

Plants used during pregnancy, childbirth, postpartum and infant healthcare in Palestine



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ABSTRACT

Keywords:
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Purpose: This study aims to evaluate the prevalence and the factors related to the use of herbs by women during pregnancy, childbirth, postpartum and for infant healthcare. The study also aims to identify the herbs therapeutic uses and preparation. To date, no previous studies have investigated this prevalence in Palestine.

Methods: A cross-sectional survey of women of different child-bearing age group inhabiting different locations in Palestine was carried out by means of a semi-structured questionnaire.

Results: A total of 372 women were interviewed. Of the participants 72.3% reported using herbs at different pregnancy stages and for infant healthcare. The most common herbal products used in this study at different stages of pregnancy were *Pimpinella anisum*, *Salvia fruticosa*, *Matricaria aurea*, and *Mentha spicata*.

Conclusion: This study revealed that there is an appreciable prevalence of herbal use among pregnant women at different pregnancy stages and for infant healthcare in Palestine.

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1. Introduction

The use of complementary and alternative medicines (CAM) has grown considerably worldwide in the last 20 years. Herbal medicines are used in all countries of the world and are included in the top CAM therapies used [1–3].

The use of medicinal plants in women's health related conditions such as female fertility, menorrhoea, birth control, pregnancy, childbirth, postpartum healthcare and lactation, including infant care, have been documented for various ethnic groups [4–10]. However, the toxicity of a large number of these plants has not been investigated [11].

Plants used during pregnancy may be pregnancy related health issues, for example for nausea and vomiting [12–14], candida vaginal infection [12], nutritional [15], and to facilitate labor [14]; or may be used for unrelated pregnancy health issues such respiratory related diseases or for skin problems [15].

Several sources have been reported for the recommendation of medicinal plants use in pregnancy including: healthcare providers, natural or alternative medicine practitioners, pharmacists, based

on information from media sources [13]; suggested by friends or family [13–15]; or based on women's own information and knowledge [13,16].

During pregnancy, childbirth, and postpartum healthcare, traditional medicine depends on the use of certain herbs for their beneficial effects to contract the uterus muscle, facilitate labor, in the removal of retained placenta and management of postpartum haemorrhage [17]. In Palestine specific surveys that investigate the attitude of woman towards the use of herbal medications during pregnancy, childbirth, postpartum and for infant healthcare are still lacking. The only available information on this issue, focused on herbal medicines used during pregnancy in a group of women mainly from a specific geographic area (Nablus city), who attended at an antenatal clinic or gave birth at maternity ward in Rafidia Hospital in Nablus within a short time of delivery [18,19].

2. Aims and objectives

Several ethnobotanical investigations have been conducted in the area to explore its vast ethnomedicinal plant knowledge [20–23]. This study aims to evaluate the prevalence and the factors related to the use of herbs by women during pregnancy, childbirth, postpartum and for infant healthcare. The study also aims to

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identify the herbs therapeutic uses and preparation. To date, no previous studies have investigated this prevalence in Palestine.

3. Methods

The study took the form of a cross-sectional survey of women of different child-bearing age groups inhabiting different locations in Palestine (Hebron, Nablus, Tulkarm, Jenin and Qalqilia). Data were collected by means of a semi-structured questionnaire administered by trained researchers from the Biodiversity and Environmental Research Centre (BERC), using a face-to-face interview of 30 min. Researchers clearly explained to participants that this is a research about their use of herbal medicines during different stages of pregnancy and giving birth and for infants' healthcare. Moreover, they were assured that any information they would reveal will strictly remain confidential and would only be used for research purposes. Prior to proceeding with the study, ethical approval for conducting the study was obtained from the Institutional Review Board (IRB) at Ministry of Health in Nablus and women expressing interest in participating in the study were requested to sign this document. The study took place over a five month period in 2010 (January 2010 until May 2010). The vast majority of the questions had pre-formulated answers.

3.1. Research sample

To evaluate the questionnaire, a pilot study on 30 randomly selected women was performed. In the present study, a total of 372 randomly selected married women participated. The findings from the pilot study have not been included in the analysis of data for the present study.

3.2. Data analysis

Responses were coded and entered into SPSS for Windows, version 16, for statistical analysis.

4. Results

4.1. Participants

A total of 400 women were consecutively contacted, with a response rate of 93%. The mean age of the final sample (372 women) was 39.7 years; most women were pluriparae (88.7%) while 9.1, 1.9 and 0.3% were nulliparae, secundiparae and primiparae, respectively. With regard to their educational level, 33.1% of women had a university degree, while 50.5% had primary or secondary school education (Table 1). The majority of the women (68.5%) were house wives, living in villages (53.5%), 8.9% of them were widows. There were no statistically significant differences between users and non-users of medicinal plants in all socioeconomic and demographic status, and pregnancy stages or infant healthcare.

4.2. Pattern of herbal preparation use among participants

Plant use during pregnancy, childbirth, postpartum healthcare and for infant care is common among Palestinian women; of the 372 participants, 88.4% ($n = 329$) were users for medicinal plants during pregnancy, while 87.1%, 95.4% and 87.6% of the women reported the use of medicinal plants during childbirth, postpartum healthcare, and for infants healthcare, respectively (Fig. 1).

The majority of herbal medicine users ($n = 95.1\%$) obtained their supply from the market, while 24.9% obtained their supply from nature, and preferred to use the herbs in the form of decoction

Table 1
Socioeconomic and demographic data of study population.

