

Parental Anxiety of Perceived Disorder and Application of Concoctions on Infant Pulsating Anterior Fontanelle in the Tamale Metropolis, Ghana

Wombeogo Michael

Department of Nursing, KAAF University College, Fetteh-Kakraba, Central Region, Ghana

Abstract

The study seeks to unearth parental anxiety of perceived disorder and application of concoctions on infant pulsating anterior fontanelle in the Tamale metropolis, Ghana. Pulsation of the anterior fontanelle though a physiological reality of all infants, causes anxiety on the part of parents for fear of the infant suffering some form of harm as a result. A qualitative study which employed the narrative realities of mothers, delving into mothers' beliefs on the physiologic functionality of the anterior fontanelle and perceived treatment mode commonly employed by mothers. The study revealed that mothers do not have any scientific reason behind the belief system for the application of concoctions on the pulsating anterior fontanelles of their infants. Consequently, the author recommends that the Ghana Health Service, the Teaching Hospitals, and the Municipal and District Health authorities should embark on serious health education on the essence of the fontanelle and demystify some cultural or traditional belief systems around pulsation of the anterior fontanelle. The application of concoctions on infant pulsating fontanelles is just not based on scientific principles known to the people, but it is perceptively done out of fear of the unknown.

Keywords: Fontanelle, Ghana, Herbal concoctions, Pulsation, Parental anxiety, Tamale Metropolis.

Introduction

High levels of parental anxiety are associated with a poor understanding of the physiology of infant growth and development processes and the characteristic pulsation of the anterior fontanelle, otherwise known as the *fonticuli cranii* [1].

Associated parental cognition and behaviour in terms of belief systems and perceived treatment mediation on the pulsating anterior fontanelle have been implicated as the major reason for the application of concoctions on the anterior fontanelle in the first three months of life of the infant.

The relationships between parental beliefs, anxiety and parental intervening behaviour in the context of the application of concoctions on infant pulsating anterior fontanelle were examined by the researcher.

Problem Statement

Pulsation of the anterior fontanelle though a physiological reality of all infants, causes anxiety on the part of parents for fear of the infant suffering some form of harm as a result. From time immemorial, researchers have done significant work on the closure of the anterior fontanelle [2], [3] based on clinical observations. However, little work has been done on the narrative reports on the belief system and perceptions of mothers about the pulsation of the anterior fontanelle and the reasons and types of concoctions they apply on the anterior fontanelle as an anxiety crutch and perceptive healing method. This study is set to establish these facts and more, particularly on the responses of nurses and midwives on the sight of applications on the anterior fontanelle of infants in the Tamale Metropolis, Ghana.

Study Objectives

The Main Objective

To unearth parental anxiety of perceived disorder and application of concoctions on infant pulsating anterior fontanelle in the Tamale metropolis, Ghana.

Specific Objectives

1. To describe the anterior fontanelle, its character and its closure physiologically.
2. To establish perceived reasons for parental anxiety in the face of pulsating anterior fontanelle among the people in the Tamale metropolis.
3. To find out various myths surrounding the pulsation of the anterior fontanelle in Ghana and in the Tamale area in particular.
4. To establish the type of concoctions parents, use to apply on pulsating fontanelles of their infants within the Tamale Metropolis in particular.
5. To find out the responses of nurses and midwives on the sight of applications on the anterior fontanelle of infants in the Tamale metropolis.

Literature Review

The Free Dictionary [4], defines a fontanelle (or fontanel) (colloquially, soft spot) as an anatomical feature of the infant human skull comprising any of the soft membranous gaps (sutures) between the cranial bones that make up the calvaria of a fetus or an infant. The fontanelle or “soft spot” [5] at the front of a baby’s head is the intersection of four (4) bones, notably the 2 frontal and 2 parietal bones in the skull. The anterior fontanelle is not fragile as some may perceive it to be but soft and vulnerable as there is no bone between a baby’s brain and the outside world.

