH, Kroesotum 30CH and Pulsatilla 30CH.

The "Experimental B" group was treated with a herbal teething gel which contained the following herbal tinctures: -
Plantago, Verbascum and Kava Kava.

The teething complex was dispensed in a number 2 vial filled with medicated granules. The parent / guardian of the infant was instructed to give the infant a ¼ capful of granules dry, into the mouth every three to four hours, whenever the infant was awake, until the follow up consultation seven days later.

The teething gel was in a 20-gram tube. The parent / guardian of the infant was instructed to apply a small amount of the gel onto the area of the gum where the tooth was erupting,

every 3-4 hours, whenever the infant was awake, until the follow up consultation seven days later.

3.4 Measurements

The efficacy of the complex was measured using a *teething questionnaire (Appendix C)*. The researcher, during the initial consultation, completed the *teething questionnaire* by questioning the infant's parent / guardian as well as examining the infant. The parent / guardian was also asked to fill out a *teething questionnaire* on certain days of the treatment namely 1, 2, 3 and 5.

During the follow up consultation, which was scheduled for one week after the initial consultation, the researcher once again completed the *teething questionnaire (Appendix C)*.

The researcher designed the *teething questionnaire (Appendix C)*, in order to determine the efficacy of the homoeopathic complex, in terms of the treatment of general and local manifestations of problematic teething in infants.

## 3.5 Statistical Analysis

For the purpose of this study, non-parametric methods for statistical data analyses had to be used. The reason for this being the small sample size per group ($n_1 = 15$, $n_2 = 15$).
Data entry and analysis was performed using the statistical computer package SPSS.

GROUPS ANALYSED

Group 1 constituted the "Experimental A" group (homoeopathic teething complex)
Group 2 constituted the "Experimental B" group (herbal teething gel)

### 3.5.1 *The Mann-Whitney Unpaired Test*

The Mann-Whitney unpaired two-tailed test was used to compare Groups 1 and 2 with one another, with respect to each variable of interest. Groups 1 and 2 were regarded as being independent of one another (unpaired). The purpose of this test was to determine whether there was any significant difference between the two groups at the $\alpha = 0.05$ level of significance.

The first Mann-Whitney Unpaired Test was used to compare the data obtained by the researcher during the initial and follow-up consultations, i.e. before and after treatment. The

second Mann-Whitney Unpaired Test was used to compare the data obtained from the parents during the week of treatment.

Hypothesis testing: -

The null hypothesis $H_0$ states that there is no significant difference between the two groups with regards to questions 1 to 11 of the questionnaire. The alternative hypothesis $H_1$ states that there is a significant difference between the two groups.

$H_0$: $\mu_1 = \mu_2$

$H_1$: $\mu_1$ and $\mu_2$ are significantly different from each other.

$\alpha = 0.05$ = level of significance

- Decision Rule: -

For a two-tailed test:

Reject $H_0$ if $p \leq \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $p > \alpha/2 = 0.025$

P is the observed significant level of the test or P-value (Gulezian 1979: 335).

### 3.5.2 *Wilcoxon's Signed Rank Test for Group 1*

The Wilcoxon's Sign Rank Test was used to compare results from related samples within the "Experimental A" group.

Two Wilcoxon's Signed Rank Tests were used for Group 1. The first compared the data obtained by the researcher during the initial and follow-up consultations. The second compared the data obtained from the parents during the week of treatment.

All tests were done at the:

$\alpha = 0.05$ = level of significance

Hypothesis testing: -

The null hypothesis $H_0$ states that there is no significant improvement between the two related samples being compared. The alternative hypothesis $H_1$ states that there is a significant improvement between the two related samples being compared.

$H_0$: there is no significant improvement

$H_1$: there is a significant improvement

$\alpha = 0.05$ = level of significance of test.

- Decision Rule: -

For a two-tailed test:

Reject $H_0$ if $p \leq \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $p > \alpha/2 = 0.025$

P is the observed significance level of the test or P-value (Gulezian 1979: 335).

3.5.3 *Wilcoxon's Signed Rank Test for Group 2*

The Wilcoxon's Sign Rank Test was used compare results from related samples within the "Experimental B" group.

Two Wilcoxon's Signed Rank Tests were used for Group 2. The first compared the data obtained by the researcher during the initial and follow-up consultations. The second compared the data obtained from the parents during the week of treatment.

All tests were done at the:

$\alpha = 0.05$ = level of significance.

Hypothesis testing: -

The null hypothesis $H_0$ states that there is no significant improvement between the two related samples being compared. The relative hypothesis $H_1$ states that there is a significant improvement between the two related samples being compared.

$H_0$: there is no significant improvement

$H_1$: there is a significant improvement

$\alpha = 0.05$ = level of significance of test.

- Decision rule: -

For a two-tailed test:

Reject $H_0$ if $p \leq \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $p > \alpha/2 = 0.025$

P is the observed significance level of the test or P-value (Gulezian 1979: 335).

3.5.4 *Tables*

The results of the two Mann-Whitney Unpaired Tests and the four Wilcoxon's Signed Rank Tests are demonstrated in the form of tables.

### 3.5.5 *Summary Statistics*

Summary statistics (mean, median, mode, range and the coefficient of variation) are provided (refer *Appendix D*).

# CHAPTER FOUR: RESULTS

For the purpose of this study, two Mann-Whitney Unpaired Tests were done with respect to the 11 variables of interest in order to compare the two groups of treatment with each other. The first Mann-Whitney Unpaired Test compared the data obtained by the researcher during the initial and follow-up consultations, i.e. before and after treatment. The second Mann-Whitney Unpaired Test compared the data obtained from the parents during the week of treatment.

The variables that were used were *irritability, drooling, waking at night, chewing / biting, decrease in appetite, increase in thirst, diarrhoea, swollen gums, red gums, cheek flushing* and *circumoral rash.*

In the first Mann-Whitney Unpaired Test 22 P-values were obtained from the 11 variables. This was because there were only 2 days being compared. In the second test, however, 44 P-values were obtained since 4 days were being compared.

Apart from the Mann-Whitney Unpaired Tests, four Wilcoxon's Signed Rank Tests were performed with respect to the 11 variables of interest, in order to compare the data within each individual group of treatment. There were 2 sets of treatment, namely a homoepathic complex and herbal teething gel. In these 2 sets, 2 tests were performed per treatment type. These tests used information obtained by the researcher during the initial and follow-up consultations, and information obtained by the parents during the week of treatment.

## HOMOEOPATHIC COMPLEX GROUP vs HERBAL TEETHING GEL GROUP

**Table 1: Comparison between the homoeopathic complex and herbal teething gel groups (Data obtained by the researcher from the initial and follow up consultations)**

**(Mann-Whitney Unpaired Test)**

| Question | Variable | Consultation | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | Initial | 0.098 | Accept |
| | | Follow up | 0.155 | Accept |
| | | | | |
| 2 | Drooling | Initial | 0.286 | Accept |
| | | Follow up | 0.891 | Accept |
| | | | | |
| 3 | Waking at night | Initial | 0.392 | Accept |
| | | Follow up | 0.000 | *Reject* |
| | | | | |
| 4 | Chewing / biting | Initial | 0.529 | Accept |
| | | Follow up | 0.061 | Accept |
| | | | | |
| 5 | Decreased appetite | Initial | 0.948 | Accept |
| | | Follow up | 0.501 | Accept |
| | | | | |
| 6 | Increased thirst | Initial | 0.661 | Accept |
| | | Follow up | 0.363 | Accept |
| | | | | |
| 7 | Diarrhoea | Initial | 0.341 | Accept |
| | | Follow up | 0.317 | Accept |
| | | | | |
| 8 | Swollen gums | Initial | 0.441 | Accept |
| | | Follow up | 0.323 | Accept |
| | | | | |
| 9 | Redness of gums | Initial | 0.581 | Accept |
| | | Follow up | 0.108 | Accept |
| | | | | |
| 10 | Cheek flushing | Initial | 0.612 | Accept |
| | | Follow up | 0.317 | Accept |
| | | | | |
| 11 | Circumoral rash | Initial | 0.417 | Accept |
| | | Follow up | 0.962 | Accept |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

**CONCLUSION:**

The table demonstrates that on the whole the $H_0$ is accepted, however it is evident that *waking at night* on the follow up consultation is rejected, indicating a significant difference between the two forms of treatment.