	Frequency	Percentage
Age		
20–30	85	22.8
31–40	95	25.5
More than 40	117	31.5
Missing	75	20.2
Marital Status		
Married	316	84.9
Divorced	2	0.5
Widower	33	8.9
Missing	21	5.6
Residence		
City	142	38.2
Village	199	53.5
Camp	16	4.3
Missing	15	4.0
Educational Level		
Illiterate	43	11.6
Primary	99	26.6
Secondary	89	23.9
University	123	33.1
Missing	18	4.8
Work		
Yes	117	31.5
No	255	68.5

(40.3%), and raw (25%). Among the plant parts used, seeds preparations has been found to be the most popular (24.6%), followed by fruits (21.1%), leaves (19.3%) and areal parts (15.8%) (Fig. 2). In case of mode of administration oral (42 Cases) exceeds the topical (16 cases).

4.3. Herbs used by women at different stages of pregnancy and for infant healthcare

In this study, 96 plant taxa, belonging to 41 botanical families are used by women at different stages of pregnancy and for infant healthcare, with Lamiaceae (13 species), Asteraceae (8 species) and Rosaceae (8 species) being the most quoted families. Of these plants, 52 species belonging to 30 families were mentioned by ≥ 3 informants (Table 2), 44 species were mentioned by ≤ 2 of the women in this study and therefore were excluded from further discussions. Table 2 presents the most frequent plants used, part used, stage of use, mode of preparation and medical use.

The reported uses of the herbs are classified into the following application categories: oral use, as decoction, infusion or cold extract; steam bath and body wash; external use applied as poultice; and eaten, either boiled or roasted.

Fifty two plant species were used by women for postpartum healthcare, while 36, 27, and 34 plant species were used during pregnancy, childbirth and infant care, respectively. Fifteen plants were common among the 4 categories, whereas 30, 28, 25, 25, 19, and 17 species were common in pregnancy and postpartum healthcare, postpartum and infant healthcare, pregnancy and infant healthcare, during birth and postpartum healthcare, pregnancy and during birth, and during birth and infant healthcare, respectively. The following plants were common to all four stages: *Pimpinella anisum* (anise), *Salvia fruticosa* (sage), *Matricaria aurea* (golden cotula), and *Mentha spicata* (peppermint) which were utilized by 54% or more of the study population. Herbal mixture was used by 3.8% of the population study.

Plants mentioned in this study were reported to treat several ailments some of which are pregnancy related, for example urinary tract infection, prepare to labor, lactagogue, facilitate delivery; or may be used to treat unrelated pregnancy health issues such as cold and respiratory illnesses and chest pain (Fig. 3).

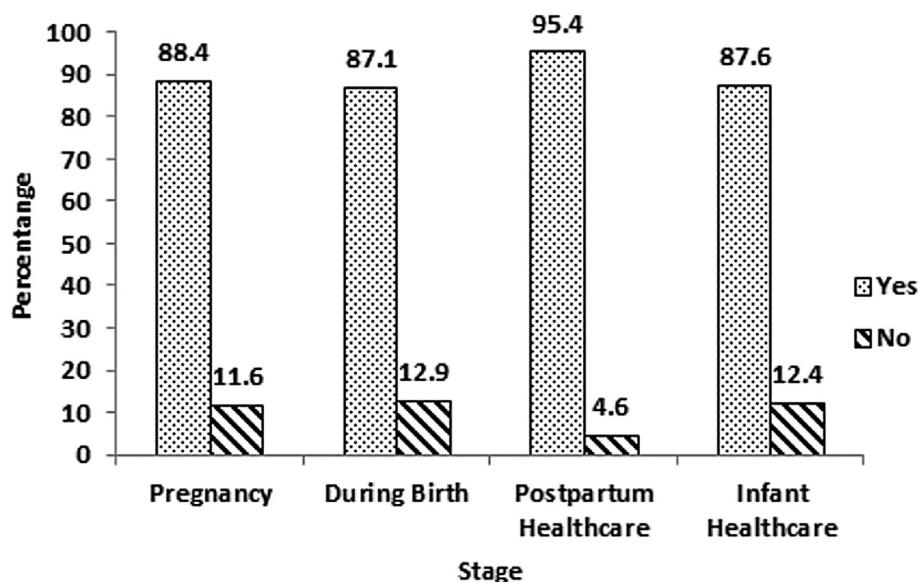


Fig. 1. Plant use during pregnancy, childbirth, postpartum healthcare and for infant care among Palestinian women.

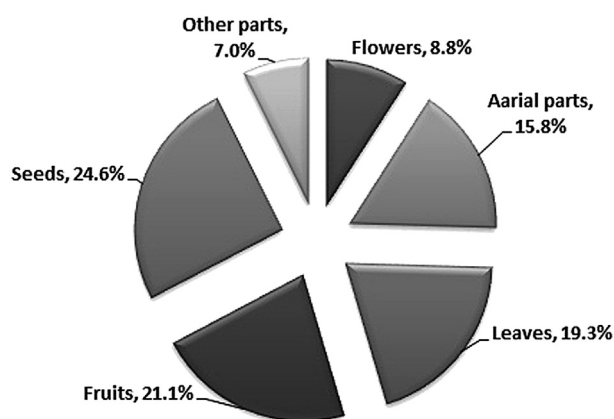


Fig. 2. Plant parts used.

