

Salting Babies. Innovation and Tradition in Premodern Procedures for Neonatal Care

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Abstract

The paper studies two aspects of the procedures of neonatal care explained by ancient and medieval medicine: the application of salt to the newborn's skin in order to harden it, and the alternative proposed by Ibn Zuhr, anointment with acorn oil. The latter procedure was echoed by several physicians in al-Andalus and was known to the physicians of the Renaissance, some of whom preferred it to all other methods. Ibn Zuhr's anointment with acorn oil is analyzed as a case study that broadens our knowledge of the innovative character of this author, one of the outstanding physicians in the history of al-Andalus medicine, and of the doctrinal change and its transmission in Pre-Modern medicine. The paper sketches the history of the application of salt in newborns, a practice still in use at present time, from its early antecedents in the Semitic cultures to Late Middle Ages and Renaissance, studying in particular the main sources of neonatal care in Greek and Arabo-Islamic medicine. Another ancestral procedure for the same purpose, rubbing with henna, and the interaction between learned and folk medicine are also considered within the framework of the discussion of whether salt or acorn oil was better for newborns.

1. Introduction

The application of salt to the skin to protect a newborn against foreign agents may seem, at first glance, a minor aspect of neonatal care in Ancient and Medieval medicine. Nevertheless, the study of the history of this procedure in Greek and Arabo-Islamic medicine and of Abū Marwān b. Zuhr's (d. 1162)¹ views on the matter provides some useful clues for the understanding of several issues: firstly, the development of Arabo-Islamic paediatrics;² secondly, the inner aspects of doctrinal change and its transmission in medieval medical sciences; thirdly, the interaction between scholarly and popular medicine; and lastly, the problematic of innovation in the *oeuvre* of Ibn Zuhr, probably the most outstanding physician in the history of al-Andalus (Muslim Iberian Peninsula). As is well known, a wide range of

¹ Ibn Zuhr is the Avenzoar of medieval translations. The author and his works have generated a wealth of bibliography, the main titles of which can be found in the recent bio-bibliographical synthesis by Rosa Kuhne, Cristina Álvarez Millán and Expiración García Sánchez, 'Ibn Zuhr, Abū Marwān', in Jorge Lirola (ed.), *Biblioteca de al-Andalus* [henceforth BA] (Almería: Fundación Ibn Ṭufayl: 2009), VI, 352-368. On Ibn Zuhr's medical practice and its innovative character, cf. moreover: Henry A. Azar, Michael R. McVaugh, Joseph H. Shatzmiller, 'Ibn Zuhr (Avenzoar)'s Description of Verrucous Malignancy of the Colon', *Canadian Bulletin of Medical History*, 19 (2002), 431-40; H.A. Azar, *The Sage of Seville: Ibn Zuhr, His Time and His Medical Legacy* (El Cairo: The American University of El Cairo Press, 2008), *passim*; Cristina Álvarez Millán, 'The Case History in Medieval Islamic Literature: the *Mujarrabāt* and *Tajārib* as Source', *Medical History*, 54 (2010), 195-214, 206-208.

² Several aspects of Arabo-Islamic paediatrics have been addressed in previous studies, but we still lack a general monograph. Cf., nevertheless: Peter E. Pormann, *The Greek and Arabic fragments of Paul of Aegina's Therapy of Children* (unpublished PhD Thesis, Oxford: University of Oxford, 1999, accessed at <http://ora.ox.ac.uk/objects/uuid:65f039b9-d4d3-4c44-9db5-e4e593f31006>), an approach to the Greek sources of Arabic paediatrics focusing on the transmission of Paul of Aegina's *Therapy of Children*, and P.E. Pormann and Emily Savage-Smith, *Medieval Islamic Medicine* (Edinburgh: Edinburgh University Press, 2007) *passim*, which contains helpful references. Cf. moreover several studies, which, despite their undeniable interest, are either too general or too specific: Nicola Latronico, 'Pediatria e puericultura nel mondo arabo', *Minerva Pediatrica*, 50 (1998), 529-543; Aurora Cano Ledesma 'Reflexiones sobre la pediatría y la ginecología en la medicina árabo-islámica', *Arbor*, 565 (1993), 31-49; Camilo Álvarez de Morales, Fernando Girón, Amador Díaz and Carmen Peña, 'El niño enfermo en los textos médicos andalusíes', *Dynamis*, 4 (1984), 265-276; María de la Concepción Vázquez de Benito and María Teresa Herrera, 'Dos capítulos sobre pediatría: árabe y castellano', *Asclepio*, 36 (1984), 47-83. Paediatrics appears frequently in ancient and medieval medicine in combination with gynaecology. A general history of Arabo-Islamic gynaecology is still to be done; however, Ron Barkai's *A History of Jewish Gynaecological Texts in the Middle Ages* (Leiden *et al.* Brill., 1998; cf. especially, 41 ff.), a monograph on the Jewish treatises on the issue, contains a most helpful synthesis.

innovative procedures and substantial improvements in medical knowledge have been traditionally attributed to Ibn Zuhr,³ but we lack a general critical survey of them that establishes the extent to which they were genuine innovations and details the methods of Ibn Zuhr. This paper aims to explain one of these innovations, probably the least important one, which has been unnoticed by the scholarship to date but is sufficiently documented for us to be able to give a thorough account of its antecedents, consequences, and the reasons for its introduction and its relative success. Although the conclusions reached in this article are chiefly drawn from Andalusī and Hispanic sources, they provide helpful clues for understanding what happened in other geographical areas and historical periods.

2. Salting babies.⁴

Galen says in *De Sanitate Tuenda*, his most important treatise on hygiene:⁵

The newborn infant, then,⁶ free from defect in his entire constitution, should first be powdered moderately [with salt] and wrapped in swaddling-clothes, in order that his skin may be made thicker and firmer than the parts within. For during pregnancy everything was equally soft, since nothing of a harder nature touched it from without, and no cold air came in contact with it, whereby the skin would be contracted and thickened, and would become harder and denser than it was before and than the other parts of the body. But when the baby is born, it is necessarily going to come in contact with cold and heat and with many bodies harder than itself. Therefore, it is appropriate that his natural covering should be best prepared by us to exposure.

³ The list is considerably long: methods of parenteral nutrition, the description of pericardial abscesses, meningitis, intracranial thrombophlebitis, colon tumours, the practice of tracheotomy, which he tested on a goat but not on human beings, and so forth.

⁴ It is beyond the scope of the present paper to give a full history of the application of salt to newborns in pre-modern medicine. The following sections, nevertheless, sketch this history from the main Greek and Arabo-Islamic sources on neonatal care in order to provide an adequate framework for understanding Ibn Zuhr's alternative and its consequences.

⁵ Galen, *De Sanitate Tuenda*, ed. Konrad Koch, *Corpus Medicorum Graecorum* [henceforth CMG] V 4,2 (Berlin-Leipzig: Teubner, 1923), 16.; trans. H.E. Sigerist, *A Translation of Galen's Hygiene (De Sanitate Tuenda)* (Springfield: Charles C. Thomas Publisher, 1951), 22-23.

⁶ A reference to the preceding paragraph in which Galen explains that human beings must be treated according to the rules of hygiene from the very beginning in order to remain healthy throughout their lifetimes.

For infants who are in accordance with nature, a simple salt dusting-powder is sufficient; for those whom it is necessary to sprinkle with dried leaves of myrtle,⁷ or something else of this sort, are obviously abnormal. Galen recommends that newborns should be treated almost like hams being cured in order to harden their skin. The application of salt to newborns, however strange it may seem, has been a frequent practice in Semitic cultures since time immemorial, the main purpose of which seems to be purification. Prescribed in the Bible (Ezekiel, 16, 4 ff), it was a current practice among Jews until recent times.⁸ Levantine Arabs and other peoples of the region also salted their infants, and some of them continue to do so. The practice is attested in Syria, Palestine, Jordan, Qatar, the northern regions of Arabia, the western parts of Iran and Turkey; under Turkish influence, it spread to some regions of the Balkans and Greece.⁹ In much the same way as Galen, the Arabs still believe that salt hardens the newborn's skin and protects him or her from the air.¹⁰

The application of salt was fairly common in Greek medicine,¹¹ since, like Galen, the main authorities on neonatal care recommended it for the purposes of hardening and cleansing the skin.¹² At the beginning of the

⁷ Myrrh in Sigerist's translation.

