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A CRITICAL REVIEW ON THE CONTRACEPTIVE AND ABORTIFACIENT MEDICINAL HERB'S DESCRIBED IN BHAVAPRAKASHA NIGHANTU

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ABSTRACT: Bhavaprakasha is Ayurveda's important nighantu (Lexicon) written in the sixteenth century AD. Many useful herbs are mentioned in Bhavaprakasha Nighantu that can be used daily. However, one common misconception is that all ayurvedic drugs are safe and devoid of any side effects since they are of herbal origin is not true. Ayurvedic herbs sometimes become harmful based on the condition of the patient. The present review reports cautions and contraindications in administering certain herbs mentioned in Bhavaprakasha Nighantu for pregnant ladies and those who wish to conceive. Out of total of twenty-three Vargas (Classified groups), six vargas that is Harithakyadi to Amradi Phala varga of Chunekar commentary of Bhavaprakasha Nighantu were reviewed. Hareethakyadi, Karpooradi, Guduchyadi, Pushpadi, Vadaadi, Amradi Phala, comprising two seventy-nine herbs were reviewed critically with regards to their already mentioned action on conceived women and who wish to conceive from Bhavaprakasha Nighantu under four headings (1) Garbhasravakara / Garbhapathakara herbs (Abortifacients) (2) Garbhanirodhakara (Contraceptive) (3) Garbhashaya sankocha kara (Oxytocics) (4) Avrishya (Anaphrodisiac). Also more than a hundred peer-reviewed journals were referred to determine their mode of action. Total fifty-eight herbs were found which was having adverse effect on pregnant women and those who wish to conceive. Hence a physician should be really cautious while prescribing these herbs to a infertile patient or a pregnant woman.

INTRODUCTION: Throughout history, women have tried to control or enhance their fertility using herbal remedies. Herbal contraceptives and abortifacients are those plants used for birth control or in the prevention of pregnancy and for premature expulsion of a foetus from the womb [1].

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Many plants have been reported to have sterilising, contraceptive, and abortifacient properties [1]. The fact that herbs have been used, since the beginning of time by women, to control their fertility, has been recently reiterated.

It is our traditional ethnopharmacological practice of inducing abortion making use of papaya (*Carica papaya Linn*.), pineapple (*Ananas comosus (L) Merr*) and custard apple *(Anona squamosa L*.), etc. Scientific research studies on these herbs proved that they have abortifacient and anti-fertility action [2]. Since, maternal mortality is the second most common cause of death among women and is as a

result of unsafe induced abortions, there is a need Proper alignment, comprising contraception and safe abortion. Also, traditional knowledge of plant uses for medicinal purposes is transferred from one generation to another without written information on these uses. Hence when one dies, he dies with his/her rich knowledge of the medicinal plants and their uses. Documented traditional knowledge on medicinal plants used for contraception and abortion by *Bhavaprakasha Nighantu* is worthwhile in this regard to ensure the continuity of this knowledge and serve as baseline data for possible formulation of new drugs for fertility control.

Of all rights of women the greatest is to become a mother. Many herbs mentioned in *Bhavaprakasha Nighantu* have *Garbhanirodhaka* (Contraceptual) and *Avrishya* (Anaphrodisiac) action. Such herbs should never be prescribed to an infertile couple who wish to conceive. Also, Ayurveda has emphasized Garbhadharana Vidhi (Procedure to become pregnant) and *Garbhini Paricharya* (Care of pregnant women). Ayurvedic acharyas have mentioned food, medicine and activities to be followed by a pregnant woman. So, utmost care should be taken while prescribing herbs to a couple who wish to become parents or to a pregnant woman.

The most precaution to be taken by a physician while prescribing medicine to a pregnant woman is during the first trimester (First twelve weeks). *Arthavajanaka* (Emmenagogue herbs) and *Garbhapaata / Garbhasravakara* (Abortifacient herbs) should be avoided in the first trimester as it may lead to abortion. *Arthavajanaka* herbs are herbs that increases the flow of arthava (menstrual blood) also called as emmenagogue drugs in modern [3] it will lead to garbhasrava if used in the first trimester. *Garbhasrava* is expulsion of foetus before 3rd month and *Garbhapatha* occurs after 4th month Space between both Bhoja mentioned in *Madhava Nidhana Madhukosha* commentary [4].

Susrutha has mentioned *Kshara* and *Garbhapaatakara* herbs as the reason for *Garbhasraava* [5]. Also, Acharyas have mentioned many Garbhashaya sankochaka (Oxytocics/ Ecbolics) herbs that should be avoided before the third stage of labour and will have an adverse effect on labour. *Garbhashaya sankochaka* herbs are those herbs that promote the contraction of uterus and promote the expulsion of foetus and placenta [3]. In modern they are called as Ecbolic drugs or Oxytocics drugs. They are used to accelerate abortion in early pregnancy, to induce labour in late pregnancy, to minimise blood loss and to control postpartum haemorrhage in puerperium. The dangers are particularly noticed when the drug is administered late in pregnancy or during labour. Fetal complications due to this may befoetal distress, foetal hypoxia or even foetal death occurring due to uterine hyperstimulation [6].

