



CONCEPTUAL UNDERSTANDING OF MAASAANUMASIKA GARBHINI PARICHARYA ACCORDING TO CHARAKA AND ITS SIGNIFICANCE IN MATERNAL AND FOETAL HEALTH.

¹Dr Nanda V Kuri, ²Dr Mamata Murthy, ³Dr Shruti Hegde

¹PG Scholar, ²Profesoor & HOD Dept. of Rachana Shareera, ³Assistant professor Dept. of Rachana Shareera

¹Dept.of Rachana Shareera,

¹Government ayurveda medical college, Bengaluru, India

Abstract: *Garbhini Paricharya* is a unique concept of Ayurveda that encompasses dietary, lifestyle, and behavioural guidelines prescribed for a pregnant woman to ensure the healthy development of the foetus and the well-being of the mother. Among its various components, *Maasaanumasika Pathya* (month-wise regimen) holds special importance as it addresses the changing physiological needs of pregnancy. Acharya Charaka has described specific dietary measures for each month, including the use of *Ksheera*, *Ghrita*, *Madhu*, *Navaneeta*, and medicated preparations, along with procedures such as *Anuvasana Basti* and *Yoni Pichu* during the later months. These regimens help in maintaining maternal nutrition, alleviating pregnancy-related discomforts, supporting fetal growth and development, preserving *Ojas*, and facilitating normal labour. The present review critically analyses the rationale behind the month-wise regimen described by Acharya Charaka and correlates its benefits with maternal and fetal health. The properties of the prescribed dietary substances and therapeutic measures indicate their role in promoting physical strength, proper tissue nourishment, fetal organ development, and uncomplicated delivery. In the present era, where pregnancy-related complications and operative deliveries are increasing, the principles of *garbhini paricharya* offer a holistic and preventive approach for achieving healthy pregnancy outcomes and enhancing maternal and fetal well-being.

Index Terms - *Garbhini Paricharya*, *Maasaanumasika Pathya*, *Garbha*, *Pregnancy*, Fetal Development, Maternal Health.

I. INTRODUCTION

Garbha is the foundation of future generations and its proper development depends on the care of the mother during the pregnancy. Ayurveda through the concept of *garbhini paricharya* prescribes the regimen of diet, lifestyle and the code of conduct so following these helps in preventing the complications, promoting normal delivery, and ensuring the wellbeing of mother and foetus.

We have the reference of *garbhini paricharya* in all *brihatraves* and *Harita Samhita*. This paper aims at understanding the *garbhini paricharya* and how it helps in promoting the health of mother and foetus.

□□□□□□□

- गर्भोऽस्त्यस्याम् । (SKD)¹
- समानार्थकः आपन्नसत्त्वा, गुर्विणी, अन्तर्वत्नी, गर्भिणी (AMK)²
- A pregnant female (Apte)³

परिचर्या

- उपासनम् (SKD)⁴
- समानार्थकः वरिवस्या, शुश्रूषा, परिचर्या, उपासना (SKD)⁵
- Service Attendance (Apte)⁶

The *garbhini paricharya* is broadly discussed under three topics:

- *Maasaanumasika pathya*: month wise dietary regimen.
- *Garbhasthaapaka dravyas*: Substances which are beneficial in maintaining pregnancy.
- *Garbhopaghaathakara bhaavas*: Activities and substances that are harmful during pregnancy for both the mother and the foetus