⁸ Jennie R. Ebeling, *Women's Lives in Biblical Times* (London-New York: T&T Clark international, 2010), 103 and the bibliography mentioned there.

⁹ Julian Morgenstern, *The Rites of Birth, Marriage, Death and Kindred Occasions among the Semites* (Cincinnati: Hebrew Union College Press 1968), 8 ff, and F. Aubaille Sallenave, 'Les rituels de naissance dans le monde musulman', in P. Bonte, A.-M. Brisebarre, A. Gokalp (eds), *Sacrifices en islam. Espaces et temps d'un rituel* (Paris: CNRS, 1999), 125-160, 131-134, which includes a rich bibliography; cf. also Rebecca L. Torstrick and Elizabeth Faier, *Culture and customs of the Arab Gulf States (Westport: Greenwood Publishing Group, 2010)*, 117.

¹⁰ The contemporary medical bibliography discusses the negative consequences of this practice for newborn's health (cf. for instance N. Yercen *et al.*, 'Fatal Hypernatraemia in an Infant Due to Salting of the Skin', *American Journal of Disabled Children*, 147 (1993), 716-7 and S. Jarrah, 'Jordanian Women's Postpartum Beliefs: an Exploratory Study', *International Journal of Nursing Practice*, 13 (2007), 289-295).

¹¹ As far as I know, in the secondary bibliography there are no studies that link the Semitic tradition with the ancestral practices of Ancient Greece. Soranus' *Gynaecia* speaks of the customs of other peoples including 'some of the Hellenes' without mentioning the application of salt (ed. J. Ilberg, CMG IV (Teubner: Berlin-Leipzig, 1927), 59).

¹² On the main authors who dealt with neonatal care in Greek medicine and the procedures they used, cf. the well-documented synthesis of J. Bertier, 'La médecine des enfants à l'époque impériale', in Hildegard Temporini and Wolfgang Haase (eds), *Aufstieg und Niedergang der Römischen Welt II 37 (3)* (Berlin-New York: Walter de Gruyter), 2147-2227; however, Bertier does not mention the application of salt.

second century, Soranus' *Gynaecia* mentions a procedure similar to Galen's salting, although more sophisticated and less aggressive:¹³

Therefore, the following method of sprinkling with salt may be acceptable. Taking fine and powdery salt, or natron or aphronite, one must besprinkle the newborn, watching out for the eyes and the mouth; for if it enters these parts it produces ulceration or severe inflammation or suffocation. Nor should one besprinkle with much salt, for by too great pungency the physique, which is still tender and very weak, is corroded; nor with little, since the surface is not rendered sufficiently firm. But the newborn being delicate, it may be necessary to beat up the salt with honey or with olive oil or with the juice of barley or fenugreek or mallow. After having cleansed the body, one must bathe it with lukewarm water and wash away all the covering emulsion. Then one must do the same a second time: besprinkle with salt but wash off with much warmer water.

The salt is not applied directly but mixed with other substances, and then washed off from the skin so as to avoid damage. Oribasius (ca. 320-ca. 400),¹⁴ possibly following Rufus of Ephesus (fl. late 1st century),¹⁵ also mentions Galen's procedure without acknowledging the ultimate source. At variance with Galen and in tune with Soranus' prescription, he recommends washing off the newborn with a decoction of barley or fenugreek and anointing him or her with oil. The same procedure is mentioned some time later by Aëtius of Amida (fl. 5th-6th centuries).¹⁶ So the application of salt on the newborn's skin appears to have been part and parcel of neonatal care from the times of Imperial Rome onwards.

Under the influence of Greek medicine, some of the greatest physicians of the *âge d'or* of Arabo-Islamic medicine recommended the application of salt in a variety of works, either in all-inclusive manuals such as *al-Kāmil fī l-Ṭibb* by al-Mājūsī (d. between 982 and 995) and *al-Qānūn fī l-Ṭibb* by Avicenna/Ibn Sīnā (ca. 980-1037),¹⁷ or in paediatric and gynaecological

¹³ Soranus, *Gynaecia*, 60; trans. Owsey Temkin, *Soranus' Gynecology* (Baltimore: Johns Hopkins University Press, 1956), 83-84.

¹⁴ Oribasius, *Collectionum Medicarum-Libri Incerti*, ed. Johann. Raeder, CMG VI, 2,2, (Berlin-Leipzig: Teubner, 1933), 120-121; ed. and trans. Ulco C. Bussemaker and Charles Daremberg, *Oeuvres d'Oribase* (Paris: Imprimerie Impériale, 1858, 6 vols.), 3, 117-118.

¹⁵ Charles Daremberg and C.E. Ruelle, *Oeuvres de Rufus d'Éphèse* (Paris: J.B. Baillière, 1879; reprint Amsterdam: Adolph M. Hakkert, 1963), 302.

¹⁶ Aëtius, *Libri Medicinales*, ed. Alexander Olivieri, CMG VII,1 (Berlin-Leipzig: Teubner, 1935), 360. The author borrows heavily from Oribasius.

¹⁷ I have found no references to the application of salt in similar manuals dating from the same era, such as al-Ṭabarī's *Firdaws al-Ḥikma fī l-Ṭibb* (ed. 'Abd al-Karīm al-Jundī, Beirut: Dār al-

treatises such as *K. Siyāsat al-Šibyān wa-Tadbīru-hum* by Ibn al-Jazzār (d. ca. 970), *K. Tadbīr al-Ḥabālā wa-l-Mawlūdīn* by ‘Arīb b. Sa‘īd (d. 980), and *K. Tadbīr al-Ḥabālā wa-l-Aḫḫāl wa-l-Šibyān* by al-Baladī (fl. late 10th century).¹⁸ Now, the main source of these authors is not Galen’s *De Sanitate Tuenda*, which is only quoted by al-Baladī (without mentioning it explicitly) and Ibn al-Jazzār.

The procedure they all explain, with the exception of al-Mājūsī,¹⁹ most resembles Soranus’ and Oribasius’ methods. On the one hand, salt, although still considered as the essential element, is mixed with other substances; on the other, the resulting compound is either diluted in water or eliminated from the skin by washing.

Al-Baladī, whose treatise on children’s health is the broadest of the three considered here and contains explicit quotations from his Greek sources, expands on this issue at length:²⁰

1. You should salt the rest of his body, except the mouth and nose, with a moderate amount of salt so that the skin becomes harder and thicker than his inner parts. For, while the foetus remained in the uterus, all these parts were equally soft [because there was nothing from the outside of a harder nature that touched him, nor did he have to endure cold air, and so there was nothing that affected and soiled [the skin] whereby it could become harder and thicker than the other parts of the body].²¹ When the foetus is born, it will necessarily be affected by heat, cold and a great deal of bodies which are harder than him. For this reason, we must prepare his natural covering, i.e. the skin, so that it is in the best state for enduring the harshness of [external] influences. Only salt is

Kutub al-‘Ilmiyya, 2002), Abū l-Qāsim al-Zahrāwī’s *K. al-Taṣṭīf* (ed. Fuat Sezgin, facsimile of ms Beşirağa 502, Bib. Süleymaniye, Frankfurt: Institute for the History of Arabic-Islamic Science: 1985, 2 vols.) and Ibn al-Jazzar’s *Zād al-Musāfir* (ed. Muḥammad Suwīsī *et al.*, Tunis: al-Majma‘ al-Tūnisī li-l-‘Ulūm wa-l-Ādāb wa-l-Funūn Bayt al-Ḥikma: 1999, 2 vols.).

¹⁸ Al-Rāzī’s *De Practica Puerorum*, considered the foundational book of Arabo-Islamic paediatrics, does not deal with neonatal care.

¹⁹ ‘Alī b. al-‘Abbās al-Mājūsī, *Kāmil al-Šinā‘a al-Ṭibbiyya*, ed. Fuat Sezgin, facsimile of ms A.Y. 6375, University of Istanbul (Frankfurt: Institute for the History of Arabic-Islamic Science, 2 vols.), 2 (1), 70. The author mentions the application of salt at the beginning of a chapter devoted to neonatal care, but he seems to grant little relevance to it: ‘it is convenient that, when a child is born, he should be sprinkled with salt and roses reduced to powder’. Al-Mājūsī then goes on to describe other procedures in which several substances are applied to the newborn’s body.

²⁰ Al-Baladī, *Tadbīr al-Ḥabālā*, ed. M Muḥammad Qāsim Muḥammad (Dār al-Rashīd: Baghdad, 1980), 201-202 (first paragraph), 203-204 (second paragraph).