The top 5 plants used during pregnancy are: *S. fruticosa* (sage), *Matricaria aurea* (golden cotula), *Pimpinella anisum* (anise), *Mentha spicata* (peppermint), and *Cuminum cyminum* (cumin) (Table 3). The most common reasons for using these herbs were abdominal pain, constipation, cold and flu, and flatulence (Fig. 3). Almost all plants were taken orally except 5 plants were used as vaginal bath.

During childbirth stage, the top 5 plants used are: *Cinnamomum verum* (cinnamon tree), *Carum carvi* (caraway), *Pimpinella anisum* (anise), *Cuminum cyminum* (cumin), and *Nigella ciliaris* (black cumin) (Table 3). These plants were mainly used for abdominal pain and to facilitate delivery.

The postpartum healthcare could be subdivided into postpartum haemorrhage, lactagogue and normal postpartum recovery. Thirteen plants were reported to be used for lactagogue, while 10 plants were reported to be used for postpartum recovery (Fig. 3). The top 5 plants used among this category are *Cinnamomum verum* (cinnamon tree), *Carum carvi* (caraway), *Nigella ciliaris* (black cumin), *Pimpinella anisum* (anise), and *Trigonella berythea* (fenugreek) (Table 3).

The top 5 plants used for infant healthcare are: *Pimpinella anisum* (anise), *S. fruticosa* (sage), *Matricaria aurea* (golden cotula), *Mentha spicata* (peppermint), and *Cuminum cyminum* (cumin)

(Table 3); these plants are mainly used for flatulence, relaxant, abdominal pain, and cold.

5. Discussion

Herbal Medicine is widely used among women throughout the world for all aspects of reproductive health issues (menstruation, conception, pregnancy, lactation and menopause) [14,33–35]. The main focus of this study was to document, identify and quantify medicinal plants uses among Palestinian women at different stages of pregnancy and for infant healthcare. Herbal medicine seems to be common among the study population; 87.1–95.4 % of the women interviewed reported the use of medicinal plants at one or more pregnancy stages and for infant healthcare (Fig. 1). In fact, 72.3% of the women reported the use of medicinal plants at all stages of pregnancy and for infant healthcare, while only 0.8% did not report the use of medicinal plants at any stage (Fig. 4).

The overall herbal medicines use among pregnant women and infant healthcare in this study was high (99.2%) and ranged from 87.1% during giving birth stage, to 87.6% in infant care, 88.4% in pregnancy, and 95.4% for postpartum healthcare (Fig. 1). This rate is higher than previously reported. The previously reported rate of herbal use among women in the pregnancy stage was much lower and ranged from 40% [18] to 45.8% [19]. This variability may reflect differences in data collection or differences in time trends. The broad availability of the study questionnaire in our work might, in fact have promoted a more representative study population rather than reflecting just an antenatal clinic or maternity ward, or specific geographic area as in the above –mentioned studies.

In fact, the rate of herb use is higher than the rate which was recently reported from 23 countries in Europe, North and South America and Australia where the use of herbal medicines ranged from 4.3% in Sweden to 69% in Russia [33].

Normal physiological changes that occur in pregnant women lead them to self-treatment. During pregnancy women tend to avoid prescription medication, mainly because they are concerned about the safety of the fetus [36]. They prefer to use medicinal herbs because they consider them safer during pregnancy than prescription medication, thus will not cause any harm to the fetus [37]. However, medicinal plants when used during pregnancy have

Table 2

List of medicinal plants with the reported methods of preparation and therapeutic uses.

