

# Factors Associated with Umbilical Cord Stump Healing Practices: Literature Review

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**How to cite this paper:** Reis, M.R., de Sousa, M.C., Silva, L. de S., Conceição, L.R.R., Silvestre, M. de A., Sudário, C. de P.S., Rossi, R.C., Guimarães, J.V., Castral, T.C., Siqueira, K.M., Meireles, P.T., Gomes, B.B.M., Abdalla, G.K., Abdalla, D.R. and Salge, A.K.M. (2020) Factors Associated with Umbilical Cord Stump Healing Practices: Literature Review. *Open Journal of Obstetrics and Gynecology*, 10, 1067-1078. <https://doi.org/10.4236/ojog.2020.1080100>

**Received:** March 19, 2020

**Accepted:** August 18, 2020

**Published:** August 21, 2020

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## Abstract

**Objective:** To analyze the evidence in the evolution of scientific production on the factors associated with curative practices of the umbilical stump. **Materials and Methods:** The study data collection took place in April 2017. The electronic databases used to search the articles were: PubMed (National Library of Medicine and National Institutes of Health) and VHL (Virtual Health Library). We used the keywords “perinatal care”, “umbilical cord”, “patient care team”, “neonatology”, “newborn”, in the Portuguese, English and Spanish languages, accompanied by the expression AND and selected through DeCS (Descriptors in Health Sciences). **Results:** A final sample of 9 articles was obtained from the PubMed and VHL databases, which met the inclusions criteria. It has been found that traditional umbilical stump care practices are still present in many communities, however, have been replaced by appropriate practices, the most recommended being: chlorhexidine 4% sanitation, soap and water and alcohol antiseptics 70%. **Conclusions:** There is a need for multi-professional involvement, approaching these women since pregnancy, with detailed information and accessible language about proper care with the newborn and the umbilical stump.

## Keywords

Perinatal Care, The Umbilical Cord, Patient Care Team, Neonatology, Newborn

## 1. Introduction

Approximately 3.3 million neonatal deaths occur annually worldwide [1]. Of these, about half a million newborns die each year from severe neonatal infections, representing 15% of the etiology of neonatal deaths [2]. Additionally, most of these deaths occur outside hospital units and may be related to inadequate hygiene practices [3], especially in the umbilical stump region.

A wide variety of cultural beliefs and practices are associated with healing practices of the umbilical stump, such as applying ashes, oils, butter, spice paste, herbs, mud, and animal lard. These substances that are frequently contaminated with spores and bacteria, so the use of them associated with the presence of newborn skin colonization by pathogenic bacteria increase the risk of infection [4] [5] [6] [7].

In the area of the umbilical stump there is the growth of some beneficial microorganisms and others that are harmful, like *Clostridium tetani*. This microorganism causes omphalitis, umbilical stump infection, that can evolve to sepsis neonatal, after contact with the bloodstream [8] [9] [10]. The incidence on omphalitis in low-income countries is still scarce, but it is estimated that the risk may range from 2 to 77 per 1000 live births in hospitals whose mortality rate varies from 1% to 15% [11].

The symptomatology of newborns with the diagnosis of neonatal tetanus is associated with tonic contractions of the chewing muscles, such as dysphagia and trismus [12] [13] [14] [15]. Despite the high mortality rate due to neonatal tetanus, studies show a significant decline in morbidity and mortality in recent years [16] [17].

Currently, the recommended practice in the treatment of umbilical stump is hygiene with soap and water and antisepsis with 70% alcohol [18] [19]. The postpartum woman is oriented in the proper way to care for the umbilical stump with this substance; however, the influence of the social group in which she is inserted is so strong that it creates doubts between the old and the new orientations [20].

Considering the importance of the social and cultural environment in which the puerperal is inserted as a determinant in its curative practice with the newborn, the importance of interventions that include these spheres in its health education strategies is highlighted. Thus, there may be behavioral changes in the care provided to newborns in order to reduce neonatal mortality rates, as well as harmful practices such as the use of inappropriate materials for umbilical stump dressing [21].