²¹ The original text, as rendered by the editor, is syntactically problematic. I translate it according to the general sense conveyed by the words and in accordance with Galen’s *De Sanitate Tuenda*.

suitable for this purpose in children. So, it is necessary to sprinkle their bodies with salt as soon as they are born, and then they must remain submerged moderately²² until their dirt is removed. Then, they must be washed off with lukewarm water and cleaned from all their dirt. (...)

2. Some people recommended that the infants should be washed, as soon as they are born, with fenugreek water and barley flour; others suggested that to the salt should be added myrtle, rose, laurel leaves, pistachio tree leaves, costus or malabathron, either separately or mixed one another. It is necessary to employ [these simples] according to the temperaments and the countries, for it happens that [the temperaments and countries] which are hot may be cold regarding the infant's temperament, and that those which are cold, may be hot regarding the infant's temperament. He who thinks that only salt suffices for achieving a balanced temperament will think that salt is enough; as for what is decocted in the water with which the infant is bathed, one must follow the very same method.²³ For this reason, the country must have [its own] method and indeed any country has a custom [whose inhabitants] follow.

Now, the most widespread method is an abridged version of the above text, which specifies the simples that should be added to salt and notes that the resulting mixture should be washed off after a short while. The first physician to mention it is the master of Qayrawān, Ibn al-Jazzār:²⁴

The newborn should be treated from the beginning, from his coming out. The umbilical cord should be cut at four fingers, and, during the hour following delivery, he should be sprinkled moderately with salt²⁵ so that his skin becomes harder. There are people who mix [salt] with malabathron, costus, sumac, fenugreek and wild thyme,²⁶ all of them powdered. Galen, for his part, said that, for the children whose nature is normal, sprinkling with salt alone was enough; and that, if one feared for their nature, they should be sprinkled with crushed myrtle leaves or something of the sort. If the newborn is sprinkled with salt, this must be done over the entire body, with the exception of the nose and mouth, and the child must remain thus for some time until his dirt is removed. Then, he will be washed off so that he becomes clean.

²² Ar. *yugh̄tasūna gh̄atsan mu'tadīlan*, which I have translated literally; lacking alternative readings, this sentence may be interpreted, according to similar texts by Ibn al-Jazzār, 'Arīb b. Sa'īd and Ibn Sīnā which I will discuss immediately after this, as follows: newborns must be rubbed with salt or submerged in some kind of brine for a certain period of time.

²³ The method of adding what the physicians think is best according to a particular climate.

²⁴ Ibn al-Jazzār, *K. Siyāsat al-Ṣibyān wa-Tadbīru-hum*, ed. M. al-Suwīsī *et al.* (Beirut: Dār al-Gharb al-Islāmī, 1984), 47-48.

²⁵ The Arabic text reads: '*wa-yumallaḥu sā'ata yūladu tamliḥan mu'tadīlan*'. The author, like 'Arīb, Ibn Sīnā and al-Baladī, uses the verb *mallaḥa*, 'to salt' or 'to rub with salt'.

²⁶ According to 'Arīb, barley in place of thyme.

‘Arīb b. Sa‘īd²⁷ reproduces Ibn al-Jazzār’s excerpt almost verbatim, probably because the latter is his main source.²⁸ Ibn Sīnā’s *Qānūn* says more or less the same,²⁹ with the exception that he prescribes that salt must be diluted in water (*mā’ al-milḥ*) and then a mixture of malabathron, costus, sumac, fenugreek and wild thyme must be added to the resulting brine. Thus, the newborn is not salted but bathed in salty and perfumed water which must also be washed off with a subsequent lukewarm bath.

Neither the long nor the short version coincides exactly with any Greek source known to me, yet both bear strong resemblances to them. Although lacking a specific antecedent,³⁰ it is likely that al-Baladī and the others borrowed from Greek authors whose ultimate source was Soranus’ method of applying salt. It seems therefore that, although Galen’s *De Sanitate Tuenda* was quoted explicitly or implicitly by the Arabo-Islamic sources, as its outstanding authority deserved, his rather rudimentary procedure was for the most part ignored.

We know next to nothing about how newborns were actually treated because, to quote one of the most influential physicians of ninth-century Baghdad, ‘Alī b. Sahl Rabban al-Ṭabarī, children health was a woman’s

²⁷ ‘Arīb b. Sa‘īd, *K. Tadbīr al-Ḥabālā wa-l-Mawlūdīn*, ed. Henri Jahier and Abdelkader. Nouredine (Algiers: Librairie Ferraris, 1956), 51.

²⁸ Khader Musa, ‘La paidología de ‘Arīb al-Qurṭubī e Ibn al-Ŷazzār al-Qayrawānī. ¿Coincidencia o plagio?’, *Anaquel de Estudios Árabes*, 10 (1999), 97-132, explains in detail the diffusion and recognition granted to Ibn al-Jazzār in late tenth-century Cordova. Moreover, he argues convincingly that, to a great extent, ‘Arīb’s *Tadbīr al-Ḥabālā* plagiarises Ibn al-Jazzār’s *K. Siyāsat al-Šibyān*.

²⁹ Ibn Sīnā, *al-Qānūn fī l-Ṭibb*, (Beirut: Dār Šādir, s.a., 3 vols.), 1, 150.

³⁰ A thorough survey of the Greek sources is beyond the scope of the present paper. Nevertheless, there are several remarks to make according to the main bibliographies of Arabo-Islamic Medicine (Fuat Sezgin, *Geschichte des Arabischen Schrifttums. Band III: Medizin-Pharmazie-Zoologie-Tierheilkunde*, Leiden et al: Brill, 1970; Manfred Ullmann, *Die Medizin im Islam*, Leiden et al.: Brill, 1970). Neither Soranus’ *Gynaecia* nor Aëtius’ medical encyclopaedia was translated into Arabic. Oribasius was better known to the Arabs, and indeed he was named *al-Qawābilī*, the obstetrician, yet his prescriptions about the application of salt quoted above do not coincide exactly with those of the Arabo-Islamic physicians. Paul of Aegina’s works on paediatrics and obstetrics also exerted a profound influence on Arabo-Islamic medicine, and particularly on al-Baladī’s *Tadbīr al-Ḥabālā*. These works are now lost and I have found no reference to the application of salt in either Paul’s *De Re Medica Libri Septem (Pragmateia)*, in Pormann’s reconstruction of his *Therapy of Children* quoted above, or in Pormann’s study of the oriental tradition of the *Pragmateia* (P.E. Pormann, *The Oriental Tradition of Paul’s of Aegina Pragmateia*, Leiden et al.: Brill, 2004). On the other hand, Rufus of Ephesus works on obstetrics, now lost, were also known to the Arabs.

affair;³¹ in his *Firdaws al-Ḥikma fī l-Ṭibb*, the first important medical manual in Arabo-Islamic medicine, he states:³²

I have summarised [in the chapter about child's hygiene and regimen] what the sage [Galen] said because I know that midwives and old women see in these issues what the physicians do not.

Thus, the knowledge of what really happened to infants has disappeared to a large extent along with the oral tradition of midwives and old women, leaving only some faint traces in the medical treatises³³ or in sources of a completely different kind whose thorough survey is beyond the scope of the present paper.³⁴ Regarding the application of salt, and according to the accounts of physicians and the current practice, we may assume that Bedouin and other Muslim newborns were salted in much the same way as Galen prescribed and in much the same way as they are salted even today. Parents who could afford to pay a skilled midwife, possibly trained and supervised by a professional physician, might salt their children following Soranus' method, which seems to have been more popular than Galen's. Still others were treated with no salt at all, in accordance with other ancestral traditions which we will discuss below or other medical opinions. Ibn Sīnā explains a most reasonable procedure in *Urjūza fī l-Ṭibb*, his famous didactic poem on medicine. The method has the same purpose – to harden the newborn's skin – but it is cheaper and easier to apply than the complex procedure found in the *Qānūn*, and less aggressive than salting: before the newborn is wrapped, he must be anointed with astringent oil and then bathed.³⁵ On the other hand, *K. al-Manṣūrī fī l-Ṭibb*, written by al-Rāzī (865-925), which is a manual as authoritative as al-Mājūsī's *Kāmil* or Ibn Sīnā's *Qānūn* for the Arabo-Islamic physicians, speaks of neonatal care without explicitly stating the substances with which the newborn should be sprinkled or anointed.³⁶

³¹ On women as practitioners and patients in Arabo-Islamic medicine, cf. Pormann and Savage Smith, op. cit. (n.2), 103-107.