According to Beasley [6], the Fontanelle allows for rapid stretching and deformation of the neuro-cranium as the brain expands faster than the surrounding bone can grow, especially when there is a premature complete ossification of the sutures, otherwise known as

craniosynostosis. Besides, the fontanelle provides an elastic-like cushion to the skull and its contents until it ultimately closes. During the process of the child’s growth, from infant to toddler stages, when the child starts to walk, the child often falls in the practice of walking, and it is that fibrous area which allows for the bones to shift and absorb any impact upon a fall.

The anterior fontanelle (otherwise also known as bregmatic fontanelle or frontal fontanelle) is the largest fontanelle and is placed at the junction of the sagittal suture, coronal suture, and frontal suture; it is lozenge-shaped, and measures about 4 cm in its antero-posterior and 2.5 cm in its transverse diameter. The fontanelle allows the skull to deform during birth to ease its passage through the birth canal and for expansion of the brain after birth. The anterior fontanelle typically closes between the ages of 12 and 18 months [7].

The skull is not one solid surface but is made up of multiple bones joined together and connected by fibrous material called sutures [8]. These look similar to the stitches a doctor makes to close up wounds after surgical operations. When babies are born, their skulls have large gaps between these bones. These gaps allow the baby’s head to easily pass through the birth canal. These soft spots also allow for the growth of the baby’s brain.

The skull is formed from 3 main bones. The anterior frontal bone has two halves which are divided by the frontal or metopic suture. The medial parietal bone has its two halves divided by the sagittal suture. The posterior occipital bone posteriorly has its two halves divided by the superior median suture. Between the frontal and parietal bones lies the coronal suture. Between the parietal bone and the occipital bone lies the lambdoid suture. Anteriorly, at the confluence of the metopic, coronal and sagittal sutures is the anterior fontanelle. Posteriorly, at the confluence of the superior median, lambdoid and sagittal sutures is the posterior fontanelle [9].

Studying the fontanelles is highly important in Paediatric nursing care. The fontanelles are felt during palpation as soft circle-like concavities, assessed with the infant in the upright position. This posture is crucial as it gives clues to an elevation of the baseline, signifying normal vagal maneuvers such as coughing, crying, emesis or vomiting, or abnormalities such as dehydration, anaemia (when the fontanelle position is very concave), neurological problems such as meningitis or haemorrhage, particularly when the fontanelle position is even with, or elevated above, the surrounding bones [7].

Other causes of an elevated anterior fontanelle are Vitamin A or lead toxicity, sinus thrombosis or a brain tumor, leukemia (which is cancer of the white blood cells) and Lyme disease [10]. However, it is worth noting that pulsations felt in the fontanelles generally are normal and reflect the peripheral pulse due to the beating of the baby's heart. When the heart delivers blood to the head, the pulsation becomes visible as no bony material is covering that area.

The posterior fontanelle generally measures 1-2 centimeters at its greatest diameter at birth and generally closes by 2 months of age. According to [10], the anterior fontanelle generally measures between 4-6 centimeters at its greatest diameter at birth and may be larger in the first 6-9 months of life. It generally closes between 4-26 months of age. A larger fontanelle may indicate hypothyroidism. It is intimated that small anterior fontanelle in a child with normal development and no evidence of craniosynostosis is most likely due to normal variation [11]. As with all children, it is important to follow them over time.

Clinical Significance

The anterior fontanelle is useful clinically. Examination of an infant includes palpating the anterior fontanelle. According to [3], a sunken fontanelle indicates dehydration, whereas a very tense or bulging anterior fontanelle indicates raised intracranial pressure. However, this is not

a certain indicator for raised pressure as prolonged crying by the baby may produce the same effect. A full anterior fontanelle may also be indicative of neonatal meningitis, specifically acute bacterial meningitis [3]. When it comes to the soft spot, the reality is just to be gentle and smart and trust your instincts. And watch out for those flying pencils.