So, promoting good healing practices should involve guidance from health professionals to mothers about correct practices. Action requires professional scientific knowledge to support newborn care [6] [18] [19]. Ensuring the success of the guidelines is extremely important, for this, the professional must investigate whether the mothers and their families have assimilated the information received and have the ability to perform the care autonomously and assertively [22].

Considering all the responsibilities imposed on the caregiver, this study aims to analyze the evidence in the evolution of scientific production on the factors associated with curative practices of the umbilical stump.

## 2. Materials and Methods

This is an integrative literature review, whose purpose is to synthesize knowledge and results of previous research on a given subject in a systematic and organized manner, to incorporate evidence into practice, enable the construction and elaboration of effective interventions in health care [23].

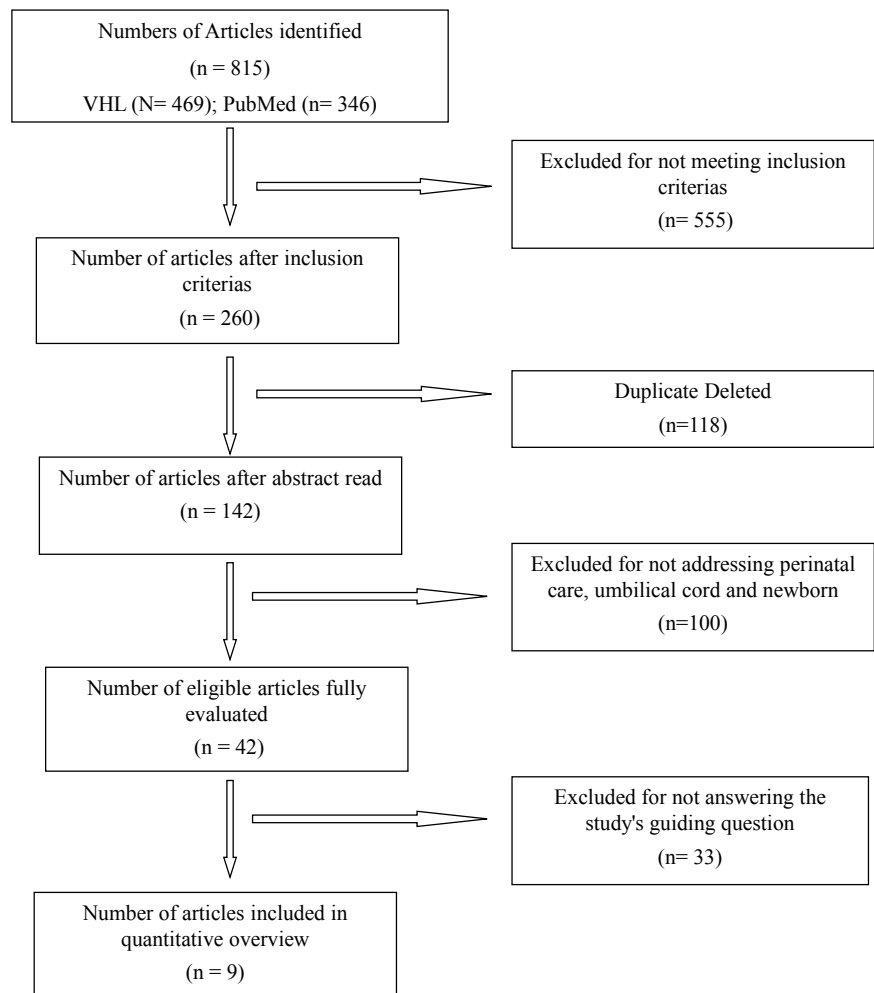
An integrative literature review is conducted in 6 methodological steps. The first step consists in elaborating the hypothesis, that is, identify the search problem, the search engine that will be adopted and determinate which descriptors or search keywords will be used. The second stage included establishing the inclusion and exclusion criteria of the articles to be selected for sample composition. In the third stage, through the exploratory reading of the abstracts, a pre-selection of the studies is performed. In the fourth stage, analytical reading of the studies is performed in order to gather, analyze and categorize the pertinent information to the investigated problem. The fifth stage comprises the interpretation of the results. The sixth and last stage promotes the synthesis and presentation of the results identified as recommendations for further studies [24] [25].