So, these four categories of herbs are categorized as

(i) *Garbhasravakara/ Garbhapathakara* (Abortifacients) (ii) *Garbhanirodhakara* (Contraceptive herbs) (iii) *Garbhashaya sankochakara* (ecbolic) herbs (iv) *Avrishya* (Anaphrodisiac). Such herbs are taken fromsix *Vargas* (Classified groups) of *Bhavaprakasha Nighantu* from *Hareethakyadi* to *Amradi Phala Varga*, one of the commonly practiced and authenticated books written by *Bhavamisra* in the sixteenth century AD. It includes twenty-three chapters delineating about eight hundred herbs. This Nighantu incorporates drugs of plant, animal, and mineral origin and is considered the best Nighantu of modern times in the field of Ayurveda.

MATERIALS AND METHODS: Out of a total twenty-three Vargas, sixvargas from *Hareethakyadi* to *Amradi Phala*varga were critically reviewed with regards to four actions like (1) *Garbhapatha* / *Garbhasrava* (Herbs promoting expulsion of foetus) (2) *Garbhanirodha* (Contraceptive) (3) *Garbhashayasankochaka* (Oxytocics) (4) *Avrishya* (Anaphrodisiac herbs). The data for the present article is mainly collected from *Chunekar* commentary of *Bhavaprakasha Nighantu*, Also other information provided in this review, was as a result of an extensive bibliographic investigation by analyzing classical textbooks, scientific journals, consulting worldwide accepted databases. The peer-reviewed papers were gathered from databases like SCOPUS, PUBMED, Google Scholar, INFLIBNET. All 58 plants were reviewed for their anti-fertility effects along with their possible mechanism of action, part used, family and animal used.

This review was concentrated to incorporate a list of various plants that have been mentioned for their use as anti-fertility agents in traditional medicines. It also contains plant extracts, which are already proved by various scientific papers.

More than 100 scientific peer reviewed articles were investigated for searching modern research studies of use of plants possessing anti-fertility activity. The various plants claimed and proved as anti-fertility, aborti-facient, contraceptive, spermicidal, were included.

RESULTS: Medicinal plants have been reported to possess anti-fertility effects by various mechanism of actions, one of the major action is their effect on sex hormones thereby suppressing fertility [8].

Moreover, plants with estrogenic property can directly influence pituitary action by modulation of luteinzing hormone (LH) and follicle stimulating hormone (FSH), decreasing their secretions and blocking ovulation[9]. The plants with anti-estrogenic activities intercept in the development of ovum and endometrium; on the other hand, plants have abortifacient effects [10, 11].

The site of action of anti-fertility agents in females comprises the hypothalamus, the anterior pituitary, the ovary, the oviduct, the uterus, and the vagina. The mammalian uterus is the main site of anti-fertility effects [8].

In the present article, some Ayurvedic herbs grouped into four groups mentioned in six *vargas of Bhavaprakasha Nighantu,* and their mode of action in the reproductive system is mentioned. Following are the four categorized groups and herbs coming under them mentioned in six Vargas are given in **Table 1-6,** respectively. In **Table 7**, the total number of herbs in six vargas with four categorized actions are mentioned.

Hareethakyadi Varga:

TABLE 1: CLASSIFICATION OF HERBS IN *HAREETHAKYADIVARGA* HAVING CONTRACEPTIVE AND ABORTIFACIENT ACTION

S. no.	Drug Name	Botanical Name	1	2	3	4	Reference
1.	*Hareethaki*	*Terminalia chebula Roxb.exFlem.*			✔□	✔□	*DGV vol1-p108 Sha.Sa.4/18*
2.	*Chithraka*	*Plumbago zeylanica Linn*	✔□		✔□		*B.P 1/71 & DGV vol1-p350 B.P1/p 22*
3.	*Yavani*	*Carum copticum. Benth. & Hook*				✔□	*B.P 1/77*
4.	*Kalajaji*	*Nigella sativa Linn.*	✔□		✔□		*B.P 1/82-85/p32*
5.	*Dhanyaka*	*Coriandrum sativum Linn.*				✔□	*B.P 1/87/p-34*
6.	*Mishreya*	*Foeniculum vulgare Mill*				✔□	*B.P 1/92/p-34*
7.	*Hingu*	*Ferula narthex Boiss.*	✔□		✔□		*B.P 1/101/p-41*
8.	*Vidanga*	*Embelia ribes Burm.F.*		✔□			*B.P vol 2 2/782*
9.	*Kampillaka*	*Mallotus Philippensis Mueller.Arg*		✔□			*DGV vol1-p 108*
10.	*Nakuli/ Sarpagandha*	*Rauwolfia serpentina Benth.ex Kurz*			✔□	✔□	*B.P 1/p-81 B.P 1/p-81*
11.	*Ishwari/ Gandhanakuli*	*Aristolochia indica Linn.*	✔□		✔□		*B.P 1/p-82*
12.	*Katuparni*	*Argemone mexicana Linn.*			✔□		*B.P 1/p-94 &95*
13.	*Katphala*	*Myrica esculenta Buch. Ham*			✔□		*B.P 1/p-97*
14.	*Ganja*	*Cannabis sativa Linn. exudate*			✔□		*B.P 1/p-139*
15.	*Postha*	*Papaver somniferum Linn.*				✔□	*B.P 1/237*
16.	*Jyothishmathi*	*Celastrus paniculatus Wild.*			✔□		*DGV vol1-p 108*
17.	*Kshara*		✔□			✔□	*Cha.Sa.Su 25/40 & Su.Sa Su 11/28 & A.Sa Su 39/5 &A.Hr Su 30/4,6*