Perceptions of Mothers

The pulsating or throbbing of the baby's head is dangerous - The action of the soft spot can be described as 'Pulsating' or 'Throbbing' [10]. It moves with a rhythm similar to the baby's heartbeat, and this is often misconstrued as incompleteness of the cranium, which has the potential to collapse if care is not taken [11].

Potential for Injury- Some respondents strongly contended that the baby's head could break if you touch it. Under normal circumstances, the soft spot is protected by a strong membrane [12]. In the view of Chinelo [9], it is obvious that the mother's hand will come in contact with her baby's head several times during the course of the day. This is normal contact, such as when washing a baby's head but as long as the head is not pressed, the soft spot cannot be injured.

Herbal Concoctions Source and Preparation

Largely traditional people have diverse knowledge in preparing herbs and related mixtures that they use for various illnesses, diseases and conditions. The World Health Organization [12] and Merriam-Webster [13] define herbal medicines as "herbs, herbal materials, herbal preparations and finished herbal products that contain as active ingredients parts of plants, or other plant materials, or combinations". Herbal medicines may be produced from any part of the plant, but are commonly made from the leaves, roots, bark, seeds, and flowers and are eaten, swallowed, drunk, inhaled, or applied to the skin [14].

Oreagba, Oshikoya & Amachree [15] share similar sentiments with [14].

Application of Concoctions for Perceived Closure

Applications of concocted substances to pulsating anterior fontanelles are common phenomena in some parts of Africa. In Nigeria, traditional herbal solutions, mostly pounded leaves and bark of trees, are mixed with water (like Agbo in the Southwest) or Palm Kernel Oil (Ude Aki in the Southeast) are often applied to the pulsating fontanel [9].

Usage of these and other ointments are only for the comfort of the mother, for there are no magical solutions that will make the soft spot disappear.

Methods

The Study Setting

This study was done in Tamale, officially called Tamale Metropolitan Area and known to be the fastest-growing city in West Africa. Tamale is located in the Northern Region and, more precisely in the Kingdom of Dagbon. It is the capital city of the Northern Region of Ghana [16]. The predominant language of the people is Dagbani. Tamale is Ghana's third-largest city, with a projected population of 950,124, according to the Tamale Metropolitan Assembly Official Website [17]. The city is located 600 km (370 mi) north of Accra [18].

The Study Design

This was a qualitative study of the narrative realities of mothers [19], delving into mothers' beliefs on the physiologic functionality of the anterior fontanelle and the perceived treatment mode commonly employed by mothers. Mothers' report on their beliefs of perceived disorder of a pulsating anterior fontanelle was gathered using a semi-structured self-constructed in-depth interview guide. Semi-structured in-depth interviews are commonly used in qualitative research and are the most frequent qualitative data source in health

services research [20], [21]. This method was specifically employed because of its two-way dialogue system between researcher and participant, guided by a flexible interview protocol and supplemented by follow-up questions, probes and comments. Besides, [20] and [22] intimate that the method allows the researcher to gather open-ended data in which participant thoughts, feelings and beliefs about a particular topic or even sensitive issues are delved deeply into. In this case, the reasons behind mothers' belief systems and the type of concoctions used were assessed.

Data Collection Technique

Mothers who had applied concoctions on their infant anterior fontanelle were used. Mothers who had applied concoctions and brought their children to the outpatient department (OPD) and child welfare clinic (CWC) were interviewed. A convenient sample was used to select all four hospitals within the metropolis and random sampling was done to select six health centres out of 18 health centres in and around the Tamale metropolis to scout for infants with concoctions applied on their anterior fontanelles.

A sample size of fifteen parents who had applied some herbal concoctions on their infants' anterior fontanelles was used.

Data Analysis Technique

The data was analysed using the narrations of mothers from verbal and written responses to derive the meaning of their perceptions and belief systems, their reasons for applying the concoctions to the pulsating fontanelle and their perceived satisfaction of treatment.