Using this protocol that has been described, the guiding question of this integrative review was: What is the evidence in the evolution of scientific production about the factors associated with the curative practices of the umbilical stump? After defined this, the study data collection took place in April 2017. As electronic database used to search for articles: PubMed (National Library of Medicine and National Institutes of Health) and VHL (Virtual Health Library). The keywords “perinatal care”, “umbilical cord”, “patient care team”, “neonatology”, “newborn” in the Portuguese, English and Spanish languages, accompanied by the expression AND were used. The descriptors used were selected through DeCS (Descriptors in Health Sciences), available from the VHL. For the selection, the following inclusion criteria were selected: centralized use as curative practices of the umbilical stump, articles based on scientific research, original research and case report, written in Portuguese, English and Spanish with full text available online, production published from 2011 to 2017.

Following the location and selection of articles, 815 potentially eligible publications to be included in this review were identified. With the removal of articles that did not meet the inclusion criteria ( $n = 555$ ) and those by duplicity ( $n = 118$ ), the abstracts of 142 articles were analyzed. After reading the abstracts, 100 articles were excluded, and the full reading of 42 articles resulting in the selection of 9 articles met the inclusion criteria and answered the review question (Figure 1).

## 3. Results

In the time limit set for this study (2011-2017), 9 publications were found and



**Figure 1.** Flowchart of the selection process of articles found and included in the review, in VHL and PubMed/Medline-Goiânia, GO, 2017.

analyzed. In 2015, 2014 and 2013 2 articles (22.2%) were published each year respectively, while in 2016, 2012 and 2011 there are only 1 publication each year (11.1%) (**Table 1**).

According to the methodology of the selected papers, the types of study were: 2 literature review articles (22.2%), 3 qualitative research (33.3%), 1 quantitative research (11.1%), 1 microanalysis (11.1%), 1 descriptive cross-sectional (11.1%) and 1 control case (11.1%). There was a predominance of publications in the English language, corresponding to 8 articles (88.8%) and only 1 article in the Portuguese language (11.1%).

The publications resulted from different journals being: Global Health Action, Niger J Clin Pract, Pediatr Infect Dis J, Rev Enferm UERJ, Reproductive Health, BMC Pregnancy Childbirth, Jpn J Nurs Sci, BMC Int Health Hum Right and Medicine each with only one publication (11.1%). Analyzing the study sites 3 articles were performed in England (33.3%) and the others in other countries such as Brazil, the United States, India, Italy, Japan and Sweden there was only one publication in each (11.1%).

**Table 1.** Search result of the articles selected for sample composition. Study identification by author, title, type of study and journal/year. Goiânia, GO, Brazil, 2017.

Author (s)/Journal/Year	Title summarized	Study type	Evidence Level
Quattrin R, <i>et al.</i> /Medicine/2016	70% Alcohol Versus Dry Cord Care in the Umbilical Cord Care	Case Control	III-1
Nalwadda CK, <i>et al.</i> /Global Health Action/2015	Sociocultural beliefs and newborn referral in rural Uganda	Qualitative	III-2
Sacks E, <i>et al.</i> /BMC Pregnancy Childbirth/2015	Practices for neonates in southern, rural Zambia	Qualitative	III-2
Degefe T, <i>et al.</i> /BMC Int Health Hum Rights/2014	Newborn care interventions in rural Ethiopia	Qualitative	III-2
Salam RA, <i>et al.</i> /Reproductive Health/2014	Postnatal interventions for improved maternal and neonatal health	Systematic literature review	I
Alparslan Ö, Demirel Y/Jpn J Nurs Sci/2013	Neonatal care practices in Turkey	Descriptive, transverse	VI
Karumbi J, <i>et al.</i> /Pediatr Infect Dis J/2013	Umbilical cord care for prevention of infection and neonatal mortality	Systematic literature review	I
Abhulimhen-Iyoha BI, Ibadin MO/Niger J Clin Pract./2012	Umbilical cord care practices among mothers in Benin City, Nigeria	Qualitative	VI
Freitas TM, Porto F./Rev Enferm UERJ/2011	Care of the newborn's umbilical cord in the 19th century	Microanalysis	VI

The studies were also analyzed regarding the research approach and thus classified in the levels of evidence [26]. From the sample 6 articles were evaluated with level of evidence IV and 3 articles with level of evidence III. And from the analysis of the results of the studies, three thematic categories were constituted: Aspects that influence the curative practices of the umbilical stump; Products and techniques used in curative practices of the umbilical stump and their impacts on morbidity and mortality of the umbilical stump; Recommended strategies for best practices in umbilical stump care.