³² 'Alī b. Sahl Rabbān al-Ṭabarī, *Firdaws al-Ḥikma*, 73, i. f.

³³ Cf. below for the case of al-Andalus.

³⁴ Cf. nevertheless the bibliography given above, n. 9.

³⁵ Ibn Sīnā, *al-Urjūza fī l-Ṭibb*, ed. H. Jahier and A. Nouredine (Paris: Les Belles Lettres, 1956), 72 §938. It seems that this simplified procedure is also based on Greek sources, according to what Oribasius says (cf. above, n. 13).

³⁶ Al-Rāzī, *K. al-Manṣūrī fī l-Ṭibb*, ed. Ḥasan al-Bakrī al-Ṣiddiqī (Kuwayt: Manshūrāt Ma'had al-Makhtūṭāt al-'Arabiyya, 1987), 231-232.

The baby's ears should be sucked as he is being born and after. Beware that the milk does not enter [the ears] during nursing. The newborn's palate must be rubbed with honey, and it is necessary to clean his nose by rubbing it with hot water and oil and wiping it. You must also rub and anoint him, stretch out his members in [the appropriate] directions, swaddle him and settle the parts of his head, the forehead and nose. With these cares [or. *tadbīr*, regime], the child is protected against a large number of diseases.

3. Ibn Zuhr, salt and acorn oil

As far as I know, the only voice raised against the application of salt on newborns was that of Ibn Zuhr, in the mid-12th century. His *K. al-Aghdhiya* ('Book on Food') written between 1147 and 1162 or somewhat earlier,³⁷ is a treatise on the properties of aliments and nutrition, one of the main topics in the medieval medical 'regime' (*tadbīr*). However, on several instances, the author digresses from the main subject of the book and deals with other aspects of this regime. In a chapter chiefly devoted to infantile nutrition (albeit given the general title 'regime of children'), we read the following:³⁸

The infant's body is like fresh cheese because his members have soft bones and [for other reasons of this sort]. The midwife must correct what needs to be corrected with extreme care and patience [lit. taking a long time]. If she bathes the child, she must do so with lukewarm and sweet³⁹ water, as long as he resists and avoiding that the air should damage his body.

The ancients and most of the Greeks used to sprinkle the body of the child with salt in order to harden it, and in order for it to resist the surrounding air; this was done without causing either disease or harm to it.⁴⁰

³⁷ E. García Sánchez, *Ibn Zuhr, Abd al-Malik b. Abi l-Ala'. Kitāb al-Agdiya/ Tratado de los alimentos* (CSIC et al.: Madrid, 1992), introd., 15-16.

³⁸ Ibn Zuhr, *K. al-Aghdhiya*, ed. García Sánchez quoted in the previous note, 129.

³⁹ This seems to be an implicit rejection of Ibn Sīnā's bathing with salted water.

⁴⁰ There are two explanations for Ibn Zuhr's contention that salt did not harm Greek babies. The first, in keeping with al-Baladī's excerpt above quoted, is that pure salt is adequate for the people who live in a particular climate. The other one – more likely in my opinion – is that Ibn Zuhr assumes that ancient people were bigger and more resistant than his contemporaries, a belief he shared with other Medieval physicians. For instance, the anonymous author of *K. al-Tibb al-Qashṭālī* (ed. C. Vázquez de Benito, 'El *Kitāb al-Tibb al-qaṣṭālī al-malūkī* (*Libro de medicina cristiana regia*) (c. 1312)', in E. García Sánchez and C. Álvarez de Morales (eds), *Ciencias de la Naturaleza en al-Andalus, Textos y Estudios VII* (Granada: CSIC et al., 2004), 11-107, 70-71), written in the early 14th century in Castile, says that the ancients were larger than contemporary people, based on a study of the bones found; and that the ancients were far more resistant to the extraction of blood or the ingestion of drugs. However, the author never questions the doses prescribed by Greek sources.

My opinion is that salt burns them and possibly makes them sleepless. For, as I said, the infant is like fresh cheese and cannot endure pain and insomnia. He is like a flower that wilts and fades with the least heat that affects it or the least thirst that its roots suffer. Thus, the infant cannot endure either effort or pain and the insomnia makes him weak.

I think that salt is not convenient for his body and it seems to me that there are other things for the same purpose better than salt, such as acorn oil. This has the same effect of hardening but it neither burns nor causes insomnia.

Ibn Zuhr describes another of his well-known ‘innovations’ for adapting Galen’s method (which, although not stated explicitly, is dealt with in the second paragraph) to present circumstances.⁴¹ As I said above, although the application of acorn oil instead of salt may seem a trivial change, it helps us to understand the evolution of neonatal care in Medieval medicine (and most particularly in the Muslim and Christian societies of the Iberian Peninsula) and the innovative character of Ibn Zuhr’s approach. The controversy of acorn oil or salt may be analyzed at several levels, the first of which must be the historical and doctrinal, since Ibn Zuhr was a contemporary and compatriot of several philosopher-physicians like Ibn Bājjā (d. 1139) and Ibn Rushd (d. 1198), who were systematically critical of Galen. These authors followed an intellectual trend that we can call neo-Aristotelianism, whose main reference was the Turkish philosopher al-Fārābī (d. 950 or 952).⁴² The physical and natural sciences (particularly medicine and the allied disciplines, for all these scholars were physicians) had to be redirected towards the Aristotelian paradigm. On the one hand, these scholars, who entertained pretensions of omniscience, aspired to avoid any contradiction between the theoretical foundations of medicine and Aristotle; on the other hand, they sought to organise the exposition and teaching of medicine according to an Aristotelian system of categorization. Moreover, they stressed the empirical character of medicine, considering experience not only in its broad, cumulative sense, but also in the sense given by Aristotle in *Posterior Analytics* in which it becomes the very source of universal knowledge.⁴³ To a large extent, the Aristotelian scholasticism of the Andalusī philosopher-physicians fought against Galenic scholasticism and

⁴¹ The point of whether Ibn Zuhr criticises Galen or his followers will be discussed below.

⁴² Miquel Forcada, *Ética e ideologia de la ciencia. El médico filósofo en al-Andalus (siglos X-XII)* (Almería: Fundación Ibn Tufayl, 2011), 88-110, 276-291 and 325-347.

⁴³ Miquel Forcada, ‘Ibn Bājjā on Medicine and Medical Experience’, *Arabic Sciences and Philosophy*, 21 (2011), 111-148, 126-134.

against what they perceived as an incompetent teaching and exercise of medicine. Ibn Zuhr was held in high esteem by these philosopher-physicians, particularly by Ibn Rushd: they appreciated both his thorough knowledge of medical literature and his ability to put theory into practice, explaining and solving medical problems. For this reason, Ibn Rushd considered that his most famous and Aristotelizing manual, *K. al-Kulliyāt* (Latinised as *Colliget*), where he expounded the general principles or ‘universals of medicine’, ought to be complemented with Ibn Zuhr’s *K. al-Taysīr* (Latinised as *Liber de Teisir*). *Al-Taysīr* was seen as an invaluable source of *juz’iyyāt* or particular knowledge, the knowledge raised by the confrontation of theory with the problems posed by specific patients. Thus, the philosophers acknowledged Ibn Zuhr as a professional who went far beyond what was said in the simplified manuals, followed blindly by the physicians of their time. It is worth noting in this regard that the target of Ibn Zuhr’s criticism is not Galen because he says that this procedure was good for Greek infants, assuming that they were stronger than Arab newborns; his real target is any physician who observes the Galenic syllabus without taking into account the specific conditions under which any treatment must be applied. Hence, the problem of salting newborns instantiates perfectly what the philosopher-physicians saw in the finest professional physician they had ever met; from a more general point of view, it is also a good example of how Ibn Zuhr’s innovative character worked. If we approach this issue from an epistemological point of view,⁴⁴ what we see is that this innovation stems neither from a systematic empirical search, nor from an *a priori* rereading of Greek sources along Aristotelian lines. It is a simple amendment suggested either by experience or by common sense and deduction, or by all these factors conjointly, just like many other criticisms and innovations which appear frequently in Arabo-Islamic medical sources. If we go into detail, we may even rule out the empirical factor and thus attribute the innovation to common sense and analogy only. Ibn Zuhr says nowhere in the excerpt that he has seen a concrete case, any particular newborn bearing a rash, tearful, and sleepless due to rubbing with salt, nor any newborn sleeping peacefully after having been anointed with acorn oil. Indeed, Ibn Zuhr precedes his opinion on salt and acorn oil with the expression ‘I think’; and, since it is generally assumed that the Arabo-Islamic physicians did not assist women in

⁴⁴ I am aware that the term ‘epistemology’ is somewhat pretentious in this context, but it is by no means inaccurate.

labour,⁴⁵ it is probable that Ibn Zuhr had no first-hand experience of the problem. The state of affairs explained in this way allows another reading in the particular case of Ibn Zuhr, for his daughter and granddaughter ranked among the exceptional women-physicians mentioned in the history of Arabo-Islamic medicine,⁴⁶ and were remembered for having treated the women and children of the Almohad dynasty. However speculative it may seem, then, we should not dismiss the possibility that Ibn Zuhr had actual (albeit indirect) experience of childcare and that he recommended acorn oil precisely because the women of his family had successfully used it to anoint the newborns of the Almohad elites.