Abbreviations used: (1) *Garbhapathakara/ Garbhasravakara* (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochakara* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs) *$ B.P- BhavaprakashaNighantu, DGV- Dravyagunavijnanam, Cha.Sa.Su- CharakaSamhithaSuthraSthana, Su.Sa.Su- SusruthaSamhithaSuthraSthana, A.Sa.Su- Astanga SangrahaSuthra, A.Hr.Su- Astanga HridayamSuthra.*

Karpooradi varga:

TABLE 2: CLASSIFICATION OF HERBS IN *KARPOORADI VARGA* HAVING CONTRACEPTIVE AND ABORTIFACIENT ACTION

S. no.	Sanskrit Name	Botanical Name	1	2	3	4	Reference
1.	*Karpoora*	*Cinnamomum camphora Nees&Eberm*				✔	*B.P 2/ p-169*
2.	*Chandanabeeja*	*Santalum album Linn.*	✔				*B.P 2/p -181*
3.	*Pathanga*	*Caesalpinia sappan Linn.*			✔		*B.P 2 P-185*
4.	*Padmakam*	*Prunus puddumRoxb.ex.Wall*	✔				*B.P 2 P-194*
5..	*Twakpathram*	*Cinnamomum cassia Blume*				✔	*B.P 2/65*
6.	*Renuka*	*Piper aurantiacum*	✔				*B.P 2/106*

#Abbreviations used: (1) *Garbhapathakara*/ Garbhasravakara (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochakara* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs). *$ B.P- BhavaprakashaNighantu*

Guduchyadi varga:

TABLE 3: CLASSIFICATION OF HERBS IN *GUDUCHYADI VARGA* HAVING CONTRACEPTIVE AND ABORTIFACIENT ACTION

S. no.	Sanskrit name	Botanical name	1	2	3	4	Reference
1.	*Eranda*	*Ricinus communis Linn.*	✔				*Ref-12*
2.	*Arka*	*Calotropis gigantea (Linn) R.Br.ex.Ait*			✔		*DGV Vol1/109 B.P 3/71 & p 293*
3.	*Snuhi*	*Euporbia nerifolia Linn.*			✔		*DGV Vol1/109 B.P 3/76*
4.	*Kalihari*	*Gloriosa superba Linn.*	✔		✔		*DGV Vol1/109 B.P8/206*
5.	*Dhathura*	*Datura stramonium Linn.*		✔			*Ref -12 B.P8/206*
6.	*Vasa*	*Adhatoda vasica Nees*	✔				*B.P 3/ p307*
7.	*Nimba*	*Azadirachta indica. Juss.*		✔			*Ref -23*
8.	*Mahanimba*	*Melia azedarach Linn*			✔		*B.P 3/p-318*
9.	*Shigrubeeja*	*Moringa pterigosperma Gaertn.*				✔	*B.P 3/110*
10	*Kantakakaranja*	*Caesalpinia bonducella Fleming*			✔		*B.P 3/P-337*
11.	*Gunja*	*Abrus precatorius Linn.*		✔			*DGVvol1-p 109*
12.	*Karpasa*	*Gossypium herbaceum Linn.*	✔		✔		*B.P 3/P-361*
13.	*Boothrinam*	*Andropogon citratus DC.*				✔	*B.P 3/171*
14.	*Paada*	*Cissampelouspareira*		✔			*DGVvol1/p-109*
15.	*Shyama thrivrit*	*Operculina turpethum Silva Manso*			✔		*DGVvol1/p-109 B.P3/194*
16.	*Apamarga*	*Achyranthes aspera Linn.*	✔	✔			*Ref -21 B.P3/400*
17.	*Kumari*	*Aloe barbadensis Mill*	✔		✔		*B.P3/p406 DGVvol1-p109*
18.	*Punarnava*	*Boerhaavia diffusa Linn.*	✔				*B.P 3/408*
19.	*Devadali*	*Luffa echinata Roxb.*	✔				*B.P3/455 B.P3/292& 293*
20.	*Dronapushpi*	*Leucas cephalotes Spreng.*		✔			*Ref -22*
21.	*Vandhya Karkotaki*	*Momordica dioica Roxb.*		✔			*DGVvol1-P109*