**Table 2: Comparison between the homoeopathic complex and herbal teething gel groups (Data obtained from the parents during the week of treatment)**

**(Mann-Whitney Unpaired Test)**

| Question | Variable | Day of treatment | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 | 0.893 | Accept |
| | | 2 | 0.297 | Accept |
| | | 3 | 0.144 | Accept |
| | | 5 | 0.353 | Accept |
| | | | | |
| 2 | Drooling | 1 | 1.000 | Accept |
| | | 2 | 0.658 | Accept |
| | | 3 | 0.930 | Accept |
| | | 5 | 0.895 | Accept |
| | | | | |
| 3 | Waking at night | 1 | 0.380 | Accept |
| | | 2 | 0.066 | Accept |
| | | 3 | 0.005 | *Reject* |
| | | 5 | 0.003 | *Reject* |
| | | | | |
| 4 | Chewing / biting | 1 | 0.380 | Accept |
| | | 2 | 0.257 | Accept |
| | | 3 | 0.076 | Accept |
| | | 5 | 0.127 | Accept |
| | | | | |
| 5 | Decreased appetite | 1 | 0.896 | Accept |
| | | 2 | 0.389 | Accept |
| | | 3 | 0.680 | Accept |
| | | 5 | 0.487 | Accept |
| | | | | |
| 6 | Increased thirst | 1 | 0.791 | Accept |
| | | 2 | 0.689 | Accept |
| | | 3 | 0.715 | Accept |
| | | 5 | 0.443 | Accept |
| | | | | |
| 7 | Diarrhoea | 1 | 0.354 | Accept |
| | | 2 | 0.694 | Accept |
| | | 3 | 0.612 | Accept |
| | | 5 | 0.035 | Accept |
| | | | | |

**Table 2 cont.**

| | | | | |
|---|---|---|---|---|
| **8** | Swollen gums | 1 | 0.287 | Accept |
| | | 2 | 0.364 | Accept |
| | | 3 | 0.784 | Accept |
| | | 5 | 0.388 | Accept |
| | | | | |
| **9** | Redness of gums | 1 | 0.544 | Accept |
| | | 2 | 0.185 | Accept |
| | | 3 | 0.158 | Accept |
| | | 5 | 0.153 | Accept |
| | | | | |
| **10** | Cheek flushing | 1 | 0.633 | Accept |
| | | 2 | 0.544 | Accept |
| | | 3 | 0.261 | Accept |
| | | 5 | 0.150 | Accept |
| | | | | |
| **11** | Circumoral rash | 1 | 0.929 | Accept |
| | | 2 | 0.725 | Accept |
| | | 3 | 0.773 | Accept |
| | | 5 | 0.888 | Accept |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

**CONCLUSION:**

The table demonstrates that on the whole the $H_0$ is accepted, however it is evident that *waking at night* on Days 3 and 5 of treatment is rejected, indicating a significant difference between the two forms of treatment.

## HOMOEOPATHIC COMPLEX GROUP

**Table 3: Comparison between initial and follow up consultation within the homoeopathic group (Day 0 and day 7 of treatment)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Group | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | Homoeopathic | 0.001 | *Reject* |
| 2 | Drooling | Homoeopathic | 0.001 | *Reject* |
| 3 | Waking at night | Homoeopathic | 0.001 | *Reject* |
| 4 | Chewing / biting | Homoeopathic | 0.010 | *Reject* |
| 5 | Decreased appetite | Homoeopathic | 0.003 | *Reject* |
| 6 | Increased thirst | Homoeopathic | 0.017 | *Reject* |
| 7 | Diarrhoea | Homoeopathic | 0.038 | Accept |
| 8 | Swollen gums | Homoeopathic | 0.117 | Accept |
| 9 | Redness of gums | Homoeopathic | 0.010 | *Reject* |
| 10 | Cheek flushing | Homoeopathic | 0.705 | Accept |
| 11 | Circumoral rash | Homoeopathic | 1.000 | Accept |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

From the above Table 3, it is evident that there is a significant improvement in 7 of the 11 variables in question, between the initial and follow-up consultations. These variables being *irritability; drooling; waking at night; chewing / biting; a decrease in appetite; an increase in thirst* and *redness of the gums.*

## HERBAL TEETHING GEL GROUP

**Table 4: Comparison between initial and follow up consultation within the herbal teething gel group (Day 0 and day 7 of treatment)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Group | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | Herbal gel | 0.001 | *Reject* |
| 2 | Drooling | Herbal gel | 0.004 | *Reject* |
| 3 | Waking at night | Herbal gel | 0.009 | *Reject* |
| 4 | Chewing / biting | Herbal gel | 0.149 | Accept |
| 5 | Decreased appetite | Herbal gel | 0.007 | *Reject* |
| 6 | Increased thirst | Herbal gel | 0.577 | Accept |
| 7 | Diarrhoea | Herbal gel | 0.046 | Accept |
| 8 | Swollen gums | Herbal gel | 0.003 | *Reject* |
| 9 | Redness of gums | Herbal gel | 0.003 | *Reject* |
| 10 | Cheek flushing | Herbal gel | 0.059 | Accept |
| 11 | Circumoral rash | Herbal gel | 0.102 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

From the above Table 4, the herbal teething gel demonstrates a significant improvement in 6 of the 11 variables, between the initial and follow-up consultations. The improvement was seen to occur in the following variables: *irritability; drooling; waking at night; a decrease in appetite; swollen gums* and *red gums.*

## HOMOEOPATHIC COMPLEX GROUP

## DAY 1 VERSUS DAY 2

**Table 5.1: Comparison between Day 1 and Day 2 of treatment in the homoeopathic complex group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 versus 2 | 0.005 | *Reject* |
| 2 | Drooling | 1 versus 2 | 0.317 | Accept |
| 3 | Waking at night | 1 versus 2 | 0.097 | Accept |
| 4 | Chewing / biting | 1 versus 2 | 0.157 | Accept |
| 5 | Decreased appetite | 1 versus 2 | 0.785 | Accept |
| 6 | Increased thirst | 1 versus 2 | 0.317 | Accept |
| 7 | Diarrhoea | 1 versus 2 | 0.317 | Accept |
| 8 | Swollen gums | 1 versus 2 | 0.194 | Accept |
| 9 | Redness of gums | 1 versus 2 | 0.052 | Accept |
| 10 | Cheek flushing | 1 versus 2 | 0.194 | Accept |
| 11 | Circumoral rash | 1 versus 2 | 0.655 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

Between Day 1 and Day 2 of treatment, a significant improvement was only seen to occur in the *irritability.*

## DAY 1 VERSUS DAY 3

**Table 5.2: Comparison between Day 1 and Day 3 of treatment in the homoeopathic complex group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 versus 3 | 0.002 | *Reject* |
| 2 | Drooling | 1 versus 3 | 0.034 | Accept |
| 3 | Waking at night | 1 versus 3 | 0.031 | Accept |
| 4 | Chewing / biting | 1 versus 3 | 0.046 | Accept |
| 5 | Decreased appetite | 1 versus 3 | 0.014 | *Reject* |
| 6 | Increased thirst | 1 versus 3 | 0.070 | Accept |
| 7 | Diarrhoea | 1 versus 3 | 0.655 | Accept |
| 8 | Swollen gums | 1 versus 3 | 0.420 | Accept |
| 9 | Redness of gums | 1 versus 3 | 0.009 | *Reject* |
| 10 | Cheek flushing | 1 versus 3 | 0.414 | Accept |
| 11 | Circumoral rash | 1 versus 3 | 0.655 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

A significant improvement was evident between these two days in the following variables, namely *irritability, drooling, a decrease in appetite* and *gum redness.*