Be this as it may, the truth is that the text translated above mentions neither direct nor indirect experience of the salting of newborns. His own common sense and primary deductive reasoning may have suggested to Ibn Zuhr that salt, which stings the wound, cannot be good for a skin that according to Galen has not yet completed its process of formation. Since Galenic science indicates that one should administer astringent and cleansing substances to the newborn's skin, Ibn Zuhr might have thought that acorn oil was preferable because it does not irritate.⁴⁷ So this peculiar innovation and its not insignificant success stem from two factors: one, common sense; the other, the moral authority of one of the most respected physicians of al-Andalus, which granted his opinion a place among the most authoritative authors of his and later generations. On the other hand, the solution is by no means entirely original, as it seems to have been inspired by the beginning of verse 938 of Ibn Sīnā's *Urjūza fī l-Ṭibb*, which reads: *udhhun-hu bi-l-qābiḍ* ('anoint him with astringent [oil]').⁴⁸

4. Ibn Zuhr's proposal of acorn oil among the physicians of 12th century al-Andalus

Although a minor question, the influence of Ibn Zuhr's opinions on salting newborns was far from negligible among Andalusī physicians and continued

⁴⁵ Cf. Pormann and Savage Smith, *op. cit.* (n.2), 107. The treatises by 'Arīb, Ibn Zuhr and Ibn al-Khaṭīb mentioned in the present paper give explicit support to this assumption.

⁴⁶ Ibn Abī Uṣaybī'a, *'Uyūn al-Anbā' fī Ṭabaqāt al-Aṭṭibā'*, ed. H. Jahier and A. Nouredine (Algiers: Librairie Ferraris, 1958), 104-105.

⁴⁷ Arabic pharmacological treatises mention the astringent properties of acorn (cf. for instance Ibn Wāfid, *K. al-Adwiya al-mufrada*, ed. Luisa F. Aguirre de Cárcer, (Madrid: CSIC *et al.*, 1995, 2 vols.), 1, 54/2, 16.

⁴⁸ Cf. above, n. 35.

until the late Renaissance. The first quotations appeared in the circle of Almohad physicians, to which Ibn Zuhr belonged. Ibn Rushd, who so sincerely admired Ibn Zuhr and who was so quick to criticise Galen, was the first to mention him: in *K. al-Kulliyāt*, he wrote at the beginning of the chapter on the regime for children:⁴⁹

Galen thought that the first treatment that should be applied to newborns is to rub their body with salt because they need to have their bodies hardened so as to protect them against foreign agents. As for me, the most important concern is that the salt should not sting them. Abū Marwān ibn Zuhr says that acorn oil has the same effect without irritating.

This excerpt presents several points of interest. Its crux is Ibn Rushd's consideration of Ibn Zuhr's medical works as a source of specific knowledge. A general (universal) principle (*kullī*) like 'the newborn's skin must be hardened so as to protect it against foreign agents' is complemented with the opinion of an experimented physician, who says (albeit not according to his own experience), that the best substance for this purpose is acorn oil. The second feature that stands out is Ibn Rushd's deliberate criticism of Galen, for he focuses on Ibn Zuhr's general references to Greek physicians, without taking into account that Ibn Zuhr actually considered that Galen's treatment was good for Greek infants. The third feature worth noting is Ibn Rushd's omission of any reference to Ibn Sīnā, which seems more deliberate than accidental because the Andalusī philosopher-physician was well aware of the fact that whereas *Qānūn* prescribed a reasonable procedure of salting the *Urjūza* prescribed the same method that Ibn Zuhr mentions. It is worth noting in this regard that, in his comments on verse 938 of Ibn Sīnā's *Urjūza fī l-Ṭibb* Ibn Rushd merely repeats Ibn Sīnā's words and adds without further comment that 'Galen orders powdering salt and sprinkling newborns with it when they are born'.⁵⁰ If the omission of Ibn Sīnā in *K. al-Kulliyāt* is, as I tend to believe, deliberate, this would lend some additional support to Iskandar and Arnaldez's theory that Ibn Rushd believed that the sum of his *K. al-Kulliyāt* and Ibn Zuhr's *K. al-Taysīr*

⁴⁹ Ibn Rushd, *K. al-Kulliyāt fī l-Ṭibb*, ed. José M. Fórneas and Camilo Álvarez de Morales (Madrid: CSIC, 2 vols.), 1, 382/399.

⁵⁰ Ibn Rushd, *Sharḥ Urjūza li-Ibn Sīnā*, ed. J. Coullaut Cordero *et al.* (Salamanca: Ediciones Universidad de Salamanca, 2010), 316-7.

could be an alternative to Ibn Sīnā's *Qānūn* as a fully-fledged manual of medicine.⁵¹

Another philosopher-physician of the Almohad court, Ibn Ṭumlūs (m. 1223/4),⁵² who was a disciple of Ibn Rushd, mentions Ibn Zuhr's acorn oil in his commentary on Ibn Sīnā's *Urjūza*.⁵³ The text may be translated as follows:⁵⁴

After this,⁵⁵ his body should be salted without delay with fine salt so as to harden its epidermis and fortify its dermis. To the water⁵⁶ should be added sumac, costus, malabathron, fenugreek and barley. The judge Ibn Rushd (may God be pleased with him) said that Ibn Zuhr mentioned that acorn oil was more convenient for it [the newborn's body] because it hardens the epidermis without irritating it.

Ibn Ṭumlūs knew about acorn oil via Ibn Rushd's *Kulliyāt* and collates uncritically two reasonable procedures for hardening the newborn's skin, that of Ibn Sīnā and that of Ibn Zuhr, the latter validated by the authority of Ibn Rushd. It is thus a scholastic text in which the author's opinion and experience, or the criticism of Galen, are conspicuous by their absence. In sum, it is what one should expect from a treatise probably devoted to medical training in the Almohad circles.⁵⁷ Even though Ibn Ṭumlūs' treatise tells us nothing about what really happened to newborns, it indicates that Ibn Zuhr's alternative had found a place in the medical guidelines for neonatal care in al-Andalus.

⁵¹ Roger Arnaldez and Albert Z. Iskandar, 'Ibn Rushd', in *Dictionary of Scientific Biographies* (Charles Scribner's Sons Pub.: New York, 1975), 12, 1-9, 7.

⁵² On the author and his works, cf. Josep Puig Montada, 'Ibn Ṭumlūs, Abū l-Ḥayyāy', BA, 5 (2007), 504-507.

⁵³ This commentary has not been edited or studied. Cf., nevertheless, M. al-Khaṭṭabī, *Al-Ṭibb wa-l-Aṭṭibbā' fī l-Andalus al-Islamiyya* (Beirut: Dār al-Gharb al-Islāmī, 1988, 2 vols.), 1, 427 ff., which edits some fragments, and Puig Montada, *op. cit.* (n. 52), 506-7.

⁵⁴ Ibn Ṭumlūs, *Sharḥ Urjūzat Ibn Sīnā al-Ṭibbiyya*, Royal Library of Rabat, ms 1014, p. 136; cf. M. al-Khaṭṭabī, *op. cit.*, (n. 53), 435.

⁵⁵ I.e., after cutting the umbilical cord.

⁵⁶ There is no previous reference to the fact that the salt is diluted in water. Nevertheless, it seems clear that the author explains the procedure of salting extant in Ibn Sīnā's *Qānūn*; indeed, it makes perfect sense to complement Ibn Sīnā with another quote from the same author.