Thematic analysis was used and done manually using the semantic approach, which involves analysing the explicit content of the data in order to describe respondents' responses on their perceptions [20]. The thematic analysis allows the researcher "a lot of flexibility" in data interpretation, enables one to utilize "large data sets more easily" and aids in the sorting of data into broad themes [22].

Results

Reasons why Traditional People put Herbal Substances on the Anterior Fontanelle

The reasons adduced by some respondents for the applications of the concoctions on the anterior fontanelle have been varied and intriguing. They include the following.

To prevent excessive vomiting, frequent fever, and diarrhea, to improve appetite when the child cannot eat, to stop the fontanelle when it is bulging and when the fontanelle is pulsating excessively.

Respondent 1

At our place, we usually apply the concoction on the side pulsating to prevent air from entering the head of the child. This is because when air enters the head of the child, he suffers from cold, fever and sometimes vomits. These are dangerous signs for the child, or what do you think? Even though, we are not sure of what we do, but we have come to understand that it works.

Types of Concoctions used to Apply on the Anterior Fontanelle

1. Chewed cola nut mixed with other substances.
2. Shea-butter.
3. Red millet mixed with other black substances from burnt leaves.
4. Black powder mixed with Shea-butter.

Respondent 2

Mostly Shea-butter is mixed with burnt leaves or chewed and spat out cola nuts, guinea corn or the red millet is grounded and mixed with Shea-butter. These substances are usually mixed with Shea-butter to make it soft and then applied daily until the pulsation stops. These sometimes are used are part of our belief system, and I am not sure how they got those ideas. They are helping anyway.

Duration of Applied Concoction on the Anterior Fontanelle

The respondents intimated that the substance, once applied, is not supposed to be removed until it is removed by itself or until the anterior fontanelle completely heals.

Persons who Apply the Concoctions on the Anterior Fontanelle

Before the application of the concoction on the anterior fontanelle of a baby, the husband and wife must consent to it, and the procedure is carried out by the herbalist and subsequently by the mother upon the instructions of the herbalist.

Respondents' Reasons for Applying the Herbal Substances on the Anterior Fontanelle

Respondent 3

If nothing was applied, it could lead to the excessive pulsation of the fontanelle, frequent fever, loss of appetite, diarrhea and excessive vomiting.

Frequency of Application of Concoctions before the Closer of the Anterior Fontanelle

The duration varies as and when the anterior fontanelle closes. Though respondents did not categorically state how they get to know that the fontanelle has closed, they contended that when the fontanelle closes, the applied substance dries up and falls automatically.

Respondent 4

Oh yes, you know, it is not possible to know, yeah, but when it is healed, the application dries up and drops off the site. With this, is easily seen.

Reactions of Nurses in the Face of Application of Concoctions on the Anterior Fontanelle of Babies

Nurses, midwives, and doctors react differently when parents come to the hospital with concoctions applied on the anterior

fontanelle of their newborns. This was revealed to the researcher by the health workers.

Respondent 5

Nurse A. It is very disturbing and confusing why these women would apply this dirt on the babies' fontanelle. I am not even sure what it is that they have applied on the babies' head.

According to some health workers, they tell parents to clean the concoctions. This is mostly after they explain to parents that is a natural phenomenon and there is no need for intervention.

Some health workers tell them of the significance of the fontanelle as a response of the babies breathing in and out visibly seen through the pulsation of the fontanelle in order to discourage the practice. In simple terms, parents are made to understand that they don't need to close the fontanelle. Once they understand, they cooperate.

Others also tell parents that the fontanel is placed there by God to help the brain in its development and therefore should heal in 18months. When they know this, they don't apply anything on the fontanels subsequently.

Respondent 6

Midwife B. Often times I get angry and do nothing about it. I believe there is nothing to be done and therefore should be left alone to the belief system and perceptions of the people.

Accordingly, some midwives simply over education to their clients on the functioning and duration of the fontanelle pulsation. See below.