## DAY 1 VERSUS DAY 5

**Table 5.3: Comparison between Day 1 and Day 5 of treatment in the homoeopathic complex group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 versus 5 | 0.006 | *Reject* |
| 2 | Drooling | 1 versus 5 | 0.006 | *Reject* |
| 3 | Waking at night | 1 versus 5 | 0.005 | *Reject* |
| 4 | Chewing / biting | 1 versus 5 | 0.024 | *Reject* |
| 5 | Decreased appetite | 1 versus 5 | 0.011 | *Reject* |
| 6 | Increased thirst | 1 versus 5 | 0.026 | Accept |
| 7 | Diarrhoea | 1 versus 5 | 0.461 | Accept |
| 8 | Swollen gums | 1 versus 5 | 0.615 | Accept |
| 9 | Redness of gums | 1 versus 5 | 0.019 | *Reject* |
| 10 | Cheek flushing | 1 versus 5 | 0.785 | Accept |
| 11 | Circumoral rash | 1 versus 5 | 0.655 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

Of the 11 variables, 6 showed a significant improvement. These being *irritability, drooling, waking at night, chewing / biting, a decrease in appetite* and *gum redness.*

## DAY 2 VERSUS DAY 3

**Table 5.4: Comparison between Day 2 and Day 3 of treatment in the homoeopathic complex group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 2 versus 3 | 0.018 | *Reject* |
| 2 | Drooling | 2 versus 3 | 0.020 | *Reject* |
| 3 | Waking at night | 2 versus 3 | 0.120 | Accept |
| 4 | Chewing / biting | 2 versus 3 | 0.157 | Accept |
| 5 | Decreased appetite | 2 versus 3 | 0.020 | *Reject* |
| 6 | Increased thirst | 2 versus 3 | 0.063 | Accept |
| 7 | Diarrhoea | 2 versus 3 | 0.317 | Accept |
| 8 | Swollen gums | 2 versus 3 | 1.000 | Accept |
| 9 | Redness of gums | 2 versus 3 | 0.194 | Accept |
| 10 | Cheek flushing | 2 versus 3 | 0.317 | Accept |
| 11 | Circumoral rash | 2 versus 3 | 1.000 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = = {}^{0.05}/_{2}$ 0.025

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

There were 3 variables that indicated significant improvements in this comparison, i.e. *irritability, drooling* and *a decrease in appetite.*

## DAY 2 VERSUS DAY 5

**Table 5.5: Comparison between Day 2 and Day 5 of treatment in the homoeopathic complex group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 2 versus 5 | 0.035 | Accept |
| 2 | Drooling | 2 versus 5 | 0.004 | *Reject* |
| 3 | Waking at night | 2 versus 5 | 0.007 | *Reject* |
| 4 | Chewing / biting | 2 versus 5 | 0.066 | Accept |
| 5 | Decreased appetite | 2 versus 5 | 0.016 | *Reject* |
| 6 | Increased thirst | 2 versus 5 | 0.083 | Accept |
| 7 | Diarrhoea | 2 versus 5 | 0.705 | Accept |
| 8 | Swollen gums | 2 versus 5 | 0.705 | Accept |
| 9 | Redness of gums | 2 versus 5 | 0.170 | Accept |
| 10 | Cheek flushing | 2 versus 5 | 0.180 | Accept |
| 11 | Circumoral rash | 2 versus 5 | 1.000 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

Between these two days, the following variables showed a significant improvement:

*drooling, waking at night* and *a decrease in appetite.*

## DAY 3 VERSUS DAY 5

**Table 5.6: Comparison between Day 3 and Day 5 of treatment in the homoeopathic complex group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 3 versus 5 | 0.330 | Accept |
| 2 | Drooling | 3 versus 5 | 0.260 | Accept |
| 3 | Waking at night | 3 versus 5 | 0.010 | *Reject* |
| 4 | Chewing / biting | 3 versus 5 | 0.258 | Accept |
| 5 | Decreased appetite | 3 versus 5 | 0.039 | Accept |
| 6 | Increased thirst | 3 versus 5 | 0.496 | Accept |
| 7 | Diarrhoea | 3 versus 5 | 0.414 | Accept |
| 8 | Swollen gums | 3 versus 5 | 0.317 | Accept |
| 9 | Redness of gums | 3 versus 5 | 0.480 | Accept |
| 10 | Cheek flushing | 3 versus 5 | 0.180 | Accept |
| 11 | Circumoral rash | 3 versus 5 | 1.000 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

During this period, only *waking at night* was seen to show a significant improvement.

## HERBAL TEETHING GEL GROUP

## DAY 1 VERSUS DAY 2

**Table 6.1: Comparison between Day 1 and Day 2 of treatment in the herbal teething gel group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 versus 2 | 0.096 | Accept |
| 2 | Drooling | 1 versus 2 | 0.317 | Accept |
| 3 | Waking at night | 1 versus 2 | 1.000 | Accept |
| 4 | Chewing / biting | 1 versus 2 | 0.317 | Accept |
| 5 | Decreased appetite | 1 versus 2 | 0.053 | Accept |
| 6 | Increased thirst | 1 versus 2 | 0.180 | Accept |
| 7 | Diarrhoea | 1 versus 2 | 0.317 | Accept |
| 8 | Swollen gums | 1 versus 2 | 0.066 | Accept |
| 9 | Redness of gums | 1 versus 2 | 0.194 | Accept |
| 10 | Cheek flushing | 1 versus 2 | 0.109 | Accept |
| 11 | Circumoral rash | 1 versus 2 | 0.705 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

No significant improvement was noted between these 2 days.

## DAY 1 VERSUS DAY 3

**Table 6.2: Comparison between Day 1 and Day 3 of treatment in the herbal teething gel group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 versus 3 | 0.022 | *Reject* |
| 2 | Drooling | 1 versus 3 | 0.046 | Accept |
| 3 | Waking at night | 1 versus 3 | 0.782 | Accept |
| 4 | Chewing / biting | 1 versus 3 | 0.564 | Accept |
| 5 | Decreased appetite | 1 versus 3 | 0.024 | *Reject* |
| 6 | Increased thirst | 1 versus 3 | 0.180 | Accept |
| 7 | Diarrhoea | 1 versus 3 | 0.059 | Accept |
| 8 | Swollen gums | 1 versus 3 | 0.010 | *Reject* |
| 9 | Redness of gums | 1 versus 3 | 0.086 | Accept |
| 10 | Cheek flushing | 1 versus 3 | 0.066 | Accept |
| 11 | Circumoral rash | 1 versus 3 | 1.000 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

Between these two days the following variables showed a significant improvement, namely *irritability, a decrease in appetite* and *swollen gums.*

## DAY 1 VERSUS DAY 5

**Table 6.3: Comparison between Day 1 and Day 5 of treatment in the herbal teething gel group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 1 versus 5 | 0.002 | *Reject* |
| 2 | Drooling | 1 versus 5 | 0.008 | *Reject* |
| 3 | Waking at night | 1 versus 5 | 0.035 | Accept |
| 4 | Chewing / biting | 1 versus 5 | 0.180 | Accept |
| 5 | Decreased appetite | 1 versus 5 | 0.014 | *Reject* |
| 6 | Increased thirst | 1 versus 5 | 0.180 | Accept |
| 7 | Diarrhoea | 1 versus 5 | 0.020 | *Reject* |
| 8 | Swollen gums | 1 versus 5 | 0.007 | *Reject* |
| 9 | Redness of gums | 1 versus 5 | 0.004 | *Reject* |
| 10 | Cheek flushing | 1 versus 5 | 0.063 | Accept |
| 11 | Circumoral rash | 1 versus 5 | 0.655 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

There were 6 variables that showed a significant improvement, these being *irritability, drooling, a decrease in appetite, diarrhoea, swollen gums* and *gum redness.*

## DAY 2 VERSUS DAY 3

**Table 6.4: Comparison between Day 2 and Day 3 of treatment in the herbal teething gel group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 2 versus 3 | 0.038 | Accept |
| 2 | Drooling | 2 versus 3 | 0.083 | Accept |
| 3 | Waking at night | 2 versus 3 | 0.782 | Accept |
| 4 | Chewing / biting | 2 versus 3 | 1.000 | Accept |
| 5 | Decreased appetite | 2 versus 3 | 0.317 | Accept |
| 6 | Increased thirst | 2 versus 3 | 1.000 | Accept |
| 7 | Diarrhoea | 2 versus 3 | 0.257 | Accept |
| 8 | Swollen gums | 2 versus 3 | 0.083 | Accept |
| 9 | Redness of gums | 2 versus 3 | 0.258 | Accept |
| 10 | Cheek flushing | 2 versus 3 | 0.317 | Accept |
| 11 | Circumoral rash | 2 versus 3 | 0.317 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

No significant improvement was noted between these 2 days.