## 4. Discussion

### Aspects that influence the healing practices of the umbilical stump

There were found 4 (50%) articles that highlighted the aspects that influence the healing practices of the umbilical stump [27] [28] [29] [30]. These studies aimed to know the traditional practices in relation to care with the umbilical stump, to later determine the factors that influence healing practices. Education level is considered one of the most important predictors for curative practices [28]. A study by Alparslan and Demirel (2012) found that the lower the level of education of mothers, the more common are beliefs in care with the umbilical stump. The study also complements that there was no statistically significant difference ( $p > 0.05$ ) to correlate such practices with women's age [28].

However, a study by Abhulimhen Iyoha and Ibadin (2012) found that older mothers practice more beneficial care compared to younger mothers, perhaps because they have gained experience over time and because younger mothers are more susceptible and consequently more influenced by other caregivers [29].

Other studies show that the confidence in the knowledge of other women who have lived the same experiences [such as grandparents, sisters and neighbors] is what determines the practice of the most varied ways possible [31], therefore, the cultural context in which these women are inserted is what determines how she cares for her newborn [6]. In addition, traditional practices are preferred because they have spiritual dimensions, easy availability, appointment as well as lower cost [32].

Thus, some authors cite the need to reconcile family and scientific knowledge, valuing the experiences of women and family members and then reconstructing their knowledge of newborn care [6]; for this, it is necessary to improve the communication between those involved in the process so that behavior change can improve these practices [27].

#### **Products and techniques used in curative practices of the umbilical stump and their impacts on morbidity and mortality of the umbilical stump**

There were 6 (66.6%) articles that highlighted this theme and highlighted the most used techniques and products [27] [28] [29] [30] [33]. In 2 articles (25%), there were reports of traditional care practices, such as abdominal bandage or abdominal band. This care aimed to avoid friction between the umbilical stump and the skin until the navel fell [27] [29]. Another article reported that the use of topical human bed is associated with shorter umbilical cord release time [27] and there is also an indication of dry care use associated with shorter stump fall time [34].

Some studies reveal some harmful practices, such as: coffee, olive oil, burnt black sesame, rotten tree powder [35], green powder or black powder [36], burnt or gray root powder [37], pumpkin flower, cow manure, butter and saliva [38] [39]. Studies also reveal that applying products to the umbilical stump such as ointment, butter, coconut oil, mustard oil, clove oil, turmeric and talc are common practices in many communities [7] [40].

However, Zupan, Garner and Omari (2004) state that, although Kenya is a less economically developed country and where past beliefs from generation to generation are deeply entrenched, the main concern with stump involves the use of alcohol 70%, denatured or povidone iodine for stump hygiene [41]. In this sense, studies show that the use of topical antimicrobials isolated or associated with dry dressing does not present significant difference in relation to the decrease of infection rates. In addition, in areas with high infection rates, umbilical stump dressing should be performed with 4% chlorhexidine, as it has the potential to reduce the risk of neonatal sepsis [42] [43].

A study of 29,760 newborns in Bangladesh found that the use of chlorhexidine is effective, but further research is needed regarding the frequency of intervention [44]. However, it is noticeable that the application of chlorhexidine 4% to the newborn's umbilical stump may reduce the neonatal mortality rate from omphalitis compared to not using it, since the protective effects occur in the first weeks of life, even with a subsequent reduction. Of protection the impact of the measure remains significant during the neonatal period [45] [46].

Nonetheless, one study showed that there is no significant difference between keeping the umbilical stump clean without application of any product, leaving it exposed to air (dry care) and the use of solutions. It's relevant to say that the time of detachment of the cord was shorter among individuals who received dry care [34].