Respondent 7

Nurse C. I give health education to the mothers and tell them to in simple terms that the "holes" in the head will close when the child is one and a half years old. Mothers are also educated that by applying substances on the head can make the child sick.

According to the nurses and midwives the researcher interacted with, they often establish rapport with the mothers to know the reason why they apply concoctions on the fontanelle of their babies. Most of the mothers believe it has tribal links and so it is deeply rooted in the understanding of those who practice it and will be difficult stopping them from doing so.

Table 1. Summary of Turning Codes into Themes and Sub-themes for Analysis

Interview extracts	Codes	Themes	Subthemes	Source	
<i>At our place, we usually apply the concoction on the side pulsating to prevent air from entering the head of the child. This is because when air enters the head of the child, he suffers from cold, fever and sometimes vomits. These are dangerous signs for the child, or what do you think? Even though we are not sure of what we do, but we have come to understand that it works.</i>	Incorrect facts	Misunderstanding	Not sure of method	Respondent 1.	
	Misunderstanding of science	Uncertainty	Cannot defend practice		
	Seeking confirmation		Believes practice works		
	Uncertainty		Misunderstanding of science		
	Belief in tradition		Thinks it fits into scientific understanding		
<i>Mostly Shea-butter is mixed with burnt leaves or chewed and spat out cola nuts, guinea corn or the red millet is grounded and mixed with Shea-butter. These substances are usually mixed with Shea-butter to make it soft and then applied daily until the pulsation stops. These sometimes that are used are part of our belief system and I am not sure how they got those ideas. They are helping anyway.</i>	Known and Unknown facts	Unhygienic concoctions preparation	Know that Shea-butter is used,	Respondent 2	
	Unhygienic preparation of concoctions		Do not know types of leaves used		
	Belief system		Unhygienic concoctions preparation		
	Uncertainty on source of practice		Believes in its efficacy		
			Uncertainty on source of practice		
<i>If nothing was applied it could lead to excessive pulsation of the fontanelle, frequent fever, loss of appetite, diarrhea and excessive vomiting</i>	Incorrect facts	Misunderstanding	Incorrect facts about fontanelle	Respondent 3	
	Misunderstanding of science	Uncertainty	Misunderstanding of scientific principles behind pulsation of anterior fontanelle		
	Seeking confirmation		Seeking confirmation		
			Uncertainty		
	Uncertainty				

	Belief in tradition			Believes in traditional practices	
<i>Oh yes, you know, it is not possible to know, yeah, but when it is healed, the application dries up and drops off from the site. With this, it is easily seen</i>	Belief in tradition	Certainty on healing time uncertainty	Uncertainty		Respondent 4.
<i>It is very disturbing and confusing why these women would apply this dirt on the babies' fontanelle. I am not even sure what it is that they have applied on the babies' head</i>	confuses belief system with medical science	Uncertainty	Confusion		Respondent 5, Nurse A.
	uncertainty				
	source of worry				
<i>Often times I get angry and do nothing about it. I believe there is nothing to be done and therefore should be left alone to the belief system and perceptions of the people.</i>	Anger	Anger Hopelessness Mistrust	Anger Hopelessness Mistrust	Expression of anger	Respondent 6, Midwife B
	Negligence			Neglects patients to belief system	
	Unprofessional			Unprofessional attitude towards clients	
	Hopelessness			misunderstanding of scientific issues	
	Mistrust				
<i>I give health education to the mothers and tell them in simple terms that the "holes" in the head will close when the child is one and a half years old. Mothers are also educated that by applying substances on the head can make the child sick.</i>	Intervention	Intervention	Accommodation	Intervention using education to clients' level	Respondent 7, Nurse C
	Accommodation			Accommodate clients at their level of belief and understanding	
	Fears			Put fears in clients about possibility of children falling sick	

Discussion

Reasons why Traditional People Apply Herbal Substances on the Anterior Fontanelle

The findings indicate that mothers who apply herbal concoctions on their children's anterior fontanelle do that out of their uncertainties about the condition and the misunderstandings they have about the condition. Accordingly, they have deduced various reasons for their actions, including prevention of excessive vomiting, frequent fever, diarrhea, improve appetite when the child cannot eat, to stop the fontanelle when it is bulging and when the fontanelle is pulsating excessively, among others. These perceptive behaviours learn credence to [3], where they intimated that dehydration could be a reason for the pulsation of the anterior fontanelle. As a belief system, the traditional people contend that pulsation of the anterior fontanelle signals vomiting, diarrhea and fever, which have the potential of causing dehydration in the infant.