Abbreviations used: (1) *Garbhapathakara*/ *Garbhasravakara* (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochakara* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs) $ *B.P- BhavaprakashaNighatu, DGV- Dravyagunavijnanam, Ref- Reference.*

Puspadi Varga:

TABLE 4: CLASSIFICATION OF HERBS IN *PUSHPADIVARGA* HAVING CONTRACEPTION AND ABORTI-FACIENT ACTION

S. no.	Sanskrit name	Botanical Name	1	2	3	4	Reference
1.	*Kadamba*	*Anthocephalus cadamba Miq.*	✔☐				*Ref-16*
2.	*Japa*	*Hibiscus rosasinensis Linn.*		✔☐			*Ref 20 & 36-37*
3.	*Thulasi*	*Ocimum sanctum Linn.*				✔☐	*Ref-33,34*
4.	*Palasha*			✔☐			*Ref-12*

Abbreviations used: (1) *Garbhapathakara*/ *Garbhasravakara* (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochakara* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs)

Vadaathi Varga

TABLE 5: CLASSIFICATION OF HERBS IN *VATAADI VARGA* HAVING CONTRACEPTIVE AND ABORTIFACIENT ACTION

S. no.	Sanskrit Name	Botanical name	1	2	3	4	Reference
1.	*Shimshipa*	*Dalbergia sissoo Roxb.*	✔☐				*B.P 5/24*
2.	*Arishtaka*	*Sapindus mukorossi Gaertn.*	✔☐				*B.P 5/38*
3.	*Burjapathra*	*Betula utilis D. Don*		✔☐			*B.P 5/p423*
4.	*Shami*	*Prosopsis spicigera Linn.*	✔☐				*B.P 5/p534*
5.	*Katabhi*	*Careya arborea Roxb.*				✔☐	*B.P 5/68*
6.	*Moksha*	*Schrebera swietenioides Roxb.*				✔☐	*B.P 5/70*

Abbreviations used: (1) *Garbhapathakara*/ *Garbhasravakara* (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochakara* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs) $ *B.P- BhavaprakashaNighantu.*

Amradi Phala Varga:

TABLE 6: CLASSIFICATION OF HERBS IN *AMRADI PHALAVARGA* HAVING CONTRACEPTIVE AND ABORTIFACIENT ACTION

S. no.	Sanskrit Name	Botanical Name	1	2	3	4	Reference
1.	*Lakucham Amam*	*Artocarpus lakoocha*				✔☐	*B.P 6/31*
2.	*Kalindam*	*Citrullus vulgaris Schrad*				✔☐	*B.P 6/43*
3.	*Kupilu*	*Strychnosnuxvomica Linn.*			✔☐	✔☐	*DGVvol1/p 350 B.P 6/p556*
4.	*Nimbookam*	*Citrus medica var acida of Watt*				✔☐	*Ref-37*

Abbreviations used: (1) *Garbhapathakara*/ *Garbhasravakara* (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochakara* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs) $ *B.P- BhavaprakashaNighantu, DGV-Dravyagunavijnanam.*

TABLE 7: CLASSIFICATION OF ABOVE SAID ACTIONS OF HERBSIN EACH VARGAS

S. no.	Vargas	Total no in each varga	(1)	(2)	(3)	(4)	Total
1.	Hareethakyadi	17	5	2	10	7	24
2.	Karpooradi	6	3	-	1	2	6
3.	Guduchyadi	21	8	7	8	2	25
4.	Pushpadi	4	1	2	-	1	4
5.	Vadathi	6	3	1	-	2	6
6.	AmradiPhala	4	-	-	1	4	5
	Total	58	20	12	20	18	70

#(1) *Garbhapathakara*/ *Garbhasravakara* (Abortifacients) (2) *Garbhanirodhakara* (Contraceptives) (3) *Garbhashayasankochaka* (Ecbolics) (4) *Avrishya* (Anaphrodisiac herbs.