MASAANUMASIKA PATHYA

Month	Charaka ⁷	Sushruta ⁸	Vagbhata ⁹	Harita ¹⁰
1st month	<i>Asanskrita dugdha</i> make it <i>sheetala</i> & drink it oftenly, <i>Satmya ahara</i> .	<i>Madhura sheeta drava prayamahaara</i>	<i>Ksheeram upaskrtam</i> 12days- <i>ghrita+saliparni&palaa,</i> <i>anupana with swarna & rajata,</i> <i>Madhura oushada.</i>	<i>Navaneeta,</i> <i>payas +Madhu</i> <i>&madhura rasa</i> <i>+yashtimadhu,paru</i> <i>shaka,</i> <i>madhupushpa</i>
2nd month	<i>Ksheeram +Madhur oushada</i>	<i>Madhura sheeta drava prayamahaara</i>	<i>Ksheeram +madhuroushada</i>	<i>Kakoli+madhura dravya</i>
3rd month	<i>Ksheeram+Madhu & sarpi</i>	<i>Sashtika oudana +dadhi, paya</i>	<i>Ksheeram+Madhu & sarpi.</i>	<i>Krisara</i>
4th month	<i>Ksheera +navaneeta</i>	<i>Payo navaneeta samsrista jangala mamsa rasa.</i>	<i>Ksheera +aksha matra navaneeta</i>	<i>Kritoudana</i>
5th month	<i>Ksheera+ sarpi</i>	<i>Ksheera+sarpi samsrishta.</i>	<i>Ksheera sarpi</i>	<i>Ksheera</i>
6th month	<i>Ksheera sarpi + Madhura oushada sidham.</i>	<i>Swadamstra siddasya sarpi</i>	<i>Ksheera sarpi + Madhura oushada sidham</i>	<i>Dadhi+madhura rasa</i>
7th month	<i>Ksheera sarpi+ madhura oushada sidham</i>	<i>Prithakparni sidda sarpi& yavagu.</i>	<i>Ksheera sarpi + Madhura oushada sidham</i>	<i>Ghrita +khanda</i>

8th month	<i>Ksheera yavagu +sarpi</i>	<i>Badarodaka+bala+ati bala+satapuspa+tila +paya dadimastu Kashaya vasti & sneha basti.</i>	Combined opinions of <i>charaka & sushruta</i> but eliminated <i>satapuspa, bala, atibala & advised basti</i>	<i>Ghruta pookara</i>
9th month	<i>Anuvasana basti with Madhuraoushada sidda taila, pichu in Garbha marga</i>	<i>Snigdha yavagu, jangala mamsa rasa.</i>	<i>Anuvasana with Madhura oushadasidda taila, yoni pichu.</i>	<i>Vividha anna</i>

Recommended diet and regimen for various months according to *acharya Charaka* (Cha. Sha8 /32)

- **First month**

Even when pregnancy is suspected, the woman should frequently consume unprocessed milk and wholesome food in the morning and evening.

- **Second month**

Ksheera medicated with *Madhura dravya* (sweet group of drugs) should be taken.

- **Third month**

Ksheera should be taken along with *madhu* and *ghruta*.

- **Fourth month**

One Aksha of *Navaneeta* extracted from *ksheera* should be consumed.

- **Fifth month**

Ghruta prepared from milk butter should be administered.

- **Sixth month**

Ghruta processed with *Madhura Dravya* (sweet group of drugs) should be given.

- **Seventh Month**

The same regimen prescribed in the sixth month should be continued.

- **Eighth month**

During the eighth month, the pregnant woman should be given *Ksheera Yavagu* (gruel prepared with milk) along with *ghruta* during meals. Bhadrakapya opines that it should not be administered, as it may cause *Paingulya Badha* (*pingala netrata*) in the foetus. However, Lord Punarvasu Atreya states that although there is a risk of *Paingulya*, it is not a contraindication for the use of this regimen. The administration of *Ksheera Yavagu* helps the mother remain healthy and disease-free and contributes to the birth of a child endowed with *arogya, bala, varna, swara, samhanana*. According to the influence of *Ahara-Vihara*, yellowish discoloration of the eyes may occur. In another context, such discoloration is attributed to the aggravation of *Pitta Dosha*. Although the intake of *Yavagu* may cause comparatively less tissue nourishment under certain circumstances, it is administered during the eighth month because of its beneficial effects on both the mother and the foetus.