Scientific name	English common name	Local name	Stage of use	Part used	Preparation	Route of administration	Medical uses	No. of informants
Amaranthaceae <i>Spinacia oleraceae</i> L.	Spinach	Sapanikh	P, PH	Areal parts	Cooked as vegetables	Oral	Anaemia	8
Anacardiaceae <i>Pistacia lentiscus</i> L.	Mastic tree, Lentisk	Sarrees	PH, DB	Plant gum leaves	Chewing and swallowing 1–2 pieces of plant gum; or prepare decoction of the plant leaves, 1 cup is taken when needed.	Oral	Activate fetus movement in the womb; abdominal pain; relaxant.	3
Apiaceae <i>Pimpinella anisum</i> L.	Anise	Yansoon	IC, PH, DB, P	Seeds	Seeds are boiled in water, take 1–2 cups/day during pregnancy and after giving birth. 1 teaspoon of the decoction can be given to infant	Oral; vaginal bath	Abdominal pain; constipation; flatulence; relaxant; cold; lactagogue; menstrual pain; infant care	200
<i>Carum carvi</i> L.	Caraway	Karawieh	IC,DB,PH	Seeds	A standard decoction is prepared from the grinded seeds; or the seeds can be cooked with wheat, and sugar can be added as required. A decoction is prepared by boiling 1 teaspoon of the grinded seeds in two cups of water, take 3 cups/day after delivery, or 3–7 cups/day until recovery from cold; cook with grinded rice and sugar, take 1–2 plates/day during lactation.	Oral	Lactagogue, uterus postpartum recovery flatulence abdominal pain, relaxant, cold, facilitate delivery	134
<i>Cuminum cyminum</i> L.	Cumin	Camoun	PH, DP, P, IC	Seeds	A decoction is prepared from the grinded leaves, sugar can be added, 1 cup can be taken at the begging of uterus contraction for delivery. The grinded seeds can be taken orally after lactation, 1 teaspoon after each infant feed.	Oral	Abdominal pain; flatulence; lactagogue	60
<i>Daucus carota</i> L.	Carrot	Jazar	P, PH	Roots	Eaten raw or cooked	Oral	Nourishment	3
<i>Foeniculum vulgare</i> Miller	Fennel	Shomar	IC, PH, P	Leaves, Seeds	A decoction is prepared from the leaves, take 1 cup/day when needed; for lactagogue take 3 cups/day; alternatively a decoction is prepared from the grinded seeds, take 2 cups/day when needed.	Oral	Abdominal pain; constipation; flatulence; lactagogue; cough; respiratory system; infant care	24
<i>Petroselinum crispum</i> (Mill.) Fuss	Parsley	Baqdonis	P, PH	Areal parts	A standard decoction is prepared from the plant, 1–3 cups are taken orally a day until improvement occurs. The plant is added to boiled water, left for 50 min, filtered, and the filtrate is used as vaginal bath 2–7 days after giving birth.	Oral; vaginal bath	Abdominal pain; relaxant; urinary tract infections; stimulate the descent of the menstrual cycle.	24
Arecaceae <i>Phoenix dactylifera</i> L.	Date palm	Nakheel Mothmer	IC,P,DB	Fruits	Fresh, 7–10 fruits are eaten daily at the beginning of the nine month pregnancy.	Oral	Increase uterus contraction during delivery; facilitate delivery; energy; anaemia	25
Asteraceae <i>Artemisia inculata</i> Delile (= <i>A. herba-alba</i> Asso)	White Wormwood	Sheeh	IC, PH	Whole plant	A standard decoction is prepared from the plant, take 1–2 cups/day,	Inhalation; oral	Abdominal pain; chest pain	5
<i>Gundelia tournefortii</i> L.	Gundelia	Akoob	P, IC	Areal parts	Eaten cooked.	Oral	Anaemia	21
<i>Lactuca sativa</i> L.	Lettuce	Khus	IC, P	Areal parts	Eaten fresh with salad.	Oral	Constipation	3
<i>Matricaria aurea</i> (Loefl.) Sch. Bip.	Golden cotula	Babouneg	IC, DB, P	Areal parts	A decoction is prepared from 1 teaspoon of the plant in a cup of water, take 2 cups when needed for adults, ½ cup/day for children; prepare a decoction from the plant with sage, anise and mint, take 1–2 cups/day for flue and cold.	Oral, vaginal bath, inhalation, skin wash	Abdominal pain, facilitate delivery, flatulence, relaxant, cold and flu, inflammation, and cough	121
<i>Mentha spicata</i> L.	Peppermint	Na'na'	IC, PH, DB, P	Areal parts	A standard decoction is prepared from the plant, take 1 cup/day when needed.	Oral, poultice	Abdominal pain; flatulence; relaxation	76

(continued on next page)

Table 2 (continued)

Scientific name	English common name	Local name	Stage of use	Part used	Preparation	Route of administration	Medical uses	No. of informants
Cucurbitaceae								
<i>Cucumis sativus</i> L.	Cucumber	Khia	IC, P	Fruits	Eaten fresh with salad.	Oral	Constipation	4
<i>Cucurbita pepo</i> L. <i>convar. giromontina</i> (L.) Greb. <i>Var. styriaca</i> Greb	Marrow	Kousa	IC	Fruits	Eaten cooked.	Oral	Infant care	6
Cupressaceae								
<i>Thuja occidentalis</i> L.	Tree of Life	Afs	PH	Leaves	A standard decoction is prepared from the leaves, use 2–3 times/day in the bath after 2–15 days of delivery.	Vaginal bath	Postpartum recovery	3
Euphorbiaceae								
<i>Ricinus communis</i> L.	Castor beans	Kharwa'	IC, DB	Seeds	Oil is applied externally.	Ointment	Chest pain for infants	4
Fabaceae								
<i>Lens culinaris</i> Medikus	Lentil	Adas	IC, PH	Seeds	Cooked as soup, take 1 plate daily	Oral	Lactagogue; anemia	10
<i>Trigonella berythea</i> Boiss. & Blanche	Fenugreek	Hilbeh	IC, DB, P	Seeds	The seeds are soaked in water for 4 h, then a decoction is prepared, take 1 cup/day for 4–7 days after delivery; or can be used as a bath in the last month of pregnancy before delivery.	Oral; vaginal bath	Lactagogue; urinary tract infections; facilitate delivery; menstrual pain; postpartum recovery; cold and flu; anaemia	64
Iridaceae								
<i>Crocus sativus</i> L.	Saffron	Za'faran	DB	Flowers	An infusion is prepared from the flowers; a cup is taken during delivery.	Oral	Facilitate delivery	7
Juglandaceae								
<i>Juglans regia</i> L.	Walnut	Jouz	IC, PH	Fruits	Fruits are eaten fresh; or fruits are grinded and then applied on the breast.	Oral, ointment	Lactagogue; children intelligence; breast cracking	3
Lamiaceae								
<i>Origanum syriacum</i> L.	Wild thyme	Za'tar Barri	IC, DB	Areal parts	An infusion is prepared from the plant; 2–3 cups are taken daily, honey can be added as required.	Oral	Abdominal pain, cold and flu, cough, chest pain,	46
<i>Micromeria fruticosa</i> (L.) Druce	Thyme	Za'tar balat	IC, DB	Leaves	An infusion is prepared from the plant; 2–3 cups are taken daily 3 days after delivery.	Oral	Lactagogue; abdominal pain; relaxant; respiratory system	5
<i>Origanum majorana</i> L.	Sweet-majoram	Mardaquoush	PH	Leaves	A decoction is prepared from the plant by boiling 1 teaspoon of grinded dry leaves in a cup of water, take a-2 cups/day, during menstrual period	Oral	Treat dysmenorrhea	4
<i>Rosmarinus officinalis</i> L.	Rosemary	Hasalban	IC, DB, P	Leaves, flowers	A decoction of 50 g leaves and flowers is prepared and taken orally, 2 cups/day, sugar can be added as needed. The leaves powder can be used as massage on the abdomen.	Oral; external	Urinary tract infection; facilitate delivery; menstrual pain; relaxant; antidepressant; abdominal pain; weight loss; to treat abdomen cracks after delivery	14
<i>Salvia fruticosa</i> Mill.	Common Sage	Mariamieh	IC, PH, DB, P	Leaves, Flowers	A decoction is prepared from leaves, taken a cup as needed, or applied as a steam bath and washing.	Steam bath; decoction	Postpartum recovery; infant care; abdominal pain	156
<i>Teucrium chamaedrys</i> L.	Germander	Je'deh	IC, DB, P	Areal parts	An infusion is prepared from the leaves, taken a cup 1–3/daily for a week.	Oral	Cold and fever in children, gestational diabetes, abdominal pain	17
Lauraceae								
<i>Cinnamomum verum</i> J.Presl	Cinnamom tree	Qerfeh	PH, DB	Bark	The bark is soaked in boiled water overnight, the next day, boil again, take 1–4 cups/day for 1–3 weeks after delivery, or take 2 cups/day from the start of the ninth month of pregnancy, and 1 month after delivery; alternatively fry the grinded bark, mix with honey, take 1 teaspoon daily in the morning.	Oral	Lactagogue; anemia; flatulence; postpartum recovery; facilitate delivery; vomiting; abdominal pain	134
<i>Persea americana</i> Mill.	Avocado	Avocado	IC	Fruits	The fruits are eaten fresh	Oral	Anaemia	3
Liliaceae								
<i>Allium cepa</i> L.	Onions	Basal	IC	Leaves, bulb	The plant is eaten fresh or cooked as vegetables, take 1–3 times with food.	Oral	Anti-microbial	7
<i>Allium sativum</i> L.	Garlic	Thoum	DP	Bulb	A teaspoon of garlic juice is added to 4 table spoons of yogurt. Used in vaginal massage twice a day and continue in use until the inflammation disappears.	Vaginal massage	Inflammation	6