## DAY 2 VERSUS DAY 5

**Table 6.5: Comparison between Day 2 and Day 5 of treatment in the herbal teething gel group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 2 versus 5 | 0.002 | *Reject* |
| 2 | Drooling | 2 versus 5 | 0.007 | *Reject* |
| 3 | Waking at night | 2 versus 5 | 0.035 | Accept |
| 4 | Chewing / biting | 2 versus 5 | 0.317 | Accept |
| 5 | Decreased appetite | 2 versus 5 | 0.180 | Accept |
| 6 | Increased thirst | 2 versus 5 | 1.000 | Accept |
| 7 | Diarrhoea | 2 versus 5 | 0.059 | Accept |
| 8 | Swollen gums | 2 versus 5 | 0.008 | *Reject* |
| 9 | Redness of gums | 2 versus 5 | 0.009 | *Reject* |
| 10 | Cheek flushing | 2 versus 5 | 0.157 | Accept |
| 11 | Circumoral rash | 2 versus 5 | 0.414 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

Decision rule: Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

Of the 11 variables, 4 variables showed a significant improvement, i.e. *irritability, drooling, swollen gums* and *red gums.*

## DAY 3 VERSUS DAY 5

**Table 6.6: Comparison between Day 3 and Day 5 of treatment in the herbal teething gel group (Data obtained from Parents)**

**(Wilcoxon's Signed Rank Test)**

| Question | Variable | Day | P-Value | $H_0$ Decision |
|---|---|---|---|---|
| | | | | |
| 1 | Irritability | 3 versus 5 | 0.050 | Accept |
| 2 | Drooling | 3 versus 5 | 0.034 | Accept |
| 3 | Waking at night | 3 versus 5 | 0.004 | *Reject* |
| 4 | Chewing / biting | 3 versus 5 | 0.157 | Accept |
| 5 | Decreased appetite | 3 versus 5 | 0.564 | Accept |
| 6 | Increased thirst | 3 versus 5 | 1.000 | Accept |
| 7 | Diarrhoea | 3 versus 5 | 0.083 | Accept |
| 8 | Swollen gums | 3 versus 5 | 0.114 | Accept |
| 9 | Redness of gums | 3 versus 5 | 0.114 | Accept |
| 10 | Cheek flushing | 3 versus 5 | 0.317 | Accept |
| 11 | Circumoral rash | 3 versus 5 | 0.564 | Accept |
| | | | | |

The level of significance is fixed at $\alpha = 0.05$

- Decision rule: -

Reject $H_0$ if $P < \alpha/2 = {}^{0.05}/_{2} = 0.025$

Accept $H_0$ if $P \geq \alpha/2 = 0.025$

## CONCLUSION:

During this period, only *waking at night* was seen to show a significant improvement.

# CHAPTER FIVE: DISCUSSION

5.1 Interpretation and Argument: -

From the results obtained, it is evident that the gel was effective in the treatment of problematic teething in infants. Between the initial and follow-up consultations 6 of the 11 disturbances were alleviated. These disturbances were *irritability; drooling; waking at night; a decrease in appetite; swollen gums* and *redness of the gums* (refer Table 4).

With the gel, the irritability and swelling of the gums showed an overall gradual improvement, whilst drooling and redness of the gums showed their greatest improvements towards the end of the week of treatment. In the first half of the week the appetite was seen to improve whilst between Day 3 and Day 5 of treatment, the frequency of waking at night was seen to decrease. Within the week of treatment, the greatest overall improvement occurred between Day 1 and Day 5 (refer Table 6.3). However, no improvement was seen to occur between Day 1 and Day 2 (refer Table 6.1) or Day 2 and Day 3 (refer Table 6.2) of treatment. The herbal teething gel was also seen to give no amelioration towards the chewing / biting, diarrhoea, thirst, cheek flushing, or cheek rash that infants may have experienced.

The homoeopathic teething complex, which was being tested and compared to the herbal teething gel, was also shown to be effective in the treatment of problematic teething in infants. The complex was seen to alleviate 7 of the 11 disturbances between the initial and

follow-up consultations. These disturbances were *irritability; drooling; waking at night; chewing / biting; a decrease in appetite; an increase in thirst* and *redness of the gums* (refer Table 3).

The homoeopathic complex was seen to improve the irritability from as early as Day 2 of treatment, with a steady improvement occurring throughout the week. The drooling however, first showed signs of improvement between Day 2 and Day 3 of treatment with a general improvement thereafter. Waking at night showed a greater improvement towards the end of the week whilst chewing / biting showed only a general improvement between Day 1 and Day 5. The greatest improvement in appetite was seen to occur in the middle of the week whilst only a gradual improvement in thirst was seen to occur between the initial and follow-up consultations. The redness of the gums had an overall improvement, however it's greatest improvement was seen to occur in the first half of the week. Within the week of treatment, the greatest overall improvement occurred between Day 1 and Day 5 (refer Table 5.3). The homoeopathic complex however, showed no amelioration with regards to diarrhoea, swelling of the gums, cheek flushing or cheek rash that some infants may have experienced.

When the two groups were compared, the homoeopathic complex showed signs of amelioration from as earlier as Day 1 and Day 2 of treatment. The herbal teething gel however, showed no significant improvement this early. The homoeopathic complex showed earlier signs of improvement with regards to the irritability as well as a greater improvement in the drooling and redness of gums within the first 3 days of treatment. The

complex was also seen to show a gradual improvement in the chewing / biting and increased thirst, where the herbal teething gel had no effect. Throughout the week of treatment, the homoeopathic complex showed a more comprehensive amelioration in appetite and frequency of waking at night. However, the homoeopathic complex showed no improvement in diarrhoea or swelling of the gums where the gel showed a slight, gradual improvement in the diarrhoea and a significant improvement occurring with the swelling of the gums. With regards to cheek flushing and a circumoral rash, neither treatment offered any significant improvement.

It can therefore be concluded that the complex was more effective than the herbal teething gel. This is due to the fact that there was a greater degree of change, in a larger number of disturbances, at an earlier stage in the treatment period with the homoeopathic complex as compared to the herbal teething gel.

The above findings support those of Lever (1998), in that a homoepathic complex can be effective in the treatment of problematic teething in infants.

As the tooth erupts through the gum, a localised inflammation, characterised by swelling and redness, occurs (Seward, 1971). Associated with this is pain, which in turn leads to irritability, restlessness as well as waking at night (Leung, 1989). Since decreases in these were seen to occur after the treatment (refer Table 3), and the infants were seen to show less discomfort, it can be deduced that a decrease in pain was achieved as well.

The complex was seen to only partially alleviate the inflammation of the gums however (refer Table 3). This is due to the fact that a significant improvement, between the beginning and the end of the treatment, was only seen to occur in the redness of the gums and not in the swelling of the gums.

Due to the inflammation of the gums and the associated pain, many infants were seen to experience a decrease in appetite. The homoeopathic complex however, was seen to improve this disturbance and in many cases returned the infants' appetite to normal.

Most infants were seen to be chewing / biting and drooling to some degree. The chewing / biting was done in an attempt to gain relief from the pressure / discomfort in the area of tooth eruption. The results of the homoeopathic complex treatment showed a decrease in both of the above disturbances (refer Table 3).

5.2 Speculation: -

The purpose of this study was to determine the relative effectiveness of a homoeopathic teething complex, as opposed to a herbal teething gel, in the treatment of problematic teething.

Of the 11 clinical manifestations being treated as part of this research study, the homoeopathic complex successfully demonstrated amelioration in 7 of these. The

homoeopathic complex was seen to be unsuccessful in 4 of the clinical manifestations namely diarrhoea, swollen gums, cheek flushing and circumoral rash.

It is the researcher's speculation that better results may have been achieved had a homoeopathic similimum, which is based on the Law of Similars, been utilised. The Law of Similars states "…. any substance which can produce a totality of symptoms in a healthy human being can cure that totality of symptoms in a sick human being." (Vithoulkas, 1980: 98).

