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Poppies as a sleep aid for infants: The "Hypnos" remedy of Cretan folk medicine

Kleopatra Mathianaki [a,*], Manolis Tzatzarakis [b], Marianna Karamanou [c]

[a] Department of History of Medicine, University of Crete, School of Medicine, Heraklion, Greece
[b] Laboratory of Toxicology, School of Medicine, University of Crete, Heraklion, Crete, GR, 70013, Greece
[c] Department of History of Medicine and Medical Ethics, Medical School, National and Kapodistrian University of Athens, Athens, GR, 11527, Greece

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ABSTRACT

Opium Poppy (*Papaver somniferum* L.) is considered as one of the earliest medicinal plants known to mankind. Derived from the Greek name "opos" meaning juice, referring to its psychotropic latex, the plant was known and extensively used since Antiquity during religious rituals and for Medical purposes, mainly as hypnotic and pain reliever agent. In Cretan folk medicine it was recommended along with other poppies until the early 20th century to induce children sedation, by the name: "*Hypnos*" meaning sleep.

1. Introduction

"Lethaeo perfusa papavera somno" (poppies, steeped with Lethe's sleep)

Agriculture, Vergilius

The *Hypnos* (meaning sleep in Greek) remedy of the Cretan traditional medicine is related to the folk use of the poppy plant to induce sleep in infants and children. The poppy family features 43 genera and 820 species [1], but this name was mainly attributed to the use of Opium poppy or *Papaver somniferum* L. ("opos", juice in Greek, is referring to the plant's psychotropic latex) [2]. The term is attributed to various preparations made from leaves, seeds, flowers or capsules of the plant, or to the plant itself [3,4,6]. At times, the similar use of other poppies, like Papaver rhoeas, was expressed by the same name [5,6]. In this paper we aim to present *Hypnos-Sleep* relative remedies, of Cretan written and oral folk Medicine.

1.1. Cretan folk medicine

In Crete during Ottoman Occupation (1645–1898), there was limited access to officially trained physicians; as a consequence resident's treatment was greatly administered by local or traveller empirical, untrained medical healers [3], called *empeirikoi or praktikoi* [7]. Many of them were using their personal *Iatrosofia* [3], remnants of simplified summaries of medical text books, originated at Byzantine period. Heavily disseminated by their numerous copyists, those manuscripts passed down from generation to generation and often ended up containing magical, religious [7], astrological, cooking, farmyard and veterinary advices [8]. Some of the surviving texts, have already been published [9,10], while others are kept in private, public or monastic libraries through the island. Additionally, oral traditional healing advices, *Giatrosofia*, were recorded through the patient research of various folklorists, mainly during the 20th century [4,6]. Many contemporary scholars of the subject argue that they both represent relics of ancient Hellenic therapeutic practices [11,12].

2. Opium poppy and opium as soporific agent

The annual plant of *Papaver somniferum* L. grows throughout the entire Mediterranean region. It's around two feet in height, bears a flower of four petals and a fruit pod (capsule, bulb or poppy head). The petals may have white, pink, purple, red, or variegated colour. The extraction of opium from the capsule is carried via tapping it vertically while it remains on the plant. The white latex is then secreted and coagulates on the surface of the capsule [13]. Another way of procession according to the distinguished Greek physician and pharmacologist

* Corresponding author at: Zorzi 17, Heraklion, Crete, TK 71409, Greece.
E-mail address: medp2011955@med.uoc.gr (K. Mathianaki).

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Dioscorides (40–90 AD), required the beating of the capsules together with the leaves, squeezing, pounding in a mortar and then fashioning lozenges; that product named *Meconium,* was a weaker form of poppies extract [14] (Fig. 1).