Duration of Applied Concoction and Applicants of the Concoctions on the Anterior Fontanelle

The concoctions are applied to the duration of when the pulsation of the anterior fontanelle ceases to be visible or as literally indicated, heals. It is perceived by the traditional people that until the throbbing heals, the concoctions cannot be removed. The respondents intimated that the substance once applied is not supposed to be removed until it is removed by itself or until the anterior fontanelle completely heals.

The element of mysticism seems to back the misunderstanding of the functioning of the anterior fontanelle. In as much as herbal concoctions are applied, they are done under strict instructions of the herbal expert. The findings reveal that before the application of the concoction on the anterior fontanelle of a baby, the husband and wife must consent to it and the procedure is carried out by the herbalist first and

subsequently by the mother upon the instructions of the herbalist.

Respondents' Reasons for Applying the Herbal Substances on the Anterior Fontanelle

Fear, uncertainty and misunderstanding of the physiology surrounding the anterior fontanelle and the fact that they have been instructed to apply it by the herbalist and landlords, mothers have no option but to do just that. These are grossly blamed for mothers' application behaviour as intimated by Respondent 3.

If nothing was applied, it could lead to excessive pulsation of the fontanelle, frequent fever, loss of appetite, diarrhea and excessive vomiting.

Reactions of Nurses in the Face of Application of Concoctions on the Anterior Fontanelle of Babies

Nurses, midwives and other health workers often react differently on the sight of concoctions applied to the anterior fontanelle of infants at the child welfare clinic in particular. These reactions could be borne out of hunger, poor understanding of myths behind the applications and disbelief. Younger mothers draw their inspiration, knowledge and cultural wisdom of their experiences of parenthood from older women within and without the family. Children are nurtured not by individuals within the family but the entire family network is involved. It is based on these networks that socialization and transfer of beliefs are done.

Based on these and similar findings, nurses and midwives often do nothing about it, except to educate them on the dangers of the practice, but no attempt is made to scrap off the substance placed on the fontanelle. This is because, like the mothers, the nurses and other healthcare workers equally believe in the power of the traditional anchor and so contend that the practice is forever unstoppable. Despite this level of awareness, the nurses still admonish the mothers to stop it and

go further to tell them that the practice could have severe consequences on the health and growth of their babies. So far, no parent has been able to give any scientific implication for applying these concoctions on the fontanelle. It is important to keep the baby, free of infections, as their immune system is yet building up.

Conclusion

The study sought to unearth parental anxiety of perceived disorder and application of concoctions on infant pulsating anterior fontanelle in the Tamale metropolis, Ghana. The findings have revealed a sense of care and higher parental responsibility for their children's safety and survival which is seen to be associated with more intrusive and perceived anxiety behaviour for infants with pulsating fontanelles. This seems to have an indirect effect between maternal anxiety and maternal intrusive behaviour, which is a manifestation of parental responsibility emanating from their belief systems. Clearly, the application of concoctions on infant pulsating fontanelles is just not based on scientific principles known to the people, but

it is perceptively done out of fear of the unknown.

Recommendations

The researcher recommends that all health stakeholders, particularly civil society organisations (CSOs) in health, Ghana Health Service, the Teaching Hospitals and the Municipal and District Health authorities, should embark on serious health education on the essence of the fontanelle and demystify some cultural or traditional belief systems around pulsation of the anterior fontanelle.

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Conflict of Interest

The author indicates no conflict of interest.

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