Table 2 (continued)

Scientific name	English common name	Local name	Stage of use	Part used	Preparation	Route of administration	Medical uses	No. of informants
Linaceae <i>Linum pubescens</i> Banks & Sol.	Pink flax	Kittan	DB	Seeds	Two teaspoon of the hot oil is taken when uterus contraction starts.	Oral	Facilitate delivery	3
Malvaceae <i>Hibiscus sabdariffa</i> L.	Roselle	Karkadeh	PH, DB	Leaves	A decoction is prepared from the plant, Take 1 cup daily, sugar can be added as needed	Oral	Uterus postpartum Recovery, facilitate delivery	4
<i>Malva sylvestris</i> L.	Common mallow	Khubbaizeh	IC, DB, P	Areal parts	Boiling the plants in water, then filtered and used in the bath three days after delivery. The plant is cooked and eaten.	Vaginal bath; oral	Uterus postpartum recovery, anaemia	11
Musaceae <i>Musa paradisiaca</i> L.	Banana	Mose	P	Fruits	Eaten fresh.	Oral	Nourishment	4
Myrtaceae <i>Syzygium aromaticum</i> (L.) Merrill & Perry	Clove	Kabsh Qoronfol	PH, DB,	Fruits	A decoction is prepared from the grinded plant; 1 teaspoon is taken when needed.	Oral	Uterus postpartum recovery; flatulence	4
Oleaceae <i>Olea europaea</i> L.	Olives	Zaitoun	IC	Oil	Oil is applied on the skin of the infant daily to strengthen bones.	Ointment	Flatulence; strengthen bone	12
Pedaliaceae <i>Sesamum indicum</i> L.	Sesame	Semsem	IC, PH	Seeds	A small teaspoon of plant oil is cocked as sweets with caraway; sugar can be added, take a cup 3 times daily.	Oral	Lactagogue; flatulence	8
Poaceae <i>Triticum aestivum</i> L.	Wheat	Qamh	PH	Seeds	The seeds are soaked in water for ½ hour, then boiled for 1 h, sugar then can be added; take a plate 3 times/day	Oral	Anaemia	3
Polygonaceae <i>Rumex patientia</i> L.	Patience dock	Seliq	DB	Leaves	The boiled leaves are prepared as compressors and applied on the abdomen of the child.	Compressors	Fever; constipation	3
Punicaceae <i>Punica granatum</i> L.	Pomegrante	Rouman	IC, PH	Fruits	A juice is prepared from the plant; 1 teaspoon is taken daily 1 month after delivery.	Oral	Anaemia, Children intelligence; inflammation	7
Ranunculaceae <i>Nigella ciliaris</i> DC.	Black cummin	Habit Al-Barakeh	DB, P, PH	Seeds	Mixing two teaspoon full of the grinded seeds with honey and eaten. Mixing an equal amount of plant seeds with sesame, boil in water for 15 min, and taken orally, 2–3 times daily after delivery. Boiling 1 teaspoon of grinded seeds with sesame seeds in a cup of water and taken orally.	Oral	Uterus postpartum recovery; abdominal pain; Lactagogue, anemia, diuretic; pain of bone	91
Rosaceae <i>Amygdalus communis</i> L.	Almond	Loze Hilo	PH, IC	Fruits, seeds	Fruits and seeds are eaten fresh, 2–3 times daily; 1–3 months after delivery, or an infusion is prepared from the grinded seeds, sugar can be added, take 1 teaspoon for infant when needed.	Oral	Lactagogue, relaxant	5
<i>Prunus mahaleb</i> L. (<i>Cerasus mahaleb</i>)	Mahaleb cherry	Mahleb	IC, PH	Seeds	An infusion is prepared by adding 1 teaspoon of the seeds to 3 cups of boiling water; take 1 cup for the mother and 3–4 teaspoon for the infant.	Oral	Infant care; abdominal pain; flatulence; postpartum recovery	10
<i>Malus domestica</i> Borkh	Apple	Tffah	IC	Fruits	The fruits can be eaten fresh or prepared as juice.	Oral	Facilitate delivery; increase fetus movment in the womb.	6
Rutaceae <i>Citrus limon</i> (L.) Osbeck	Lime, Limon tree	Leimon	PH, DB	Flowers, fruits	A juice can be prepared from the fruits; take a cup 3 times daily; hydrodistillation of flowers; take 1 small teaspoon when needed.	Oral	Cold; abdominal pain; lactagogue	9