- **Ninth month**

During the ninth month, *Anuvasana basti* prepared with *taila* processed with *madhura aushadhi* should be administered. The same medicated oil should also be used as a *Yoni pichu* and placed in the vaginal canal to provide lubrication and facilitate an easier delivery.

The *Garbhini* who follows these regimens will experience the *mrudutha* in the *kati pasrhwa, prushta, vatanaulomana*, proper evacuation of *mala* and *mutra, mrududta* in the *charma* and *nakha, bala varna upachaya*, and helps in easy parturition at right time.

Prajasthapaka Dravya / Garbhasthapaka dravya (cha.su4/18)¹¹

Aindri, bramhi, doorva, patala, amalaki, lakshmana, kadali, guduchi, haritaki, katurhini, priyangu.

Garbhopaghatakara bhavas¹²

Improper diet and lifestyle during pregnancy may lead to fetal death or abortion (*Garbha mriyate antha kuskhe*) premature delivery (*akala samsrana*), foetal emaciation (*Shosha*).

- *Utkata Vishama Kathina Asana Sevana* – Sitting on hard, uneven, or uncomfortable surfaces.
- *Vata Mutra Purisha Vega Dharana* – Suppression of natural urges such as flatus, urine, and faeces.
- *Daruna Anuchita Vyayama Sevana* – Excessive or inappropriate physical exercise.
- *Tikshna Ushna Matra Sevana* – Consumption of excessively hot, pungent foods or inadequate food intake.

Other Garbhopaghatakara bhava

- *Abhighata* – Trauma or injury.
- *Prapidana* – Excessive compression of the abdomen.
- *Shvabhruka kupa avalokana* – Frequently looking into deep wells, pits, or waterfalls.
- *Prapata desha avalokana* – Travelling in jerky vehicles or over uneven terrain.
- *Apriya matra shravana* – Exposure to unpleasant sounds or loud noises.
- *Uttana shayana* – Excessive sleeping in the supine position.
- *Nabhyashraya nadi kanthamanuveshtita* – Umbilical cord encircling the fetal neck.
- *Vivruta shayini* – Sleeping in open areas.
- *Nakta charini* – Wandering during the night.
- *Apasmara puna kalikalahashila* – Frequent quarrels and physical conflicts.
- *Vyavayashila* – Excessive sexual activity during pregnancy.
- *Shoka nitya bhita* – Constant grief, fear, and anxiety, resulting in weak and short-lived progeny.

Acharya Charaka included *Ksheera*, *ghruta* and *madhu* in the first second and third month.

- **Ksheera** - *Vata-Pittahara, Sara, Balya, Medhya, Snighda, Madhura, Satmya* (charaka)¹³
Madhura rasa, dosha dhatu mala srotas kledakara, guru, sheetala, snigdha, vatapittashamaka. (BP)¹⁴

गर्भं स्रवे च सततं मुनिवरैः स्मृतम् ।¹⁵

Ksheera is indicated in the women who experiences the repeated abortions.

- **Ghruta**- *Chakshushya, Vrushya, agni Deepana, Vata-Pitta kapha shamaka, medha lavanya kanti oja vrudhikaram, vayasthapaka, guru, Balya, Rasayana, (BP)*¹⁶
Udavarthahara, Shoolahara. (charaka)¹⁷
- **Madhu**- *sheeta laghu, ruksha, grahi, vilekhana, chakshushya, Deepana, swarya, vrunashodhana ropana, srotovishodhana, varnya, medhakara, vrushya, yogavahi alpa vatala.*¹⁸
- **Navaneeta** – *chakshushya, raktapittahara, vrushya, balya, atisnigdha, Madhura, grahi, sheetala, grahi, laghu, Medhya.*¹⁹
- **Anuvasana basti**:

Anuvasana Basti is termed so for two reasons-

- a) Even if it stays for prolonged period in the body, it does not cause any harm.
- b) It can be administered daily.