It's hypothesized that the cultivation of the plant originated in the Mediterranean basin, from the middle of the 6th millennium BC, however spread over time in Asia, North Africa and Western Europe [15]. In Crete, the method of extracting opium was known by 1250–1450 BC. In the Archaeological museum of Heraklion, is kept the "Goddess of poppies" a bare breasted, raised handed Minoan terracotta figurine of 1300 BC, found in a sanctuary of the village Gazi. It is so named due to three movable hairpins of its head, shaped as poppy capsules, called *Mekones* [16]. The statue appears to have the eyes closed as though asleep, an indication of the plant's sedative powers [14] (Fig.2). Remnants of coals and a tubular vase found at the same site implied the ritual inhalation of opium vapors [16].

Several clay vessels in the shape of the pods, as well as a jar decorated with poppy heads and sacred horns, have been also found in the island, supporting the profane nature of the plant use, during the Bronze Age [16] (Fig. 3).

The soporific properties of Opium poppy and its constituents was mentioned by the philosophers Aristotle (384−322 BC) and Pliny the Elder (23–79 AD) [14], the Roman encyclopaedist Celsus (25 BC –50 AD) and the physicians: Hippocrates (460–377 BC), Heraclides of Tarentum (3rd century BC) [17] and Dioscorides (10-90 AD) [14]. Its indication as a treatment for children insomnia was referred to the Egyptian papyrus Ebers (16th century BCE) [2] and mentioned by the physicians Galen (129–200 AD) [14], Rhazes (10th century AD) and Avicenna (11th century AD) [2]. Opium preparations were administered orally (Diosc.4.64.2), applied on the skin or onto the eye (Celsus 6.6.1. H), as a suppository (Diosc. 4.64.4) or by inhalation (Diosc. 4.64.5) [14]. The sedative properties of the unlanced poppy capsules were also

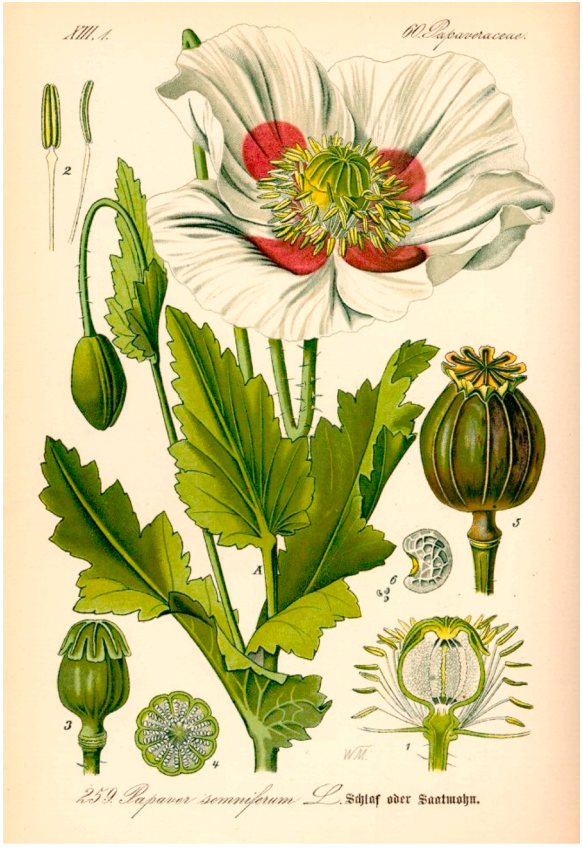

Fig. 1. Papaver Somniferum L. (Otto W. Thome, Flora von Deutschland, 1885).

Fig. 2. The Goddess of Poppies. (By courtesy of the Archaeological Museum of Heraklion).

mentioned in Ayuvedic, Hindu, Tibbi and Mohammedan Medicine as well [18].