DISCUSSION: ***Garbhasravakara*/** *Garbha-pathakara* Herbs *Bhavaprakasha* has mentioned twenty *Garbhapathakara* herbs in the six groups excluding emmenagouge herbs. If we take into consideration emmenagouge herbs which also causes *Garbhasrava*, it will be more than this number. *Garbhasrava* occurring before the third month can occur due to non-congenial diet and mode of life; the foetus is not retained because up to this period, it is *Asanjathasara* (does not have

proper development) and is in *Amavastha*[12]. Arthavajanaka herbs explained in the first category taken by a pregnant woman causes garbhasrava if used in first trimester due to improper development of foetus and absence of placenta. Garbhapatha on the other hand, which occurs after fourth month can occur due to the use of Oxytocics herbs. *Chunekar*, commentator of *Bhavaprakasha Nighantu* has told many *Garbhapathakara* herbs. A pessary prepared from *Beeja* of *chandana* is mentioned to cause *Garbhapatha* [13].

Vasa (*Adhatodavasica Nees*.) has abortifacient action like Peganin from *Peganumharmala*. *Vasa* contains vasicine/peganin and vasicinone like in *Peganumharmala L.*. These quinazoline alkaloids (e.g. vasicine and vasicinone) are believed to be responsible for the abortifacient activity of *Peganum harmala* L. extracts. It has been reported that these chemicals have a uterine stimulatory effect, apparently through the release of prostaglandins [14, 15].

Kadamba (*Anthocephalus cadamba Miq*.) is another herb having abortifacient action. It is found that methanolic extract of *Kadamba* stem bark showed abortifacient action. The mechanism of abortion could possibly be through the changes in the uterine milieu, altered hormone levels, luteolysis and partly estrogenecity [16].

***Garbhanirodhaka* Herbs:** Second category is *garbhanirodhaka* herbs (Contraceptive herbs) that prevent Garbhadharana (conception). PV Sharma describes six herbs *Gunja* (*Abrus precatorius Linn.), Pada (Cycleapeltata Hook.f & Thoms.), Pippali (Piper longum Linn.), Vidanga (Embelia ribes Burm. F.), Kampillaka (Mallotus Philippinensis Muell. Arg) and Japa (Hibiscus rosa-sinensis L.) as having Garbhanirodhaka action 3. Bhavaprakasha mentions burls of Burja (Betul-autilis) i.e. Burjagrandhi* as having Garbha-nirodhaka action [17]. Many other *Garbhanirodhaka* herbo- mineral combinations are mentioned in *Yogaratnakara* and *Bhavaprakasha*. Some of them are: The menstruating women who use equal quantity of powdered *Pippali* (*Piper longum* L.), *Vidanga* (*Embeliaribes*) and *Tankana* (Borax) mixed with milk should be consumed at the time of conception [18]. *Japakusuma* (Flower of *Hibiscusrosa sinensis*) macerated with *Aranala* (rice washed water) added with one *Mushti* (40 gms) of old *Guda* (jaggery) consumed during menstrual period, such a women doesn't become pregnant at all [19]. Equal quantity of *Talisa* (*Abieswebbiana*) and *Gairikachoorna* (Red Chalk Powder) with cold water on fourth day of her menstrual cycle, the women will not conceive [20]. Thus total of twelve herbs having contraceptive action are mentioned. Some other herbs like *Dronapushpi (Leucascephalotes (Roth.) Spreng*.) and *Apamarga* (*Achyranthesaspera Linn.)* mentioned in *BhavaprakashaNighantu* have *Garbhanirodhaka* action. It is due to their anti-implantation activity. *Avrishya* herbs can also be used as Garbhanirodhaka herbs as most have reversible anti-fertility action.

The anti-implantation activity of *Achyranthes aspera L.* may be due to the estrogenic activity, causing the expulsion of ova from the tube, disrupting the luteotrophic activity of blastocyst. (Pincus, 1965, Anderson, 1972). For implantation, it is well known that exact estrogen and progesterone equilibrium is necessary and any disturbance in the level of these hormones causes infertility. The hormonal values of *Achyrathesaspera Linn.* disturbs hormonal milieu in the uterus and provokes the anti-fertility effect [21]. Japa (*HiniscusRosa-sinensis* Linn.) also has similar estrogenic activity leading to anti-implantation [36].

The loss of implantation at higher doses of prepared extract of *Leucascephalotes* may be due to antizygotic, blastocytotoxic or anti-implantation activity as described by Hafez (1970) [22].

NimbaThaila is another drug considered to be a strong spermicidal agent. Administration of neem oil to pregnant rats for 3 days showed significant anti-fertility activity. To elucidate a positive mechanism of action of neem oil, the following aspects cannot be ruled out: (i) Neem oil may kill the spermatozoa or ova in the female genital tract and hence a zygote is not formed, (ii) if a zygote is formed neem oil may be blastocidal and the dead blastocytes cannot implant in the uterus, and (iii) even if the blastocyst is formed normally, it may not be welcomed by the unprepared uterus since neem oil may denature the endometrial lining of the uterus. Although work is in progress to find out

answers to the above options, it is expected that the major action of neem oil will be related to a non-hormonal mechanism. Since the post coital contraceptive effect of neem oil seems to be non-hormonal, neem oil would be expected to elicit less side effects than the steroidal contraceptives [23].