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Table 2 (continued)

Scientific name	English common name	Local name	Stage of use	Part used	Preparation	Route of administration	Medical uses	No. of informants
Solanaceae <i>Solanum lycopersicum</i> L.	Tomato	Bandoureh	P, IC	Fruits	Eaten raw or cooked.	Oral	Anaemia	4
Theaceae <i>Camellia sinensis</i> (L.) Kuntze	Tea	Shai Akhdar	DB, P	Leaves	A standard decoction is prepared from the leaves; 3–4 cups are taken daily.	Oral	Weight loss	14
Xanthorrhoeaceae <i>Aloe vera</i> (L.) Burm.f.		Saber	IC, PH	Cladodes	Juice from macerated cladodes is applied externally.	Ointment	Breast cracking; weaning breastfeeding; skin burns	4
Zingiberaceae <i>Elettaria cardamomum</i> (L.) Maton	Green cardamom	Hall	IC, PH	Seeds	A decoction is prepared from the grinded seeds; take 1 teaspoon 1–2 times/day, 1–6 months after delivery.	Oral	Infant care; flatulence	4
<i>Zingiber officinale</i> Rose.	Ginger	Zanjabeel	IC, PH	Roots	A decoction is prepared from 1 to 2 teaspoon of grinded roots in a cup of water; take 1 cup in the morning when needed.	Oral	Abdominal pain; relaxant; vomiting,	13

P, pregnancy, DB, during birth; PH, postpartum healthcare; IC, infant and children <2 years.

constituents that can cross the placenta, reach the fetus, and promote serious problems such as teratogenicity, embryo toxicity and even abortion (Table 3) [38]. *S. fruticosa*, and *Matricaria aurea*, were the most widely used plants among pregnant women in this study.

S. fruticosa (sage) is a perennial herb or sub-shrub belonging to Lamiaceae family. The leaves are traditionally used as antiseptic, antispasmodic, astringent, carminative, cholagogue, expectorant, tonic and vasodilator. They are used orally in the treatment of digestive and respiratory complaints, menstrual problems, infertility, nervous tension and depression. The essential oil obtained from *S. fruticosa* exhibited antimicrobial, antiviral, and cytotoxic activities [39], as well as the anti-oxidant, antifungal, anticancer, anti-acetylcholine esterase (in the treatment of Alzheimer) activities of different extracts obtained from its leaves [40,41]. However, it is advisable to avoid consuming the plant in large quantities during pregnancy; *S. fruticosa* was reported to possess potential reproductive toxicities and can cause miscarriage when taken in large doses [32], also the volatile oil of *Salvia officinalis* was reported to stimulate the muscles of the uterus when consumed in large concentrations [30].

Matricaria aurea (golden cotula) is one of the most widely used and well documented medicinal plants in Palestine. The plant is used as herbal remedy for various ailments, including colds and coughs; chest, stomach, and abdominal pain; and sore throat. It is also used as an antispasmodic and analgesic agent [20,42]. In this study, the plant was reported to be used during pregnancy, childbirth and infant healthcare for abdominal pain, facilitate delivery, flatulence, relaxant, cold and flu, inflammation, and cough.

In vitro analysis of the ethanolic extract of the plant indicates that the extract possesses analgesic properties which are mediated via peripheral and central inhibitory mechanisms [43].

Care should be taken when using *Matricaria aurea* during first months of pregnancy, because cammomile (*Matricaria chamomilla*) was reported to possess a miscarriage or stillbirth effects [44].

The postpartum period is important in many Middle Eastern Asian cultures. It is considered as a period of recovery and a period of confinement of about 40 days. In Palestine, typically during the first month after birth the new mom is under the care of her mother, sister or mother-in-law, who helps her to restore her strength as quickly as possible, by taking care of the older children,

doing the housework and providing her with good nutrition. Nutrition and diet therapy includes preparations of medicinal herbs in the form of decoction and infusion. Medicinal plants given during this period are traditionally known to strengthen the body and to prevent disorders such as postpartum depression, insomnia, and constipation. This diet is also helpful for the growth and development of the new born as bioactive molecules pass from mother to the child through lactation.