The reason, therefore, for this suggestion is that the totality of symptoms presented by each individual infant did not always correlate with the symptom picture of the remedies that constituted the complex. As a result of this sometimes-partial similarity, only partial alleviation of the signs and symptoms was achieved.

# CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Conclusion: -

Based on the fact that the objective of this study was to determine the effectiveness of a homoeopathic teething complex compared to a herbal teething gel in terms of clinical manifestations of problematic teething, it can be concluded that the homoeopathic complex did have an effect and was therefore successful. This conclusion is based on the fact that there were a number of statistical improvements observed in the homoeopathic group. More improvements were noted with the homoeopathic complex treatment than with the teething gel, which is an already recognised and often chosen form of treatment for teething difficulties. Therefore if the two forms of treatment are compared in terms of effectiveness, it can be concluded that the complex was more effective than the gel due to a greater number of statistical improvements.

## 6.2 Recommendations: -

The researcher recommends that should future studies of this nature be carried out, certain changes should be made. The recommended changes are as follows: -

With regards to the questionnaire, *cheek flushing* and *circumoral rash* should be excluded, since the occurrence of these signs were uncommon in such a small research group, resulting in these being of little statistical value to the research.

Since many of the infants experienced drooling to some degree, it is suggested that a liquid medication be utilised. It was often found that the granule medication got caught up in the excess saliva and as a result was displaced from the mouth. The liquid medication would not have to dissolve, like the granules, in the mouth before being absorbed and there is less likelihood of being expelled by the infant. It would thus, ensure contact with the mucus membranes in the mouth and therefore result in greater absorption of the medication.

It is also recommended that a homoeopathic similimum be used in order to achieve better results.

Since each group being tested only consisted of 15 patients per treatment group, it is recommended for more accurate results that a bigger sample size be used.

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APPENDIX A – CASE TAKING FORM

# CASE TAKING FORM FOR TEETHING RESEARCH

***INFANTS DETAILS: -***

Name_____ Date _____

Address_____

_____

_____Code_____

Date of Birth _____ Age _____ Sex: M / F

Consultation: initial / follow up

***PARENTS' DETAILS: -***

Name of parent(s) / guardian(s)_____

_____

Telephone (H) _____ (W) _____

*MAIN COMPLAINT:* _____

_____

_____

_____

_____

_____

_____

*PAST MEDICAL HISTORY AND TREATMENT:* (including childhood diseases): _____

_____

_____

_____

Medication: _____

Vaccinations: _____

Allergies: _____

*FAMILY HISTORY:*

*BIRTH HISTORY:* Pregnancy _____

_____

_____

_____

Labour_____

_____

_____

*MILESTONES:* _____

_____

_____

GENERALS:

Sleep: (patterns and positions)_____

_____

_____

_____

Weather preference: _____

SYSTEMS REVIEW:

HEAD: _____

_____

ENT: Ears _____

_____

Nose_____

_____

Throat_____

_____

RESPIRATORY:_____

_____

_____

_____

CARDIOVASCULAR: _____

_____

_____

GIT: Feeding / diet _____

_____

_____

Cravings and aversions _____

_____

Appetite_____

Thirst _____

Stool (colour, consistency, frequency)_____

_____

_____

GENITO-URINARY: _____

_____

Urine _____

_____

Discharges_____

MUSCULOSKELETAL AND CNS: _____

_____

_____

SKIN: Rashes _____

_____

Perspiration _____

_____

PERSONALITY:Temperament _____

_____

_____

Relations with others _____

_____

_____

Fears _____

## PHYSICAL EXAMINATION

**VITAL SIGNS:**

Temperature _____ Pulse rate _____

Respiratory rate _____ Weight _____

Head circumference _____

**GENERAL EXAMINATION:**

Jaundice / anaemia / cyanosis

Dehydration Oedema _____

Lymphadenopathy _____

_____

Neck stiffness / Kernig's sign _____

Fontanelles _____

**ENT:** Ears:Right _____

Left _____

Throat _____

_____

Nose _____

**ORAL EXAMINATION:** _____

Gums/mucosa _____

_____

Salivation _____

Number of teeth erupting _____

**CHEST EXAMINATION:** _____

Deformities _____

_____

Lungs _____

_____

Heart _____

_____

**ABDOMINAL EXAMINATION:** _____

_____

_____

_____

APPENDIX B – CONSENT FORM

## Covering Letter For The Informed Consent Form

## Problematic Teething in Infants

Teething is an event that occurs in everyone during infancy, however only some experience problematic teething which results in not only distress and disturbed nights for the infant, but for the parents as well. Because of this we are constantly looking to better our treatment of problematic teething by finding a medication that provides fast and effective relief.

This research project will propose to determine the effectiveness of a homoeopathic teething complex compared with a herbal teething gel in alleviating the signs and symptoms of this condition. In order to do this, we appeal to you for your assistance in allowing your baby to become actively involved, by informing us about their symptoms, their degree of intensity as well as how this condition effects their daily lives.

The treatment will last for one week during which time the parents will be requested to fill out a questionnaire on days 1, 2, 3 and 5 of the treatment. This questionnaire will give you the opportunity to give your honest and objective contribution, which will enable us to determine the effectiveness of homoeopathy compared with a herbal teething gel on problematic teething and whether in fact homoeopathy has a place in the medical arena for such treatment.

The demand for some successful, non-harming treatment for this condition is quite evident and growing. With your help we can determine the impact and effectiveness of homoeopathy on problematic teething and whether we should accept or reject it as a form of treatment.

Thank you for the courtesy of your assistance.

Julia Eldridge

### INSTRUCTIONS FOR TEETHING QUESTIONAIRE:

A. Your answers to the questionnaire will be regarded as strictly confidential and will be used for research purposes only.

B. Please answer the questions as objectively as possible.

C. Make sure you answer all the questions and do not skip any accidentally.

D. Please read every question carefully before answering. If you have any queries please ask for assistance from the researcher conducting the questionnaire.

## INFORMED CONSENT FORM

(To be completed in duplicate by patient/subject*) *Delete whichever is not applicable.

TITLE OF RESEARCH:

- *An Investigation into the effectiveness of a Homoeopathic Teething Complex compared to a Herbal Teething Gel on Problematic Teething in infants.*

NAME OF SUPERVISOR:

- *Dr G. McDavid*

NAME OF RESEARCH STUDENT:

- *Julia Eldridge*

DATE:_____

PLEASE CIRCLE THE APPROPRIATE ANSWER.

| | |
|---|---|
| 1. Have you read the research information sheet? | Yes/No |
| 2. Have you had an opportunity to ask questions regarding this study? | Yes/No |
| 3. Have you received satisfactory answers to your questions? | Yes/No |
| 4. Have you had an opportunity to discuss this study? | Yes/No |
| 5. Have you received enough information about this study? | Yes/No |
| 6.Who haveyou spoken to?_____ | |
| 7. Do you understand the implications of your involvement in this study? | Yes/No |
| 8. Do you understand that you are free to withdraw from this study? | Yes/No |
| a) at any time | |
| b) without having to give a reason for withdrawing, and | |
| c) without affecting your future health care. | |
| 9. Do you agree to voluntarily participate in this study? | Yes/No |

PATIENT/SUBJECT*Name_____ Signature_____
(In block letters)

PARENT/GUARDIAN*Name_____Signature_____
(In block letters)

WITNESS*Name_____ Signature_____
(In block letters)

RESEARCH STUDENT Name: *Julia Eldridge* Signature _____

APPENDIX C - TEETHING QUESTIONNAIRE

**TEETHING QUESTIONNAIRE** BY MISS J. ELDRIDGE

NAME: ..... PATIENT NO.: .....

AGE: ..... DATE: .....