***Garbhashaya sankochaka* Herbs:** The third one is *Garbhasankochakara* or Ecbolic herbs, which increase the contraction of *Garbhashaya* [3]. Total twenty *Garbhashayasankochakara*/ecbolics are mentioned in six vargas. They are of two types direct and indirect. Direct ecbolic work by three different mechanism of action. First one is stimulating the muscles of uterus like quinine (*Cinchona officinalis* Linn.). Dextrorotatory cinchona alkaloids *i.e*., cinchonine and quinidine had a greater action than the leavorotatory isomerides *i.e.,* cinchonidine and quinine-in increasing the amplitude and rhythm of uterine contractions innon-pregnant guinea-pigs [24].

Other herbs like *Langali* (*Gloriosa superba* L.) have similar oxytocic activity. *Chunekar* commentator of *BhavaprakashaNighantu* describes *Kemuka* (*Costusspeciosus*) is having more ecbolic action than *Langali*. Second is by stimulating the vessels causing vasoconstriction in *Garbhashaya* like *Annamaya* (Ergot) (Clavicepspurpuria). *Karpasa* (*Gossypium herbaceum L.)* also has action like ergot. Ergot alkaloids in obstetrics are administered at the third stage of lab or to prevent postpartum hemorrhage. They must be administered with great caution because of side effects *e.g.,* blood pressure elevation and pain. Thus, the dose must be chosen with care because of the side effects. Ergot alkaloids used to be widely applied in obstetrics and yet, nowadays, only a few are still used. Ethylergonovine is used as a highly effective second-line uterotonic medication (unfortunately it is associated with severe vasoconstriction) [25]. Third group of direct ecbolic drugs stimulate the brain centre and induce oxytocic action like *Kupilu*. Abundant quantity of strychnine found in the seeds of *StrychnosNux-Vomica* (Loganiaceae) [26]. Under the effect of strychnine there is a reduction of the inhibitory post- synaptic potentials and a marked rise in the excitatory post- synaptic potentials of the motor neurones, caused by the cerebellum stimulation [27]. Second category is called indirect ecbolic herbs. They increase the blood flow in the organs of the pelvis and contract the uterus [3]. These herbs are *theekshna*, *ushna* and *bhedhana* (Intence, Hot and Piercing) like *Arka* (*Calotropis gigantea Linn.), Kumari (Aloe vera Linn.) etc. Hingu* (Ferula asafoetida) though mentioned as a *Garbhashaya sankochaka* herb by *Bhavaprakasha Chunekar* commentary, in modern research study muscle relaxant action of *Hingu* was found (Mohammed Reza Khazdain *et al*., 2015) [28]. So taking into consideration these three properties *Bhedhaneeyadashaimami* herbs like *Eranda* (*Ricinus communis L.), Trivrit* (*Operculina turpethum Linn.), Arka* (*Calotropis gigantea L.) etc* mentioned in *CharakaSamhithaSoothraSthana* may be taken as indirect ecbolic [29]. More research works are yet to be done on these ten *bhedhaneeyadashaimani* herbs and other herbs having these qualities to find out their oxytocic activity.

***Avrishya* Herbs:** The fourth category is Kamasadaka/ Shandyakara/ Pumsthwaghathi (Anaphrodisiac herbs), which decreases sexual power. Total twenty one herbs are mentioned as Anaphrodisiac. PV Sharma mentions that it is of two categories. (i) *Shukranashaka*: Some herbs decrease *shukra* (sperm) like *Kshara* [3]. *Kshara* is *Shukranashaka*. It is told not give *kshara* to a women during Rithukaala (Ovulatory period).

So, it destroys both sperm and ovum. *Dhanyaka* (*Coriandrum sativum Linn*.) is told as *avrishya*. It is *Arthavanashaka* (destroys ovum) and it is also *Kamashakthinaashaka* (destroys sexual power). Majority of *avrishya* herbs belong to first category. (ii) *Shukravegashamaka*: Some herbs depresses the nadi (nerves) of the penis like *Suchi* (Atropabelladona) and *Karpoora* (*Cinnamomum camphora* Linn.) Chunekar commentator of *BhavaprakashaNighantu* mentions that *Karpoora* (*Cinnamomum camphora Linn*.) in small doses is vrishya and in large doses it is *avrishya*. This is due to the suppression of *nadi* of penis was observed that as concentration of the camphora solution increased, there was decrease in concentration, motility and viability of sperms [30]. A similar study, though in humans, by Jadhav, *et al*. also explained in their study how sperm motility and morphology reduced with increasing concentration of camphora [31]. (iii) *Sharangadhara* mentions a third category of

herbs with anaphrodisiac action: *Shukrashoshana*. Those herbs having opposite qualities of *shukra* will cause it's deterioration like *Hareethaki* (*Terminalia chebula* Retz.) [32]. Due to this reason, it is contraindicated in *Krisha* and *durbala* (debilitated and lean persons). This is due to reduction in plasma testosterone due to reduced male androgenesis, as testosterone is needed for the production of sperm [33]. Thulasi (*Ocimum sanctum* Linn.) and Japa (*Hibiscus rosa-sinensis* Linn.) also have similar anti-fertility and anti-spermatic action [34, 37]. Without a continuous androgen supply, sperm reproduction does not proceed optimally to completion [35]. Following is the list of plants reported to possess anti-fertility effects along with their botanical name and mechanism of actions.