Medicinal plants reported to be used in this study during postpartum period were mainly to relieve abdominal pain (19 plants), for uterus postpartum recovery (12 plants) and to stimulate lactagogue (13 plants), of these plants *Cinnamomum verum*, and *Carum carvi* are the most widely used plants during birth and postpartum healthcare stages.

Cinnamomum verum (cinnamon) has been reported in this study to be used to facilitate delivery during giving birth, for postpartum recovery, and to stimulate lactagogue. In Traditional Arabic Palestinian Herbal Medicine (TAPHM) the plant was reported to control postpartum haemorrhage, and it has been used for the treatment of flooding during miscarriage and in menorrhagia, diarrhoea and diabetes [42].

The biological activity of *Cinnamomum verum* has been studied extensively. From the literature available the plant has shown to possess a potential antimicrobial activity against a wide variety of bacteria and fungi, lowering of blood glucose, blood pressure and serum cholesterol [45–47], anti-oxidant and free-radical scavenging properties [48], wound healing properties [49,50] and hepato-protective effects [51]. Not enough is known about the safety of taking larger amounts of cinnamon; it is not therefore recommended to use the plant as a treatment for children or for women who are pregnant or breastfeeding. *Carum carvi* (caraway), belonging to the family Apiaceae, is one of the earliest cultivated herb in Asia, Africa and Europe. The seeds of the plant have remained popular as culinary spices and are used in folkloric medicine since antiquity in diverse geographical areas [52]. In this study the plant seeds were reported to be widely used during giving birth and postpartum stages to facilitate delivery, uterus postpartum recovery, lactagogue, flatulence, and abdominal pain. In Palestine, the plant seeds are prepared either as decoction or cooked with rice flour, sugar and cinnamon and topped with

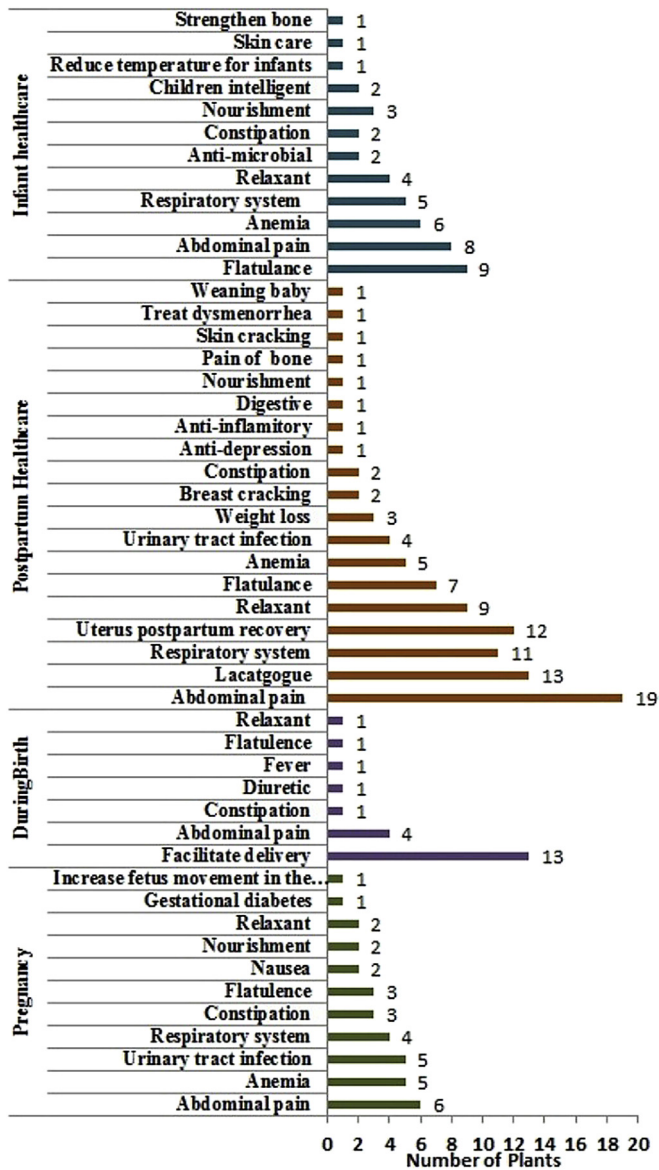


Fig. 3. Number of plants mentioned and reasons for use in each pregnancy stage and infant healthcare.

walnuts, almonds, and coconut. In TAPHM, the plant was reported to be used for the treatment of several ailments including constipation, flatulence, abdominal pain, relaxant, during menstrual period, lactagogue, and for postpartum recovery [42]. In Moroccan traditional medicine, *Carum carvi* seeds are used as diuretics [53]

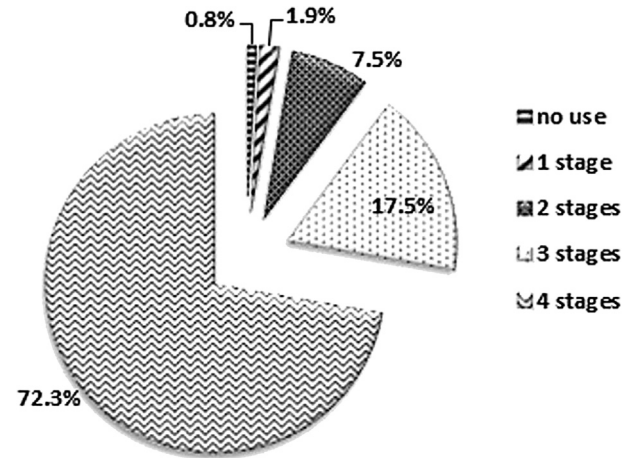


Fig. 4. Percentage of medicinal plants uses among population study with regard to pregnancy stage and child healthcare.

and to treat diabetes and hypertension [54]. The plant is recommended to be avoided during pregnancy because it may cause uterine contractions, miscarriage or premature labor [55].