⁵⁷ Forcada, *op. cit.* (n. 42), 325-328.

5. The survival of newborn salting, and of Ibn Zuhr's opinion

As is well known, Ibn Zuhr's work enjoyed great prestige from the 12th century onwards in several settings: Western and Levantine Islam,⁵⁸ and the Europe of the Late Middle Ages and the Renaissance.⁵⁹ His opinions about newborn salting were also echoed through the ages in both Muslim and Christian areas. The earliest mention is found in a treatise similar to his *K. al-Aghdiya*, the book of the same title written by the physician of Granada, Ibn Khalṣūn. Although we do not know much about him,⁶⁰ he appears to have been a scholar of note who flourished between the 13th and 14th centuries, in the last bastion of al-Andalus, the Naṣrid kingdom of Granada. He says:⁶¹

As for the infant, some salt should be sprinkled on him so as he hardens against the effects of heat and cold. This is what Galen explains, but Ibn Zuhr says: 'acorn oil has the same effect without irritating the skin.' The contemporary practice of sprinkling henna instead of all these things is excellent, but henna should be mixed up with a third of its quantity of powdered myrtle and a sixth of salt.

Ibn Khalṣūn puts Galen on an equal footing with Ibn Zuhr without granting too much importance to either of them. The procedure he prefers is that of the 'people', which consists again of a popular practice possibly as ancestral as the application of salt among Semitic cultures: the rubbing with henna, which, as far as I know, Ibn Khalṣūn documents for the first time in a medical treatise. The ethnological bibliography of the early 20th century describes the spreading throughout North Africa of the practice of rubbing the newborn's body with henna, either applying it directly or mixed with oil

⁵⁸ The influence of Ibn Zuhr's works has not been studied monographically and we know little about its real extent, particularly in Levantine Islam. Maimonides was possibly Ibn Zuhr's best publicist in that region because he quotes him on several instances (cf. Azar, *op. cit.* (n.1), 82 ff). However, I have been unable to find any reference to either newborn salting or to the anointment with acorn oil.

⁵⁹ For an approach to the spreading of Ibn Rush and Ibn Zuhr in Europe, cf. Danielle Jacquart and Françoise Micheau, *La médecine arabe et l'occident médiéval* (Paris: Maisonneuve & Larose: Paris, 1990), 206-8 *passim* and Azar, *op. cit.* (n.1), 107-108.

⁶⁰ On the life and works of Ibn Khalṣūn, cf. Eloísa Llaveró Ruiz, 'Ibn Jalṣūn, Muḥammad', BA, 4 (2004), 611-614, where it is said that he may have been born in 1266/7. It is worth noting that the sources refer to him as a disciple of the most important physician of that time, Muḥammad al-Riqūfī.

⁶¹ Ibn Khalṣūn, *K. al-Aghdiya*, ed. S. Gigandet (Damascus: Institut Français de Damas 1996), 64.

or other substances.⁶² There are several reasons for this practice, which range from magical to cosmetic, but one of them is to harden the skin, in much the same way as medieval physicians and Semitic peoples did with salt.

Ibn Khalṣūn deliberately merges the folk and cult traditions, probably because he knows that pharmacological treatises say that henna is astringent and does not sting.⁶³ He thus recommends the mixing of henna with myrtle and salt, the substances that Galen mentions in *De Sanitate Tuenda*. Moreover, Ibn Khalṣūn advises implicitly against Galen's procedure of salting, which seems to have fallen into disuse in Granada at this time. The other procedure of salting, however, could have been put into practice according to the works of another physician who lived in the same place as Ibn Khalṣūn although slightly later, the famous polymath Ibn al-Khaṭīb (d. 1374).⁶⁴ He speaks about the hygiene and regime of children in two works, *K. al-Wuṣūl li-Ḥifẓ al-Ṣiḥḥa fī l-Fuṣūl* and *K. 'Amal man Ṭabba li-man Ḥabba*, where he mentions Ibn Sīnā's procedure of salting to which he adds interesting nuances. In the first treatise,⁶⁵ he only says as a parenthesis that 'there are people who add salt to the water with which he is washed off so as to harden him and to dry off his humidity'. In the second book, he is far more explicit and begins the chapter on neonatal care specifying what he has drawn from 'the practice of the midwives' (*tadbīr al-ṭifl bi-'amal al-qawābil*).⁶⁶ After dealing with omphalotomy, he says: 'among them [feminine pronoun in Arabic], there are some who wash off [the infant's] body with salt diluted in water'; then, the author goes on to repeat Ibn Sīnā's procedure. Since this feminine 'them' can only refer to 'midwives', Ibn al-Khaṭīb bears witness to the fact that, according to Ibn Sīnā, at least some midwives practised salting of newborns. What we cannot know is the extent of this practice, which seems to be restricted to those parents who could

⁶² M. Vonderheiden 'Le henné chez les musulmans de l'Afrique du Nord', *Journal de la Société des Africanistes*, 4 (1934), 35-61, 50-52. The application of henna has survived also until present time (cf. Marie-Luce Gélard, 'De la naissance au septième jour. Rituels féminins et temps suspendu (tribu berbérophone du Sud-Est marocain)', *Ethnologie française*, 33 (2003), 131-139, 132-133).

⁶³ Cf., for instance, Ibn Wāfīd, *K. al-Adwiya al-Mufrada*, 1, 228-229/2, 170-171, where it is said, moreover, that Galen explains that henna dries without doing any harm.

⁶⁴ On his life and work, cf. Jorge Lirola, 'Ibn al-Khaṭīb al-Salmānī, Lisān al-Dīn', *BA*, 3 (2004), 643-698.

⁶⁵ Ibn al-Khaṭīb, *K. al-Wuṣūl*, ed. María de la Concepción Vázquez de Benito (Salamanca: Ediciones Universidad de Salamanca), 127: 4-5.

⁶⁶ Ibn al-Khaṭīb, *K. 'Amal man Ṭabba*, ed. M.C. Vázquez de Benito (Salamanca: Ediciones Universidad de Salamanca, 1972) 256, i. f.

afford a medically trained midwife. Conceivably, while some kind of perfumed brine was applied to infants of the higher classes, the newborns of the common people were rubbed with henna. It might also be inferred from the treatises by Ibn Khalṣūn and Ibn al-Khaṭīb that both Galen's procedure for salting and Ibn Zuhr's prescription of an anointment with acorn oil were mere erudite curiosities in fourteenth-century Granada.

But these erudite curiosities experienced a revival when the Arabic medical texts were translated into Latin and other vernacular languages, although there are few references to the controversy between salt and acorn oil in the texts of the Late Middle Ages.⁶⁷ What we find in this epoch is the method of salting described by Ibn Sīnā, which is mentioned by two famous works devoted to *regimen*: explicitly in *Régime du Corps*, written by Aldobrandino da Siena (d. 1287) in 1256,⁶⁸ and implicitly, in the *Reggimento e Costumi di Donna*, by Francesco da Barberini (1264-1348).⁶⁹ Still other procedures are considered: Trotula's well-known *De Mulierum*

⁶⁷ In addition to the sources quoted below, I follow: Danièle Alexandre-Bidon and Monique Closson, *L'Enfant à l'ombre des cathédrales* (Lyon: Presses Universitaires du CNRS *et al.*: 1985), 62 ff.; Shulamit Shahar, *Childhood in the Middle Ages* (London-New York: Routledge: 1990), 40-43; S. Laurent, *Naître au Moyen Âge* (Paris: Léopard d'Or, 1989), 199 ff.; Ana M. Bau, 'Los cuidados del recién nacido en España a través de la teoría médica (siglos XIII a XVI)', in M.E. González de Fauve, ed., *Medicina y Sociedad: curar y sanar en la España de los siglos XIII al XVI* (Buenos Aires: Instituto de Historia de España 'Claudio Sánchez Albornoz' *et al.*, 1996), 167-194, 171-182; Pedro Gil-Sotres, Juan Antonio Paniagua and Luis García Ballester, 'La higiene medieval', in L. García Ballester and J.A. Paniagua (eds), *Arnaldi de Villanova Opera Medica Omnia X (1). Regimen Sanitatis ad Regem Aragonum* (Barcelona: Fundació Noguera-Universitat de Barcelona, 1996), 364 ff./ 830 ff.; Louis Haas, *The Renaissance Man and his Children: Childbirth and Early Childhood in Florence, 1300-1600* (New York: St. Martin's Press, 1998), 37 ff. It is worth noting that, in the Early Middle Ages, some European physicians and midwives may have known of Soranus' method via Muscio's version of *Gynaecia* (cf. the Latin text and a translation into Italian of this work in Rino Radicchi, *La Gynaecia di Muscione: Manuale per le ostetriche e le mamme del VI sec. d.C.* (Pisa: Giardini, 1979), 62, 66/79, 81). However, this treatise fell into oblivion when the Arabic manuals began to be translated into Latin in the 12th century (cf. A. E. Hanson and M. H. Green, 'Soranus of Ephesus: Methodicorum princeps', in Hildegard Temporini and Wolfgang Haase (eds), *Aufstieg und Niedergang der Römischen Welt II 37 (3)* (Berlin-New York: Walter de Gruyter), 968-1075).