CONCLUSION: Out of the total two seventy-nine herbs in six Vargas reviewed, fifty-eight were found to have abortifacient and contraceptive action. Emmenagogue abortifacients could not be included in the present review because of space constraints. Modern research studies from peer reviewed journals were taken for comparison with the actions of herbs mentioned in six vargas of *Bhavaprakasha Nighantu*. All these fifty-eight herbs should be avoided by couples who wish to become pregnant or by a pregnant woman. Many of these herbs are rare or controversial. So, research studies are not available on them. Efforts should be made to find their original identity, and more research studies are yet to be done on them to ascertain their safety and efficacy.

Regarding contraceptives, many of modern contraceptives have a lot of side effects, so we should make use of alternative safe and convenient contraceptives herbs mentioned in Bhavaprakasha Nighantu. New herbal contraceptives should be formulated and they should be brought to market.

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REFERENCES:

1. Lans C: Ethnomedicines used in Trinidad and Tobago for 598 reproductive problems. Journal of Ethnobiology and Ethnomedicine 2007; 3: 13.
2. Ghana Statistical Service (GSS), Ghana Health Service (GHS) and Macro International. Ghana Maternal Health Survey 2007, Accra, Ghana: GSS and GHS; Calverton, MD, USA: Macro International 2009b.
3. Sharma PV: *Dravyagunavijnanam* Basic ConceptsVol1, Reprint editor. Chaukamba Orientalia 2013; 350-108.
4. *Vijayarakshita* and *Srikanthadathadatta*: Commentator, *Madhavakara, Madhukosha* commentary of *Madhava Nidana, Nidanasthana.MugdhagarbhaRogaNidana*64/2, re-edited by P V Sharma, 1933, Reprint editor, Chaukamba Orientalia 2014.
5. *Dalhana:* Commentator, *Susrutha*, *SusruthaNibandhasangraha* Commentary of *SusruthaSamhitha*, *Shareera* Sthana, *GarbhiniVyakaranaAdhyayam*10/54, Reprint Editor. Chaukamba Orientalia 2010; 167.
6. Dutta D.C: Text Book of Obstetrics, New Central Book Agency, 6th edition, Chapter 33- Pharmacotherapeutics in Obstetrics 2009; 480.
7. Williamson EM, Okpako DT and Evans FJ: Pharmacological methods in phytotherapy research: Selection preparation and pharmacological evaluation of plant material. John Wiley and Sons Ltd., London 1996; 1: 191-21.
8. Brinker F: Inhibition of endocrine function by botanical agents, antigonadotropic activity. Br J Phytother 1997; 4: 123-145.
9. Gark SK, Mathur VS and Chaudhury RR: Screening of Indian plants for anti-fertility activity. Indian J Exp Biol 1978; 16(10): 1077-1079.
10. Prakash AO, Saxena V, Shukla S and Mathur R: Contraceptive potency of *Pueraria tuberosa D.C.* and its hormonal status. Acta EurFertil 1985; 16(1): 59-65.
11. Turner DC. General endocrinology 4 ed. Tokyo, WB Saunders Company, Topan Company Ltd. 1971.
12. Thewari PV: *AyurvediyaPrasoothiTanthra* and *Sthreeroga* First Part *PrasoothiTanthra*, 1st Edition, Varanasi: Chaukamba Sanskrit Pratishthan Chapter 9, 2013; 333-612.
13. Krishnachandra Chunekar: Commentator, *BhavaprakashaNighantu* of *Bhavamishra*, Chapter 2, 3rd Edition, Edited by Dr.G.S.Pandey, Varanasi: Chaukamba Krishna Das 2005; 181.
14. Shapira Z, Terkel J, Egozi Y, Nyska A and Friedman J: Abortifacient potential for the epigeal parts of peganumharmala. J Ethno-pharmacol 1989; 27: 319-325.
15. Gupta OP, Anand KK and Atal C: Vasicine alkaloid of aadhatiyavasica, A promising uterotonic abortifacient. Indian J Exp Biol 1978; 16: 1075-1077.
16. Muhammad Vaseem Shaikh, Manikantan Kala, Nirav Ravat, ManishNivsarkar: Abortifacient potential of methanolic extract of *Anthocephalus cadamba* stem bark in mice. J of Ethnopharmacology 2015; 173: 313-317.
17. Krishnachandra Chunekar: Commentator, *BhavaprakashaNighantu* of *Bhavamishra*, Chapter 5, 3rd Edition, Edited by Dr.G.S.Pandey, Varanasi: Chaukamba Krishna Das 2005; 423.
18. Bhavamishra: BhavaprakashaNighantu, 3rd Edition, Srikantha Murthy, Reprint editor,Chaukamba Krishna Das, Varanasi 2005; 2: 782.