**SECTION A - (GENERAL QUESTIONS):-**

| | | Initial | Follow up |
|---|---|---|---|
| 1. Is your baby irritable? | | Yes/No | Yes/No |
| If yes, is it | ◇ Frequently | 5 | 5 |
| | ◇ Occasionally | 3 | 3 |
| | ◇ Seldom | 1 | 1 |
| 2. Is your baby drooling? | | Yes/No | Yes/No |
| If yes, is it | ◇ Excessive | 5 | 5 |
| | ◇ Moderate | 3 | 3 |
| | ◇ Slight | 1 | 1 |
| 3. Is your baby waking at night? | | Yes/No | Yes/No |
| If yes, is it | ◇ Frequently | 5 | 5 |
| | ◇ Occasionally | 3 | 3 |
| | ◇ Seldom | 1 | 1 |
| 4. Is your baby sucking or biting his / her hands, fingers or toys? | | Yes/No | Yes/No |
| If yes, is it | ◇ Frequently | 5 | 5 |
| | ◇ Occasionally | 3 | 3 |
| | ◇ Seldom | 1 | 1 |
| 5. Does your baby show a decrease in appetite / feeding? | | Yes/No | Yes/No |
| If yes, is it | ◇ Severe | 5 | 5 |
| | ◇ Moderate | 3 | 3 |
| | ◇ Slight | 1 | 1 |

6. Does your baby show an increase in thirst? Yes/No Yes/No

If yes, is it
- Excessive 5 5
- Moderate 3 3
- Slight 1 1

7. Does your baby have diarrhea? Yes/No Yes/No

If yes, is it
- Severe 5 5
- Moderate 3 3
- Slight 1 1

**SECTION B - (ORAL EXAMINATION - to determine the severity of the eruption):-**

**Initial** **Follow up**

1. Is the gum around the erupting tooth swollen? Yes/No Yes/No

If yes, is it
- Severe 5 5
- Moderate 3 3
- Slight 1 1

2. Is there a change in the colour of the gum around the erupting tooth? Yes/No Yes/No

If yes, is it
- Very red 5 5
- Moderately red 3 3
- Slightly red 1 1

3. Is your baby's cheek(s) flushed? Yes/No Yes/No

If yes, is it
- Very red 5 5
- Moderately red 3 3
- Slightly red 1 1

4. Is there a rash around your baby's mouth? Yes/No Yes/No

If yes, is it
- Severe 5 5
- Moderate 3 3
- Slight 1 1

## SECTION C - (SUNDRY):-

| | **Follow up** |
|---|---|
| 1. Did the medication offer any relief? | Yes/No |
| If yes, was it ◇ Rapid | 5 |
| ◇ Moderate | 3 |
| ◇ Slow/poor | 1 |
| 2. Did your baby like the medication? | Yes/No |
| 3. Was the medication easy to use? | Yes/No |

## APPENDIX C - TEETHING QUESTIONNAIRE

**TEETHING QUESTIONNAIRE** BY MISS J. ELDRIDGE

(To be completed by the parent/guardian)

NAME: ..... PATIENT NO.: .....

AGE: ..... DATE: .....

**SECTION A - (GENERAL QUESTIONS):-**

| | Day 1 | Day 2 | Day 3 | Day 5 |
|---|---|---|---|---|
| 1. Is your baby irritable? | Yes/No | Yes/No | Yes/No | Yes/No |
| If yes, is it ◇ Frequently | 5 | 5 | 5 | 5 |
| ◇ Occasionally | 3 | 3 | 3 | 3 |
| ◇ Seldom | 1 | 1 | 1 | 1 |
| 2. Is your baby drooling? | Yes/No | Yes/No | Yes/No | Yes/No |
| If yes, is it ◇ Excessive | 5 | 5 | 5 | 5 |
| ◇ Moderate | 3 | 3 | 3 | 3 |
| ◇ Slight | 1 | 1 | 1 | 1 |
| 3. Is your baby waking at night? | Yes/No | Yes/No | Yes/No | Yes/No |
| If yes, is it ◇ Frequently | 5 | 5 | 5 | 5 |
| ◇ Occasionally | 3 | 3 | 3 | 3 |
| ◇ Seldom | 1 | 1 | 1 | 1 |
| 4. Is your baby sucking or biting his / her hands, fingers or toys? | Yes/No | Yes/No | Yes/No | Yes/No |
| If yes, is it ◇ Frequently | 5 | 5 | 5 | 5 |
| ◇ Occasionally | 3 | 3 | 3 | 3 |
| ◇ Seldom | 1 | 1 | 1 | 1 |
| 5. Does your baby show a decrease in appetite / feeding? | Yes/No | Yes/No | Yes/No | Yes/No |
| If yes, is it ◇ Severe | 5 | 5 | 5 | 5 |
| ◇ Moderate | 3 | 3 | 3 | 3 |
| ◇ Slight | 1 | 1 | 1 | 1 |

6. Does your baby show an increase in thirst? Yes/No Yes/No Yes/No Yes/No

| If yes, is it | | | | |
|---|---|---|---|---|
| ◆ Excessive | 5 | 5 | 5 | 5 |
| ◆ Moderate | 3 | 3 | 3 | 3 |
| ◆ Slight | 1 | 1 | 1 | 1 |

7. Does your baby have diarrhea? Yes/No Yes/No Yes/No Yes/No

| If yes, is it | | | | |
|---|---|---|---|---|
| ◆ Severe | 5 | 5 | 5 | 5 |
| ◆ Moderate | 3 | 3 | 3 | 3 |
| ◆ Slight | 1 | 1 | 1 | 1 |

**SECTION B - (ORAL EXAMINATION):-**

**Day 1 Day 2 Day 3 Day 5**

1. Is the gum around the erupting tooth swollen?

Yes/No Yes/No Yes/No Yes/No

| If yes, is it | | | | |
|---|---|---|---|---|
| ◆ Severe | 5 | 5 | 5 | 5 |
| ◆ Moderate | 3 | 3 | 3 | 3 |
| ◆ Slight | 1 | 1 | 1 | 1 |

2. Is there a change in the colour of the gum around the erupting tooth?

Yes/No Yes/No Yes/No Yes/No

| If yes, is it | | | | |
|---|---|---|---|---|
| ◆ Very red | 5 | 5 | 5 | 5 |
| ◆ Moderately red | 3 | 3 | 3 | 3 |
| ◆ Slightly red | 1 | 1 | 1 | 1 |

3. Is your baby's cheek(s) flushed? Yes/No Yes/No Yes/No Yes/No

| If yes, is it | | | | |
|---|---|---|---|---|
| ◆ Very red | 5 | 5 | 5 | 5 |
| ◆ Moderately red | 3 | 3 | 3 | 3 |
| ◆ Slightly red | 1 | 1 | 1 | 1 |

4. Is there a rash around your baby's mouth? Yes/No Yes/No Yes/No Yes/No

| If yes, is it | | | | |
|---|---|---|---|---|
| ◆ Severe | 5 | 5 | 5 | 5 |
| ◆ Moderate | 3 | 3 | 3 | 3 |
| ◆ Slight | 1 | 1 | 1 | 1 |

## APPENDIX D - DETAILED STATISTICAL RESULTS

## SUMMARY STATISTICS FOR ALL VARIABLES

**Data obtained from Researcher: -**

### 1. Homoeopathic Treatment

| ❖ **Variable** | $Y_{11}$ |
|---|---|
| Mean | 4.3333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 4 |
| Coefficient of variation | 28.4868 |

| ❖ **Variable** | $Y_{21}$ |
|---|---|
| Mean | 0.5333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 156.3393 |

| ❖ **Variable** | $Y_{31}$ |
|---|---|
| Mean | 3.2000 |
| Median | 3.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 55.6516 |

| ❖ **Variable** | $Y_{41}$ |
|---|---|
| Mean | 1.2000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 100.5935 |

| ❖ **Variable** | $Y_{51}$ |
|---|---|
| Mean | 3.7333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 47.987 |

❖ **Variable** $Y_{61}$

| | |
|---|---|
| Mean | 0.2667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 171.6516 |

❖ **Variable** $Y_{71}$

| | |
|---|---|
| Mean | 3.6667 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 52.2233 |

❖ **Variable** $Y_{81}$

| | |
|---|---|
| Mean | 2.4000 |
| Median | 3.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 81.5281 |

❖ **Variable** $Y_{91}$

| | |
|---|---|
| Mean | 1.7333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 85.7565 |