Carum carvi seeds contain numerous volatile oils, the most prominent being carvone and limonene. Caraway is a purported galactagogue [56–60], and maternal use has been advocated to reduce colic in the breastfed infant [61]. The plant seeds are also rich sources of essential oils and have been actively researched for their chemical composition and biological activities [52]. Numerous investigations have revealed a potential antimicrobial activity against a range of useful as well as pathogenic gram positive and gram negative bacteria, of oil and aqueous extracts of the plant [62,63]. Also, the traditional use of caraway as a diuretic was confirmed in an experimental study, where aqueous extract of caraway was shown to increase the urine output during and after 24 h of per oral treatment in rats. However, the urinary levels of sodium and potassium were found to increase, while in plasma these were not affected. Carum extract did not produce any renal toxicity or any other adverse effects during the study period [53].

Herbal remedies have been used over time for children even among educated parents, with apparent success. It was reported that the use of herbal remedies for children can be helpful in maintaining health and preventing illness including acute and chronic conditions [64]. However, it is important to know the actions and possible side effects of herbs before giving it to a child [65]. In this study, 25 plant species were reported to be used for infants' healthcare. The mentioned plants were reported to be used to treat 12 common ailments among children (Table 2, Fig. 3). These ailments included abdominal pain, flatulence, relaxant, cold and flu, fever, inflammation, chest pain, constipation, children intelligent, anaemia, strengthen bone, and skin burns. The mode of

Table 3

The top five medicinal plants mentioned by the study population and their adverse effects in pregnancy and lactation.

Family	Stage of use	Adverse effect*	Reference
<i>Carum carvi</i> L.	IC,DB,PH	NA	
<i>Cinnamomum verum</i>	PH, DB	Antihemorrhagic	[24]
<i>Cuminum cyminum</i>	PH, DP, P, IC	Abortive	[25]
<i>Matricaria aurea</i>	IC, DB, P	Abortion, promotes menstruation, relaxing the uterus	[26,27]
<i>Mentha spicata</i>	IC,PH, DB,P	Promotes menstruation, Abortion	[27,28]
<i>Nigella ciliaris</i>	DB,P, PH	Stimulation of uterine contractions, abortion	[29]
<i>Pimpinella anisum</i>	IC, PH, DB, P	Hormone action, promotes menstruation	[27,30,31]
<i>Salvia fruticosa</i>	IC, PH, DB, P	Abortion, genotoxic	[32]
<i>Trigonella berythea</i>	IC,DB,P	Abortifacient, promotes menstruation, and uterine stimulant	[24]

* NA, no available data; P, pregnancy; DB, during birth; PH, postpartum healthcare; IC, infant and children <2 years.

preparation of the herbal remedies and dosage of the administration are also documented.

Pimpinella anisum, and *S. fruticosa* are among the most widely used plants for infant's healthcare in this study, they were mainly reported for the treatment abdominal pain, flatulence and relaxation.

Pimpinella anisum (anise), belonging to the Apiaceae family, is one of the medicinal plants which has been used for different purposes in traditional medicine [66]. In Palestine, the plant has been reported to be used as carminative, aromatic, disinfectant, galactagogue, and has been used by Palestinian patients suffering from chronic diseases including hypertension, diabetes, and cancer [21–23,42].

The relaxant effect of anise was evaluated *in vitro* on isolated guinea pig tracheal chains and its possible mechanism was studied by Boskabady and Ramazani-Assari [67]. In this research, the aqueous and ethanol extracts, essential oil, and theophylline (1 mM) showed significant relaxant effects compared to the controls. The results also showed that the relaxant effect of this plant is due to inhibitory effects on muscarinic acetylcholine receptors [67]. These results might explain the traditional use of the plant as relaxant at different pregnancy stages and for infant care. However, no information is available on the safety of the plant when taken orally by children in medicinal amounts.

Given the fact that few and even no toxicological information are available for many of the recorded medicinal plants, more attention should be paid on some treatment indications notably those requesting longer period of administration of unlimited amount of preparations or recipes. Indeed, it is proven that plant extracts or some of their metabolites can be toxic for human being.

6. Conclusion

Medicinal plants use is common among the Palestinian women to alleviate pregnancy associated ailments, to facilitate childbirth, mitigate postpartum haemorrhages aid uterus postpartum recovery and for use in infant healthcare. The population accepts easily the use of plant products based on the belief that herbs are not harmful for their health and free of adverse effects, as they natural. This has lead to a potential risk of self-medication. However, research has shown that some of the most cited plants and used almost during all the pregnancy stages are not without risks to health and may be toxic, as some plants may have embryotoxic, abortifacient and teratogenic effects. Information on the toxicological potential of many of the plants used is lacking. Our results therefore suggest the need for the implementation of education programs targeted at healthcare professionals, pregnant women and breastfeeding, and community members, about the proper use of herbs during pregnancy and for infant care. The results also suggest the importance of the healthcare professionals to guide women of childbearing age on risks to their health and on the possibilities of utilization of herbs during fertile period, giving special attention to the potential risk of self-medication.

Conflict of interest statement<disclosure>

The authors have no conflict of interests.

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