⁶⁸ Aldobrandino of Siena, *Régime de santé*, ed. L. Landouzy and Roger Pépin, *Le régime du corps de maître Aldebrandin de Sienna* (Champion: Paris, 1911), 74-75. According to this source, 'sel deliè mellé à pouvre deliè de cost ou de somac ou de fien grec ou d'origano' is applied on the newborn.

⁶⁹ Francesco da Barberino, *Reggimento*, ed. Giuseppe E. Sansone (Rome: Zauli, 1995), 151: verse 42 - 152: verse 6.

*Passionibus*⁷⁰ mentions a simple lukewarm bath; Bernard of Gordon (1260-ca. 1318) speaks of a lukewarm bath followed by several procedures which do not include either salting or anointing with acorn oil;⁷¹ in the famous encyclopaedia by Bartholomaeus Anglicus (d. 1272) it is said that the newborn must be rubbed with a compound of powdered roses, honey, and salt.⁷²

In his *Regimen Sanitatis*, Maino of Manieri (d. 1368) dealt with the polemic between salt and acorn oil, piecing together what Galen, Ibn Zuhr (and/or Ibn Rushd) had said and adding what seem to be personal⁷³ caveats and remarks:⁷⁴

Now, some of the ancients said that their bodies, after the delivery, must be besprinkled with fine-powdered salt and then properly swaddled. The ties should be neither tight nor loose; besprinkling is helpful for hardening the members and avoiding the effects of exterior agents like heat, cold and the like. It also makes the skin thicker and harder and eliminates the humidity and impurities of the skin which are so abundant in infants. Now, since the nature of salt is to sting the members of the infant, some authors employ for the same purpose acorn oil instead of salt, for it hardens the members and dries the humidity without stinging. This is reasonable enough for infants [whose nature] is very hot and light (sc. sanguine and choleric), yet for those [whose nature] is extremely balanced, it may be otherwise. For them, salt might be more useful; and if the infants are phlegmatic, the salt [employed] ought to be hotter and more intense; if they are melancholic, hotter but not drier.

⁷⁰ Trotula, *De Mulierum Passionibus*, ed. and trans. Monica H. Green, *The Trotula. A Medieval Compendium of Women's Medicine* (Pennsylvania: University of Pennsylvania Press, 2001), 106-108/107-109. As says Green (*ibid.*, 106, n. 59), Trotula borrows here from al-Rāzī. Although the work was written during the Early Middle Ages, it spread widely during the following centuries.

⁷¹ Bernard of Gordon, *Tractatus de Conservatione Vitae Humanae* (Leipzig: J. Rhamba for E. Vogel, 1570), 11-12.

⁷² Alexandre-Bidon and Closson, *op. cit.* (n. 67), 62, and Haas, *op. cit.* (n. 67), 47. This recalls al-Mājūsī's procedure (cf. above, n. 19).

⁷³ Indeed, the section on neonatal care is quite original, because it does not just repeat what other books say; it contains interesting materials about the procedures of French women which are analyzed by Gil Sotres *et al.*, *op. cit.* (n. 67), 365/366/381-382.

⁷⁴ Maino of Manieri, *Excellentissimi Magnini Mediolanensis medici famosissimi Regimen Sanitatis* (Iohannem Prūs: Strasbourg, 1503), 5r; however, I have translated from the book which appears attributed to Arnau de Vilanova in Basel's edition of the latter's *Opera Omnia* (Basel: Conradvm Vvaldkirch, 1585), col. 665, because it contains some sentences omitted in the former edition. On the wrong attribution of Maino's *Regimen* to Arnau de Vilanova, cf. Gil Sotres *et al.*, *op. cit.* (n. 67), 403/871.

In accordance with the sketchy style of medieval *regimina sanitatis*, Maino does not quote his sources for the procedure of anointing the newborn with acorn oil. The excerpt says that Maino has read more than one author on the subject of acorn oil, but it is doubtful whether he was directly aware of what Ibn Zuhr said; of the six non-Arabic authors (including Maino) who speak of acorn oil mentioned in the present paper, only one, as we will see immediately, quotes a source, which is Ibn Rushd's *Kulliyāt/Colliget*. Although Ibn Zuhr's *K. al-Aghdhiya* was translated into Latin, Catalan and Hebrew from 1299 onwards and found a wide readership,⁷⁵ it is possible that these translations did not contain the lines devoted to the salting of newborns and acorn oil.⁷⁶

Maino's attitude to Ibn Zuhr's innovation is balanced, though biased towards Galen: he states that it is a reasonable procedure, but that acorn oil should be recommended only in certain cases, whereas salt is more helpful for the majority of newborns. In spite of this criticism of the critics, it seems that Maino's *Regimen* contributed to the diffusion of Ibn Zuhr's procedure, which was quoted fairly often in obstetrical treatises of the Renaissance.

Ibn Zuhr's method appears in the first treatise on obstetrics ever written in a vernacular language in Europe, a true bestseller until the late 17th century and even afterwards: Eucharius Rösslin's *Der Swangern Frauwen und hebammen Rosegarten*, written in German in 1513. Unlike Maino and others, Rösslin preferred the anointment with oil to the application of salt,

⁷⁵ Cf. on these versions: Jacquart and Micheau, *op. cit.* (n. 39), 206; E. García Sánchez, *op. cit.* (n. 37), introd., and 'Traducciones catalanas de textos científicos andalusies en la Corona de Aragón', *Sharq al-Andalus*, 10-11 (1993-94), 385-401, 'La traducción catalana medieval del *Kitāb al-Agdiya* (*Tratado de los alimentos*) de Avenzoar', in A. Riera Melis ed., *Actes del Ier Colloqui d'Història de l'Alimentació a la Corona d'Aragó*, (Lleida: Institut d'Estudis Ilerdencs, 1995), 363-386; Gil Sotres *et al.*, *op. cit.* (n. 67), 52-53/509-511.

⁷⁶ The translations of the works on *regimen* attributed to Ibn Zuhr or to other members of his family are problematic, as can be seen in the bibliography quoted in the previous note. I have only been able to consult two of the treatises mentioned by García Sánchez and neither of them refer to the problem of salt and acorn oil: the Catalan translation of *K. al-Aghdhiya*, which has come down to us incomplete (cf. the edition of the text by Gabriel Martínez i Ferrà in an excellent unpublished master's dissertation, *La traducció catalana del Kitāb al-agdiya, d' Abū Marwān 'Abd al-Malik b. Zuhr o Remembrança de les viandes*, Barcelona, 2011); and *De Regimine Sanitatis* by 'Abohaly Abenzoar', who might be considered to be Abū l-'Alā' Zuhr (Ibn Zuhr's father) if some catalogues had not ascribed the work to Ibn Zuhr (cf. the trans. into Latin published by G. Schenk in Basle, 1618; on this work, cf. moreover C. Álvarez Millán, 'Las traducciones latinas atribuidas a Abū l-'Alā' Zuhr', *Anaquel de Estudios Árabes*, 5 (1994), 5, 11-17, 11-15). Of course, other unexplored texts of this kind may also have dealt with the issue, and may have helped its transmission to European medicine.

which he omits – in spite of the fact that he follows Ibn Sīnā's *Qānūn/Canon* when he explains omphalotomy in the preceding lines. In the English translation by Thomas Reynalde, written in 1540, the paragraph in which the author refers to Ibn Zuhr's procedure reads as follows:⁷⁷

Now return to our purpose: when that the navel is cut off and the rest knit up, anoint all the child's body with the oil of acorns; for that is singularly good to confirm, steadfast, and to defend the body from noisome things which may chance from without, as smoke, cold, and such other things; which, if the infant be grieved withal straight after the birth, being yet very tender, it should hurt it greatly. After this anointment, wash the infant with warm water.