Opium was often offered to children in mixtures like: *Theriac, Mithridatum, Requies Nicolai, Diascordium or Laudanum* [2]. The first two were composed by 50–65 ingredients and were initially used as antidotes against venoms of vipers or scorpions and of drug poisoning respectively, but later as panacea for a range of illnesses [19]. *Requies Nicolai* also called *Electuarium pro infantibus*, consisted by opium, nutmeg, and mandrakes; *Diascordium* by 14 herbs plus poppy syrup, rose honey, cinnamon and water germander (Teucrium scordium); *Laudanum* by opium dissolved in alcohol, saffron, cinnamon, or nutmeg [2]. In the Hellenic folk Medicine, similar preparations for children's sedation were used widely and called: *Sorbet* in Thrace, *Gioumesi* in Attica region and *Afioni,* in Asia Minor [11]. Paediatric instructions for sleepless infants were conserved through medical textbooks until the 18th century, but poppy syrup was in use in the self -medicated Europe well into the 20th century [2].

3. Cretan "Iatrosofia Manuscripts" and "oral Giatrosofia"

Fifteen collections of remedies in *Iatrosofia* manuscripts have been found so far in Crete dated back to 15th up to the early 20th century. One of them has no recorded recipes but it's rather a list of plants [22]. Only six of them are published, three as books [5,9,10] and four as single

Fig. 3. Clay vessel in the shape of Opium poppy, with the sacred snake. (Photo from the book *Kypriaca in Crete*, by courtesy of Dr Athanasia Kanta).

articles or sequels of Greek Journals [20–23]. The Manuscript (1) of the Library of University of Crete by Dr Georgios Nikoletakis (1807), the Manuscript of Pavlos Vlastos kept in the Historical Archive of Crete in Chania (1865), 4 recipes by Dr Svenios Gersar in the Archive of Elders, (1875) of Vikelaia Library of Heraklion, the Manuscript of the Monastery of Diskouriou in Mylopotamos, the Manuscript of Monk Ierotheos Kalogridis (Codex 2, 1878) of Chrisopigi Monastery in Chania, the Manuscript of the nurse G. Tzompanakis written in 1903 (with a supplement of remedies from 17th century) kept in the Monastery of Toplou in Sitia, the Manuscript of Panagiotakis (possibly of 15th century), kept in the private library of K. Panagiotakis in Rethymno and the collection of remedies of G. Pyrgiannakis from Kroussonas (early 20th century) kept in the private library of H. Pyrgiannakis in Heraklion, were the unpublished data we extensively studied. One of the books we decided to include in our *Iatrosofia* list, is *Geoponikon* written by "Agapios Landos, the Cretan (1620)", since his work may reflect some of the folk healing practices of his island of origin (Fig.4).

In our research we included also nine articles or books that mention oral transmitted traditional remedies, called by the Cretans *Giatrosofia*, published by local or traveller laographers [4,6,24–30]. Sometimes the distinction between written and oral transmitted traditional remedies is difficult, like in the case of Pavlos Vlastos Manuscript, which although detailed, and named by him as *Iatrosofion*, is a record of the knowledge he gathered while talking to the inhabitants of mountainous Crete.

4. Hypnos and opium in Cretan folk medicine

The French naturalist Charles Nicolas Sigisbert Sonnini de Manoncourt (1751–1812), who travelled in Aegean islands and Crete during 1777, in the book: *Voyage en Grèce et en Turquie: fait par ordre de Louis XVI et avec l'autorisation de la Cour Ottomane*, records the custom of the inhabitants to use the (opium containing) *Venice Theriac* mixture, as panacea for every illness of a child: "in every pain, when they cry, when they don't sleep well, in every malaise, people resort to *Theriac*. For a kid, not a day passes without drinking *Theriac* or without having a patch of *Theriac* placed on the navel" [27,28].

In his travelogue in Crete during 1817, the botanist Franz Wilhelm Sieber (1789–1844), in his book: *Travels in the island of Crete in the year 1817*, reports to opium use for sleepless children: "to prepare the *Hypnos*, they used to boil a piece of capsule and some seeds of the plant with sugar and from the resulting decoction, they would give 1 or 2 tea spoons to the infant. Many women also, used to smear their nipples with opium tincture (a solution containing about 10 % opium) so that the infant, while breastfeeding, would take the relevant dose of the alkaloid and would calm down or sleep according to the dose" [3].