The World Health Organization (WHO) since 1998 recommends dry care on the umbilical stump. Cleaning in case of dirt should be done with water only. The use of topical antiseptics, like chlorhexidine, should be recommended in situations where hygiene conditions are poor and/or infection rates are high [4]. Therefore, chlorhexidine has been shown to be an effective, acceptable and inexpensive intervention that can be easily used by health professionals, community and family members [47].

Based on this recommendation, the articles included in this review 5 (55.5%) indicated chlorhexidine as an effective antiseptic that significantly reduces adverse effects related to umbilical stump infection in potentially contaminated environments; 4 (44.4%) spoke about dry dressing (also known as dry sec) and 2 (22.2%) also talked about the use of alcohol 70%.

The articles also addressed the association between newborn practices, the occurrence of infections such as tetanus and neonatal mortality [27] [30] [31] [32]. The umbilical stump should be a potential source of contamination, taking into consideration two important factors: natural colonization of the newborn's skin and umbilical cord with potentially pathogenic microorganisms and the application of harmful substances to the umbilical stump [11] [48] [49].

Approximately 40% of child deaths occur in the first month of life, and one third of these deaths are attributed to infectious processes [3] [50]. Factors contributing to the high incidence of infections and neonatal tetanus in developing countries may be pointed out: unhygienic circumstances and procedures performed by untrained personnel [1], and other harmful practices [48] that can be associated with popular beliefs. A study by Güleç (2000) mentions that traditional applications of substances to the umbilical stump may result in tetanus infection [51]. Other strategies should be considered as important tetanus prevention measures, such as correct hand hygiene to provide care to the newborn and the correct follow-up of the vaccination schedule [29].

From this perspective, a study conducted from November 2002 to March 2005 selected 15,123 children randomly from communities in southern Nepal to be monitored for the presence of omphalitis and umbilical stump fall time. Newborns receive one of the following umbilical stump care: 4% chlorhexidine cleaning, soap and water cleaning, or dry care. The longest fall time was not associated with the presence of infection. In addition, chlorhexidine 4% has been recommended for use in environments where the risk of infection is high because it is effective in reducing infection and mortality [43] [52].

So, most often umbilical stump infections can be prevented, so it is necessary to identify best practices in order to reduce neonatal mortality and morbidity rates and offer alternatives to widespread harmful practices [53]. This can and

should be accomplished through educational interventions.

#### **Best practice strategies for umbilical stump care**

There were found 2 (22.2%) articles whose central theme was to identify practices in the care of the umbilical stump, thus suggesting modifications and strategies to improve survival in the neonatal period [8] [54].

Care of the newborn varies between different cultures and the perception of the disease and care are unique in each context [55]. Understanding local practices and beliefs during a newborn's first month of life is essential for optimizing and promoting care based on healthy behaviors that ensure its survival and continuity [54] [56]. At this moment, the importance of home visit to the postpartum woman as an educational strategy is highlighted [57]. Providing antiseptic kits along with guidance on appropriate practices in umbilical stump care is the most recommended measure in underdeveloped and developing countries for the prevention of umbilical stump infections, as they have a low cost and high acceptability/utilization rate [58].

## **5. Conclusions**

From studies that address the evolution of umbilical stump healing practices and their repercussions, it is possible to highlight that most publications occurred in the 21st century, in developed countries and in the English language. And despite the advances made, there is still much work to be done in the search for adequate and quality care for the newborn.

It is concluded that practices that could be considered outdated, such as substance application, band use and heat treatment, are still present in many countries. Therefore, the need for orientation actions for mothers and families about care with the umbilical stump and complications is highlighted, since maternal education is one of the main aspects that influence the improper practices of umbilical stump healing.

This guidance should be provided by a multi-professional team that addresses and encourages women from pregnancy, during antenatal consultations, delivery room and accommodation, with detailed and accessible information on proper care of the newborn and umbilical stump.

With this family preparation by multi-professional teams, it is believed that finally, what is described in the literature can be performed daily. This is by cleaning the umbilical stump with soap and water and then performing antiseptics with 70% alcohol or chlorhexidine solution in potentially contaminated environments.

## **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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