Besides the fact that no salting at all is mentioned, two other aspects should be noted. First, the author, probably following common sense and Ibn Sīnā's brine bath procedure, recommends lukewarm washing to eliminate the oil; second, there is again no indication of source.⁷⁸

Anointment with acorn oil is a regular feature of treatises on obstetrics written in Renaissance Spain. The second treatise in this genre written in a vernacular language in Europe, the *Libro del arte de las comadres*, by Damià Carbó (d. 1554) and printed in the City of Majorca in 1541, says, in a wide-ranging chapter about neonatal care which echoes authors like Aristotle, Soranus (via Muscio), Galen and Ibn Sīnā:⁷⁹

It is true that Averroës of Cordova says no [to this],⁸⁰ and that it should be applied soft things which do not irritate like acorn oil. Some do not appreciate [this opinion] because they do not deem it necessary.

Carbó is aware that the usefulness of Ibn Zuhr's treatment is disputed and he does not take a decisive position on the problem. Although Carbó seems to rank among those who are unconvinced by Ibn Zuhr's procedure, his

⁷⁷ Thomas Reynalde, *The Birth of Mankind*, ed. E. Hobby (Farnham-Burlington: Ashgate, 2010), 154; cf. the Latin translation of Rösslin's treatise, *De Partu Hominis* (Venice: I. B. Pederzani, 1537), 48v.

⁷⁸ Possibly, the origin of this quotation may be either Ibn Rushd's *Kulliyāt/Colliget*, a translation of Ibn Zuhr's *K. al-Aghdhiya* or a Latin source such as Maino's *Regimen sanitatis*. On the sources of the *Rosegarten*, cf. Monica H. Green, 'The Sources of Eucharius Rösslin's 'Rosegarten for Pregnant Women and Midwives' (1513)', *Medical History*, 53 (2009), 167-192.

⁷⁹ Damià Carbó, *Libro del arte de las comadres* (City of Majorca: Hernando Consoles, 1541), 52v.

⁸⁰ A reference to several procedures described previously, which include the application of salt according to Galen and Ibn Sīnā, together with the submersion in cold water, practised by Germans and Gypsies.

excerpt bears witness to the fact that the anointment with acorn oil had found a place in medical guidelines for neonatal care, despite all the caveats. According to Carbó, the success of the therapy is directly related to the wide readership that Ibn Rushd's *Kulliyāt/Colliget* reached during the Late Middle Ages. Shortly after Damià Carbó's work was written, Luis de Lobera said in his *Libro del regimiento de la salud y de la esterilidad de los hombres y mugeres y de las enfermedades de los niños*, printed in Valladolid in 1551:⁸¹

Avicenna says that one should be diligent in washing off the infant with a brine prepared with a small amount of salt, so as his skin hardens and thus he might be not as affected by heat, cold and the swaddle clothes which wrap it as it could be affected if it was not hardened, and this because of his having been born so tender and delicate. For this reason, the infant feels anything as rough, hard and cold: it is true that nowadays it is no longer used to wash off the infant with brine, yet it will be really useful to anoint the infant body with acorn oil or myrtle oil and then to wash it off with lukewarm water.

Once again without mentioning any author, Lobera prefers Ibn Zuhr's procedure (with the addition of myrtle oil which can be traced back to the Greek sources) to the application of salt as advocated Ibn Sīnā, which, he said, was no longer in use. There is no explanation of why Ibn Zuhr's procedure is better (although the underlying rationale seems to be that it 'hardens without irritating'), nor any reference to actual experience with acorn oil. In much the same way as Eucharius Rösslin, whose *Rosegarten* Lobera may have known,⁸² the latter says that a lukewarm bath should follow the anointment. Still another Hispanic treatise on obstetrics, *Libro intitulado del parto humano*, written by Francisco Núñez de Coria and printed in Alcalá de Henares in 1580, echoes Ibn Zuhr's procedure. Although borrowing heavily from Ibn Sīnā in the section about neonatal care, the author omits any reference to his method of salting, mentioning instead the anointment with acorn oil followed by a lukewarm bath as the only way to harden the newborn's skin.⁸³ Núñez de Coria seemingly reflects the opinion of Eucharius's *Rosegarten*, which is one of the main sources of

⁸¹ Luis de Lobera, *Libro del regimiento de la salud* (Valladolid: Sebastián Martínez, 1551), 75r.

⁸² J.M. López Piñero and F. Bujosa, *Los tratados de enfermedades infantiles en la España del Renacimiento* (Valencia: Cátedra de Historia de la Medicina-Universidad de Valencia, 1982), 57. However, Lobera's excerpt about acorn oil differs from that of Rösslin.

⁸³ Francisco Núñez de Coria, *Libro intitulado del parto humano* (Alcalá de Henares Juan Gracián: 1580), 108v-109v.

the *Libro intitulado del parto humano*.⁸⁴ Probably for this reason, and unfortunately for Ibn Zuhr's or Ibn Rushd's reputation, neither of them were mentioned by Núñez de Coria.

6. Conclusions

The application of salt to the newborn's skin, a feature of several Semitic traditions, was prescribed by Greek medicine and was for centuries an important element in the medical guidelines for neonatal care. Two main procedures for applying salt, one described by Galen and another which dated back to Soranus, were mentioned over and over again, with some variants in the second case. None of the authors who dealt with the question were really concerned about the effects that the application of salt could produce on the newborn's skin, for several reasons. One is that they were encumbered by the weight of scholasticism; another is that they probably cared little about neonatal care; the third is that, generally, midwives, mothers and grandmothers did what they thought was best for their infants, without consulting physicians and following long-standing traditions (like the application of henna) which, on occasions, physicians accepted as suitable treatment. Thus, although scholarly medicine prescribed alternative procedures such as anointing with oil, the application of salt remained unquestioned until the sharp mind of Ibn Zuhr (a mind which was able to unencumber itself from the load of scholasticism) turned its attention to it. Aware of the problems that salt could cause, Ibn Zuhr followed Ibn Sīnā in prescribing anointment with acorn oil. It seems that only analogy and common sense argued in favour of this innovation, which appeared rather out of the blue as a mere footnote in a treatise whose main subject had little to do with the health of either children or women. In more than one sense, anointment with acorn oil is a good example of how innovation worked in the Middle Ages: it was not a by-product of deliberate, empirical research but the fortunate conclusion of a deduction. Another innovation of this kind, far more famous than acorn oil, was Ibn al-Nafīs discovery of pulmonary circulation, which he possibly found not by means of thorough empirical research but through an attentive reconsideration of the manuals which led him to deduce that things could be better explained otherwise.⁸⁵

⁸⁴ López Piñero and Bujosa, op. cit. (n.82), 70.

⁸⁵ As is well known, this is a polemic question, on which see the considerations of Emily Savage Smith ('Attitudes toward Dissection in Medieval Islam', *Journal of the History of Medicine and Allied Sciences*, 50 (1995), 67-110, 99-104), and two contradictory opinions

Thanks to Ibn Zuhr's own authority as a physician, the intrinsic good sense of his proposal, and the echo that it found in Ibn Rushd, anointment with acorn oil became accepted in the Arabic medical manuals, even though other methods were supported by more authoritative authors (namely bathing with perfumed brine prescribed by Ibn Sīnā, who was by far the most prestigious source in Arabo-Islamic medicine and the best known Arabic physician in Europe). Ibn Zuhr's innovation was received critically by Medieval scholars of Christian Europe but was ranked nevertheless among the hodge-podge of procedures for neonatal care that the medical literature had recorded since the time of Soranus. However, some important sixteenth-century physicians (particularly in Spain) who were well acquainted with the bibliography found Ibn Zuhr's procedure interesting and decided that it was preferable to the application of salt. One might think that this revival was due to the intellectual renewal ushered in by the Renaissance, which prompted the reconsideration of what the main authorities (in this case Galen and Ibn Sīnā) had said. This was possibly one of the reasons, but the main cause seems to be the sound common sense that Ibn Zuhr had shown four centuries before.

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mentioned in this article, one by Max Meyerhof ('Ibn An.Nafis (13th cent.) and his Theory of the Lesser Circulation', *Isis*, 23 (1935), 100-120), another by L.G. Wilson ('The Problem of the Discovery of Pulmonary Circulation', *Journal of the History of Medicine and Allied Sciences*, 17 (1962), 229-244).