Fig. 4. Diagram of the Zodiac in the Iatrosofion Manuscript of the Diskouriou's Monastery. (By courtesy of Diskouriou's Monastery library).

The Cretan folklorist Evangelia Fragaki in her book: *The folk medicine of Crete* (1978), records a recipe for restless children: "When the infant is restless and cannot sleep, they chop dried capsules of *Hypnos* (capsules of Paraver somniferum L.), ground nutmeg, add sugar, mix in a small cup of milk and they periodically offer the infant half of a teaspoon of the mixture. Or they boil *Hypnos* flowers, leaves and capsule, make syrup and offer a little bit to the children, because larger quantities make them dumb. Half an hour after the sleep induction, they make them drink a tea spoon of sweet almond oil" [4].

The physician and laographer Ioannis E. Havakis in his book: *Plants and Herbs of Crete* (1978), reports the use of flowers from all poppy species but predominately of Opium poppy to induce sleep, in children with insomnia and irritability. Sometimes people would use only leaves from the particular plant. The practice he says was alive, until the late 19th century [6].

Without focusing specifically to children Ioannis Volanakis, another Cretan laographer, in his article: *Prevention and treatment of diseases with herbs in Apodoulou Amari*, (2000), records the popular use of *Papaver somniferum* L. to induce sleep, in the region of Apodoulou (Rethymno county), during the early 20th century [29], while for the same reason, the physician and folklorist Dimitra Spitha-Pimpli mentions the custom use of koutsounada (Papaver rhoeas, red poppy) in Western Crete in her article: *Folklore of Crete* (2000) [26].

Although not referring specifically to children, the monk Agapios Landos (17th century) in *Geoponikon* Iatrosofion, states: "To make a person to fall asleep take flaxseed, white and red poppy, seeds of Dysciamos (mean. Hyoscyamus niger) and Conion (mean. Conium maculatum). Mix them all, take their oil, and add the same quantity of oil from mekones, meaning oppio Tebaico. After mixing the two oils give one oz, so that whoever takes it sleeps for three hours. Another recipe: Take seeds of Andrakla (mean. Portulaca oleracea), poppy and lettuce, and oil from the powerful Dysciamos, half a litter from each seed. Turn them into powder; put them in a bottle- meaning a glass ampolleta, with the oil. Cover it well and dig into manure and place it there for 9 days. Then put it out and filter them. And from the resulting water, let drink whoever cannot sleep only half an oz, so that he will sleep until he is fed up of sleeping. Another recipe: Make him drink the flowers of red poppy, meaning Koutsounada, to sleep almost as a dead person or beat Hamaikti, meaning Ebulo (mean. Sambucus ebulus L.) and mix the juice with the white of the egg. Smear the patient's face to sleep at once" [5].

5. Comments about opium's toxicity

Papaver somniferum L. possesses hypnotic, analgesic and hallucinogenic properties due to its secondary metabolite content called benzylisoquinoline alkaloids (BIAs), the most important being morphine, codeine, and papaverine. All the parts of the plant contain alkaloids, with the highest amount being found in the capsules [1]. Even its seeds - used as condiments for cooking- contain some quantity, but they don't exceed the recommended reference dose of morphine in food products (10 μg morphine/kg of body weight) [31]. Opium contains more than 42 individual alkaloids and a much higher quantity of Morphine than the pods [1,15,32]. Some of the alkaloids act on human endogenous opioid receptor system, highly distributed in the central nervous system, but also in the gastrointestinal and in the immune system [33]. Morphinan alkaloids, a nature's gift to alleviate suffering, can be fatal if misused, due to their respiratory depressant action, leading to increased intracranial pressure [14,34].