❖ **Variable** $Y_{101}$

| | |
|---|---|
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 207.0197 |

❖ **Variable** $Y_{111}$

| | |
|---|---|
| Mean | 1.3333 |
| Median | 1.00 |
| Mode | 3 |
| Range | 3 |
| Coefficient of variation | 96.8246 |

❖ **Variable** $Y_{121}$

| | |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 126.7731 |

❖ **Variable** $Y_{131}$

| | |
|---|---|
| Mean | 0.6667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 156.9804 |

❖ **Variable** $Y_{141}$

| | |
|---|---|
| Mean | 0.0667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 387.2983 |

❖ **Variable** $Y_{151}$

| | |
|---|---|
| Mean | 2.3333 |
| Median | 3.00 |
| Mode | 1 |
| Range | 4 |
| Coefficient of variation | 62.0354 |

❖ **Variable** $Y_{161}$

| | |
|---|---|
| Mean | 1.6667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 95.319 |

❖ **Variable** $Y_{171}$

| | |
|---|---|
| Mean | 2.0667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 2 |
| Coefficient of variation | 49.974 |

❖ **Variable** $Y_{181}$

| | |
|---|---|
| Mean | 0.6000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 216.3918 |

❖ **Variable** $Y_{191}$

| | |
|---|---|
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 207.0917 |

❖ **Variable** $Y_{201}$

| | |
|---|---|
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 387.2983 |

❖ **Variable** $Y_{211}$

| | |
|---|---|
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 207.0197 |

❖ **Variable** $Y_{221}$

| | |
|---|---|
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 387.2983 |

❖ **Variable** $Y_{241}$

| | |
|---|---|
| Mean | 3.9333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 4 |
| Coefficient of variation | 32.5393 |

❖ **Variable** $Y_{261}$

| | |
|---|---|
| Mean | 1.0667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 1 |
| Coefficient of variation | 24.2061 |

❖ **Variable** $Y_{281}$

| | |
|---|---|
| Mean | 1.3333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 1 |
| Coefficient of variation | 36.5963 |

**2. Herbal Teething Gel**

❖ **Variable** $Y_{12}$

| | |
|---|---|
| Mean | 3.6667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 4 |
| Coefficient of variation | 33.6662 |

❖ **Variable** $Y_{22}$

| | |
|---|---|
| Mean | 0.9333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 102.9804 |

❖ **Variable** $Y_{32}$

| | |
|---|---|
| Mean | 2.5333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 64.8047 |

❖ **Variable** $Y_{42}$

| | |
|---|---|
| Mean | 1.2000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 105.4093 |

❖ **Variable** $Y_{52}$

| | |
|---|---|
| Mean | 3.2667 |
| Median | 3.00 |
| Mode | 5 |
| Range | 4 |
| Coefficient of variation | 51.0496 |

❖ **Variable** $Y_{62}$

| | |
|---|---|
| Mean | 1.5333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 73.3998 |

❖ **Variable** $Y_{72}$

| | |
|---|---|
| Mean | 4.2000 |
| Median | 5.00 |
| Mode | 5 |
| Range | 4 |
| Coefficient of variation | 30.1169 |

❖ **Variable** $Y_{82}$

| | |
|---|---|
| Mean | 3.7333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 43.5059 |

❖ **Variable** $Y_{92}$

| | |
|---|---|
| Mean | 1.8000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 96.6822 |

❖ **Variable** $Y_{102}$

| | |
|---|---|
| Mean | 0.6667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 185.164 |

❖ **Variable** $Y_{112}$

| | |
|---|---|
| Mean | 1.2667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 134.9933 |

❖ **Variable** $Y_{122}$

| | |
|---|---|
| Mean | 1.1333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 140.9662 |

❖ **Variable** $Y_{132}$

| | |
|---|---|
| Mean | 0.2667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 171.6516 |

❖ **Variable** $Y_{142}$

| | |
|---|---|
| Mean | 0.0000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 0 |
| Coefficient of variation | - |

❖ **Variable** $Y_{152}$

| | |
|---|---|
| Mean | 2.6667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 52.3979 |

❖ **Variable** $Y_{162}$

| | |
|---|---|
| Mean | 1.0667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 82.8483 |

❖ **Variable** $Y_{172}$

| | |
|---|---|
| Mean | 2.4000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 62.5991 |

❖ **Variable** $Y_{182}$

| | |
|---|---|
| Mean | 0.8000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 96.8246 |

❖ **Variable** $Y_{192}$

| | |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 207.0917 |

❖ **Variable** $Y_{202}$

| | |
|---|---|
| Mean | 0.0000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 0 |
| Coefficient of variation | - |

❖ **Variable** $Y_{212}$

| | |
|---|---|
| Mean | 0.3333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 146.385 |

❖ **Variable** $Y_{222}$

| | |
|---|---|
| Mean | 0.0667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 387.2983 |

❖ **Variable** $Y_{242}$

| | |
|---|---|
| Mean | 2.8667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 2 |
| Coefficient of variation | 18.0139 |

❖ **Variable** $Y_{262}$

| | |
|---|---|
| Mean | 1.0667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 1 |
| Coefficient of variation | 24.2061 |

❖ **Variable** $Y_{282}$

| | |
|---|---|
| Mean | 1.0667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 1 |
| Coefficient of variation | 24.2061 |

**Data obtained from the parents: -**

**1. Homoeopathic Treatment**

| ➢ **Variable** | $Y_{11}$ |
|---|---|
| Mean | 3.1333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 55.102 |

| ➢ **Variable** | $Y_{21}$ |
|---|---|
| Mean | 2.0667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 69.561 |

| ➢ **Variable** | $Y_{31}$ |
|---|---|
| Mean | 1.2667 |
| Median | 1.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 105.357 |

| ➢ **Variable** | $Y_{41}$ |
|---|---|
| Mean | 1.0000 |
| Median | 1.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 113.389 |

| ➢ **Variable** | $Y_{51}$ |
|---|---|
| Mean | 2.4667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 69.995 |

➢ **Variable** $Y_{61}$

| | |
|---|---|
| Mean | 2.6000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 64.686 |

➢ **Variable** $Y_{71}$

| | |
|---|---|
| Mean | 1.8667 |
| Median | 1.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 80.654 |

➢ **Variable** $Y_{81}$

| | |
|---|---|
| Mean | 1.4667 |
| Median | 1.00 |
| Mode | 3 |
| Range | 3 |
| Coefficient of variation | 92.438 |

➢ **Variable** $Y_{91}$

| | |
|---|---|
| Mean | 2.8000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 47.149 |

➢ **Variable** $Y_{101}$

| | |
|---|---|
| Mean | 2.1333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 72.762 |

➢ **Variable** $Y_{111}$

| | |
|---|---|
| Mean | 1.4667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 95.963 |

| | |
|---|---|
| ➢ **Variable** | $Y_{121}$ |
| Mean | 0.6000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 138.013 |
| ➢ **Variable** | $Y_{131}$ |
| Mean | 3.5333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 53.343 |
| ➢ **Variable** | $Y_{141}$ |
| Mean | 3.2667 |
| Median | 3.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 59.525 |
| ➢ **Variable** | $Y_{151}$ |
| Mean | 3.0000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 60.422 |
| ➢ **Variable** | $Y_{161}$ |
| Mean | 2.6667 |
| Median | 3.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 75.888 |
| ➢ **Variable** | $Y_{171}$ |
| Mean | 1.6000 |
| Median | 1.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 99.665 |

➢ **Variable** $Y_{181}$

| | |
|---|---|
| Mean | 1.5333 |
| Median | 1.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 107.069 |

➢ **Variable** $Y_{191}$

| | |
|---|---|
| Mean | 0.8000 |
| Median | 1.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 126.773 |

➢ **Variable** $Y_{201}$

| | |
|---|---|
| Mean | 0.2667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 171.652 |

➢ **Variable** $Y_{211}$

| | |
|---|---|
| Mean | 1.4667 |
| Median | 1.00 |
| Mode | 3 |
| Range | 3 |
| Coefficient of variation | 92.438 |

➢ **Variable** $Y_{221}$

| | |
|---|---|
| Mean | 1.1333 |
| Median | 1.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 109.936 |

➢ **Variable** $Y_{231}$

| | |
|---|---|
| Mean | 0.7333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 140.836 |