19. Thewari PV: *AyurvediyaPrasoothiTanthra* and *Sthreeroga* First Part *Prasoothi*Tanthra, 1st Edition, Chaukamba Sanskrit Pratishthan, Varnasi Chapter 9 2013; 608.
20. Asha Kumara and Tewari PV: *Yogaratnakara* 1st Edition, ChaukambaVisvabharati, Varanasi; Chapter 70/P.1142.
21. Vasudeva N and Sharma SK: Post-coital Antifertility Activity of *Achyranthes aspera Linn* root. J Ethno Pharmacol 2006; 107; 179-81.
22. RheenaBhora, Sushma Kainsa and Manjusha Choudhary: Antifertility Activity of Chloroform and Alcoholic Flower Extracts Of *Leucascephalotes* (*Roth) Spreng*. In Albino Rats. Int J Drug Dev & Res 2013; 5(1); 1-10.
23. Prakash AO, Tewari RK and Mathur R: Non-Hormonal Post-Coital contraceptive action of neem oil in rats, journal of ethnopharmacology. Elsevier Scientific Publishers 1988; 23; 53-59.
24. Major Acton HW: The Action of quinine on pregnant uterus. Lancet 1921; 216-217.
25. Vallera C, Choi LO, Cha CM and Hong RW: Uterotonic Medications. Anesthesiol Clin 2017; 35: 207–219.
26. Strychnine-found in the Seeds of *StrychnosNuxVomica*. Available at: http:// www.epharmacognosy.com/2012/07/strychnine-found-in-seeds-of- strychnos.html (Accessed 18 Aug 2016).
27. Shapovalov AI and Arushanyan EB: Effect of strychnine on activity of motor and internuncial neurons of the spinal cord during stimulation of the anterior lobe of the cerebellum, Bull. Exp Biol Med 1963; 56: 1295-1301.
28. Mohammed Reza Khazdair and Mohammad HB: The relaxant effect of *Ferula asafoetida* on smooth muscles and the possible mechanisms, J HerbMed Pharmacol 2015; 4(2): 40-44.
29. *Chakrapanidatta*: Commentator, *Agnivesha*, *CharakaSamhitha*, revised by *Charaka* and Dridhabala with the Ayurveda Dipika Commentary, *SuthraSthana*, *Shadvirechana*shathrashitheeya4/94, Sharma.R.K, Das.B, Reprint editor, Chaukamba Orientalia 2009.
30. Gabriel Godson Akunna, Francisca Duru, Oluwatobiloba-Ayoade: Androgenic Effects of *Cinnamomum camphora* in Male Sprague-dawley Rats. Journal of Advances in Medicine and Medical Research 2019; 31(7): 12.
31. Jadhav MV, Sharma RC, Rathore M and Gangawane AK: Effect of *Cinnamomum camphora* on human sperm motility and sperm viability. J Clin Res Lett 2010; 1(1): 01-10.
32. *Sharangadhara*: *SharangadharaSamhitha* with Deepika and Gudartha Deepika commentary 4/18, Reprint editor, ChaukambaSurabharathiPrakasan, Varanasi 2016; 60.
33. Abhinandan Ghosh, Kishalay Jana, BhabaniPrasad Pakhira, Adrija Tripathy and Debidas Ghosh: Anti-fertility effect of aqueous-ethanolic (1:1) extract of the fruit of *Terminalia chebula:* Rising approach towards herbal contraception. Asian Pacific Journal of Reproduction 2015; 4(3): 201-207.
34. Mukhtar Ahmed, Nazeer Ahmed RH, Aladakatti MG and Ghosesawar: Reversible anti-fertility effect of benzene extract of *Ocimum sanctum* leaves on sperm parameters and fructose content in rats. Journal of Basic and Clinical Physiology & Pharmacology 2002; 13(1): 51-59.
35. Brooks DE: Metabolic activity in the epididymis and it's regulation by androgens. Physiol Rev 1981; 61: 515-518.
36. Sinha RK & Nathawat GS: Anti-fertility effects of some plants used by the street herbal vendors for birth control. Ancient Science of Life 1989; (2): 66-68.
37. Neeru Vasudeva and Sharma SK: Post-Coital Anti-fertility Activity of *Hibiscusrosa-sinensis* Linn. Evidence Based Complimentary and Alternative Medicine 2008; 5(1): 91-94.

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