Although Galen warned against the use of the *Theriac* mixture in children due to risk of respiratory failure and death, and the side effect of infant's addiction had already been recognised by the 18th century [27], it was only during the 19th century when physicians became really aware of the disaster of that "common practice". Christian August Struve, physician (1767–1807), referring to infants upbringing in the big cities stated in 1803: "they give infants *Mithridatum* or poppy soup, from which they become dazed or fall into convulsions." Arthur Lutze (1813–1870), a major figure in medicine of Germany, in 1862 added: "It is a crime to administer poppy decocts and such like against crying; they make the infant stupid and dull" [2]. Dr Mark Philip Zalonis, (1760−1826?) in his book *Voyage a Tine* (1809), criticises the practice of giving the child *Theriac of Venice* in the Greek island of Tinos: "As soon as the baby ejaculates a few voices, they claim that he has colic, and in order to relieve him, they offer a large dose of *Theriac of Venice*"; he comments on the soporific and addictive power of the drug, and describes children in the crib, in a state of stroke due to the *Theriac*, with pale faces and bradycardia. Their awakening was not with screams, but with "sardonic laughter" [3,35]. Lethal intoxication of children and severe withdrawal symptoms were repeatedly reported by physicians and published in Medical magazines during mainly the 19th century. In UK in 3 years (1863–1867), 236 infant deaths younger than 1 year were recorded in the Registrar General Reports, as due to narcotics [2]. In Greece, in 1884, Theodoros Afentoulis in his book "*About the nature and strength and use of medicines*", gave the estimated lethal opium dose: 1–3 granules for children and 10–30 granules for adults, depending on previous addiction and of the general health condition of the patient.

Papaver rhoeas (red poppy), the other most common poppy plant used to induce sleep in Cretan folk medicine, contains Rhoeadine alkaloids: Rhoeadine, Rhoeadic acid, Papaveric acid, Rhoeagenine, and Anthocyanins. The plant has been traditionally used for sleep disorders or for sedation, and it doesn't seem to lead to addiction. However cases of involuntary intoxication by the consumption of 250–500 gr of red poppies has been reported, presented with nausea and vomiting, seizures, myosis, arrhythmia, confusion and CNS depression findings [36].

From the rest Cretan poppies [37], P. argemone, apulum and hybridum L. does not seem to contain Morphinans; P. dubium, contains very few amounts of morphine, codeine and thebaine, and P. purpureomarginatum kadereit (or P.syriacum) traces of Thebaine [37–42].

6. Conclusion

We found none of the written Cretan *Iatrosofia* texts to contain a specific *Hypnos* remedy for children, although in the oral tradition *Giatrosofia* of the island, *Hypnos* is present until the 19th to early 20th century. The only one from the *Iatrosofia* manuscripts containing a relative recipe, but not specified for age, was the *Geoponikon* by Agapios Landos, which was written in the 17th century, long before the extensive medical studies, reviled the danger of opium or *Papaver somniferum*'s use in children. It is also notable that in most of the texts, there are very few "exclusively paediatric therapies". We assume that the same recipes, like the *one* of Agapios Landos, were used in adults and children for most illnesses. The absence of *Hypnos* written remedies between 18th and the 20th century on the other hand could be the result of the copyist's conscious elimination action, due to the fear of the already known *Papaver somniferum*'s toxicity. The free sale and use of opium was banned in Crete after 1913, when the administrative and political union with Greece was completed. In 1925 in Geneva a convention on drugs restriction strengthened the controlling measures, while defining drugs worldwide as the object of a state monopoly [43]. Today in Crete, where traditional herb mixtures are still in use for various common health problems, the poppies use for sleep, is kept only as a memory of the elders.

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Kleopatra Mathianaki: Conceptualization, Investigation, Writing - original draft, Visualization, Data curation. **Manolis Tzatzarakis:** Validation, Resources, Supervision. **Marianna Karamanou:** Methodology, Resources, Project administration.

Declaration of Competing Interest

The authors report no declarations of interest.

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