➢ **Variable** $Y_{241}$

| | |
|---|---|
| Mean | 0.5333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 156.339 |

➢ **Variable** $Y_{251}$

| | |
|---|---|
| Mean | 0.4667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 227.164 |

➢ **Variable** $Y_{261}$

| | |
|---|---|
| Mean | 0.3333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 244.949 |

➢ **Variable** $Y_{271}$

| | |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 207.02 |

➢ **Variable** $Y_{281}$

| | |
|---|---|
| Mean | 0.2667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 171.652 |

➢ **Variable** $Y_{291}$

| | |
|---|---|
| Mean | 2.2000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 73.293 |

➢ **Variable** $Y_{301}$

| | |
|---|---|
| Mean | 1.9333 |
| Median | 1.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 74.358 |

➢ **Variable** $Y_{311}$

| | |
|---|---|
| Mean | 1.9333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 84.011 |

➢ **Variable** $Y_{321}$

| | |
|---|---|
| Mean | 2.0667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 86.686 |

➢ **Variable** $Y_{331}$

| | |
|---|---|
| Mean | 1.8667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 3 |
| Coefficient of variation | 69.751 |

➢ **Variable** $Y_{341}$

| | |
|---|---|
| Mean | 1.3333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 83.452 |

➢ **Variable** $Y_{351}$

| | |
|---|---|
| Mean | 0.9333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 102.98 |

➢ **Variable** $Y_{361}$

| | |
|---|---|
| Mean | 0.8000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 178.035 |

➢ **Variable** $Y_{371}$

| | |
|---|---|
| Mean | 0.3333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 244.949 |

➢ **Variable** $Y_{381}$

| | |
|---|---|
| Mean | 0.6000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 242.343 |

➢ **Variable** $Y_{391}$

| | |
|---|---|
| Mean | 0.4667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 227.164 |

➢ **Variable** $Y_{401}$

| | |
|---|---|
| Mean | 0.2667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 299.553 |

➢ **Variable** $Y_{411}$

| | |
|---|---|
| Mean | 0.3333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 244.949 |

| ➢ **Variable** | $Y_{421}$ |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 263.899 |

| ➢ **Variable** | $Y_{431}$ |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 263.899 |

| ➢ **Variable** | $Y_{441}$ |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 263.899 |

**2. Herbal Teething Gel**

| ➢ **Variable** | $Y_{12}$ |
|---|---|
| Mean | 3.2667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 4 |
| Coefficient of variation | 45.503 |

| ➢ **Variable** | $Y_{22}$ |
|---|---|
| Mean | 2.6000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 4 |
| Coefficient of variation | 52.009 |

➢ **Variable** $Y_{32}$

| | |
|---|---|
| Mean | 2.1333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 78.969 |

➢ **Variable** $Y_{42}$

| | |
|---|---|
| Mean | 1.4000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 88.723 |

➢ **Variable** $Y_{52}$

| | |
|---|---|
| Mean | 2.4667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 69.995 |

➢ **Variable** $Y_{62}$

| | |
|---|---|
| Mean | 2.3333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 68.085 |

➢ **Variable** $Y_{72}$

| | |
|---|---|
| Mean | 1.9333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 84.011 |

➢ **Variable** $Y_{82}$

| | |
|---|---|
| Mean | 1.3333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 100.889 |

| | |
|---|---|
| ➢ **Variable** | $Y_{92}$ |
| Mean | 3.2667 |
| Median | 3.00 |
| Mode | 5 |
| Range | 4 |
| Coefficient of variation | 51.05 |
| ➢ **Variable** | $Y_{102}$ |
| Mean | 3.2667 |
| Median | 3.00 |
| Mode | 5 |
| Range | 4 |
| Coefficient of variation | 51.05 |
| ➢ **Variable** | $Y_{112}$ |
| Mean | 3.3333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 50.285 |
| ➢ **Variable** | $Y_{122}$ |
| Mean | 2.0667 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 69.561 |
| ➢ **Variable** | $Y_{132}$ |
| Mean | 4.1333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 35.258 |
| ➢ **Variable** | $Y_{142}$ |
| Mean | 4.0000 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 41.188 |

| ➢ **Variable** | $Y_{152}$ |
|---|---|
| Mean | 4.0000 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 45.316 |

| ➢ **Variable** | $Y_{162}$ |
|---|---|
| Mean | 3.7333 |
| Median | 5.00 |
| Mode | 5 |
| Range | 5 |
| Coefficient of variation | 47.987 |

| ➢ **Variable** | $Y_{172}$ |
|---|---|
| Mean | 1.4000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 88.723 |

| ➢ **Variable** | $Y_{182}$ |
|---|---|
| Mean | 0.9333 |
| Median | 1.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 124.598 |

| ➢ **Variable** | $Y_{192}$ |
|---|---|
| Mean | 0.8000 |
| Median | 0.000 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 150.89 |

| ➢ **Variable** | $Y_{202}$ |
|---|---|
| Mean | 0.7333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 166.745 |

➢ **Variable** $Y_{212}$

| | |
|---|---|
| Mean | 1.4667 |
| Median | 1.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 114.864 |

➢ **Variable** $Y_{222}$

| | |
|---|---|
| Mean | 1.1333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 140.966 |

➢ **Variable** $Y_{232}$

| | |
|---|---|
| Mean | 1.1333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 140.966 |

➢ **Variable** $Y_{242}$

| | |
|---|---|
| Mean | 1.1333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 5 |
| Coefficient of variation | 140.966 |

➢ **Variable** $Y_{252}$

| | |
|---|---|
| Mean | 0.5333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 156.339 |

➢ **Variable** $Y_{262}$

| | |
|---|---|
| Mean | 0.4000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 207.02 |

| | |
|---|---|
| ➢ **Variable** | $Y_{272}$ |
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 207.02 |
| ➢ **Variable** | $Y_{282}$ |
| Mean | 0.0000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 0 |
| Coefficient of variation | - |
| ➢ **Variable** | $Y_{292}$ |
| Mean | 2.8000 |
| Median | 3.00 |
| Mode | 3 |
| Range | 5 |
| Coefficient of variation | 54.331 |
| ➢ **Variable** | $Y_{302}$ |
| Mean | 2.3333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 4 |
| Coefficient of variation | 52.904 |
| ➢ **Variable** | $Y_{312}$ |
| Mean | 1.9333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 4 |
| Coefficient of variation | 66.201 |
| ➢ **Variable** | $Y_{322}$ |
| Mean | 1.4000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 75.400 |

➢ **Variable** $Y_{332}$

| | |
|---|---|
| Mean | 2.1333 |
| Median | 3.00 |
| Mode | 3 |
| Range | 3 |
| Coefficient of variation | 52.756 |

➢ **Variable** $Y_{342}$

| | |
|---|---|
| Mean | 1.8667 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 60.293 |

➢ **Variable** $Y_{352}$

| | |
|---|---|
| Mean | 1.5333 |
| Median | 1.00 |
| Mode | 1 |
| Range | 5 |
| Coefficient of variation | 88.419 |

➢ **Variable** $Y_{362}$

| | |
|---|---|
| Mean | 1.0000 |
| Median | 1.00 |
| Mode | 1 |
| Range | 3 |
| Coefficient of variation | 92.582 |

➢ **Variable** $Y_{372}$

| | |
|---|---|
| Mean | 0.5333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 198.769 |

➢ **Variable** $Y_{382}$

| | |
|---|---|
| Mean | 0.1333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 263.899 |

| | |
|---|---|
| ➢ **Variable** | $Y_{392}$ |
| Mean | 0.0667 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 387.298 |
| ➢ **Variable** | $Y_{402}$ |
| Mean | 0.0000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 0 |
| Coefficient of variation | - |
| ➢ **Variable** | $Y_{412}$ |
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 207.02 |
| ➢ **Variable** | $Y_{422}$ |
| Mean | 0.3333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 3 |
| Coefficient of variation | 244.949 |
| ➢ **Variable** | $Y_{432}$ |
| Mean | 0.2000 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 207.02 |
| ➢ **Variable** | $Y_{442}$ |
| Mean | 0.1333 |
| Median | 0.00 |
| Mode | 0 |
| Range | 1 |
| Coefficient of variation | 263.899 |