The *Basti* consist of *oushadha siddha sneha* i.e. medicated material. *Basti* is advocated as a treatment for disorders of *vata* predominance. *Sneha* is the first line of treatment for *vata*

dosha. Sneha can be administered in four forms – *Pana, Abhyanga, Nasya, Basti*. *Basti* which contains *sneha* i.e. *anuvasana basti* is the most ideal

➤ **Yoni pichu**

Our acharyas explained *pichu*, one among various *sthanika chikistha*, which is widely practiced now a days with desirable results.

The routinely practiced *yonipichu* is *taila pichu*. *Yonipichu* is the application of sterile swab soaked in medicated oil or decoction etc, into the vagina.

First trimester (first 12 weeks)²⁰

Symptoms

- Amenorrhoea
- Morning sickness- Present in about 50% of cases, its intensity varies from nausea on rising from the bed to loss of appetite or even vomiting.
- Frequency of micturition
- Breast discomfort
- Fatigue

Nausea and vomiting are caused by the hormonal changes like HCG and Oestrogen and progesterone. HCG will be peak during 8-12 wk. of pregnancy stimulates the chemoreceptor trigger zone in the brain and oestrogen increases sensitivity of the stomach & brain to HCG which can cause the hyperaemia of gastric mucosa leading to the nausea.

Second trimester (13 -28 weeks)

- Chloasma – Pigmentation over the forehead and the cheek may appear about 24th week.
- Breast changes

Third trimester (29-40weeks)

- Amenorrhea persists
- Enlargement of abdomen may cause some mechanical discomfort to the patient such as palpitation, or dyspnoea following exertion.

DISCUSSION

Garbhini Paricharya is a unique concept described in Ayurveda that emphasizes systematic antenatal care through appropriate dietary regimens, lifestyle modifications, and psychological support during pregnancy. The month-wise recommendations advocated by Acharyas are designed to fulfill the changing physiological needs of both the mother and the developing fetus. These measures aim not only at ensuring normal fetal growth and maternal well-being but also at promoting the birth of a healthy offspring. An analysis of these recommendations from both Ayurvedic and contemporary scientific perspectives provides a deeper understanding of their significance and therapeutic relevance. The following discussion explores the rationale behind the various dietary and lifestyle measures prescribed during different stages of pregnancy.

Benefits of following *garbhini paricharya* for mother**First, Second and Third month****Ksheera**

Properties	Probable action
<i>Vatapitta shamaka</i>	Reducing the acidity
<i>Sara guna</i>	Early emptying of stomach contents
<i>Madhura rasa, Snigdha, sheeta guna</i>	Maintains the hydration

Ghruta

Properties	Probable action
<i>Shoolahara</i>	Reduces the Breast discomfort
<i>Balya</i>	Reduces the feeling of fatigue
<i>Udavartahara</i>	Subsides the nausea and vomiting

Madhu

Properties	Probable action
<i>Hridi prasada janaka</i>	Corrects the mood swings
<i>Trishnahara</i>	Reduces the Excessive thirst caused by frequent micturition

Fourth Month

In the fourth month, the *garbhini* experiences *guru gatrata* (heaviness of the body). Therefore, Acharyas have indicated *ksheera nishkashita navaneeta* (freshly churned butter obtained from milk), which possesses *laghu* and *sheeta guna*.

Fifth Month

In the fifth month of pregnancy, the *garbhini* becomes *karshya* due to the *upachaya* of *mamsa* and *shonita* in the *garbha*. Therefore, *madhuroushadha siddha ksheera* and *ghrita* are advised, as both possess *madhura rasa, snigdha guna*, and *balya karma*, which promote *dhatu upachaya*.

Sixth and Seventh Months

In the sixth and seventh months of pregnancy, the mother experiences *bala-varna-hani* and *klantatama* (fatigue) due to the *bala* and *varna upachaya* occurring in the *garbha*. Both *ghrita* and *ksheera* possess *balya* properties, while *ghrita* additionally enhances *kanti*.

Eighth Month

In the eighth month of pregnancy, *oja* oscillates between the *garbhini* and the *garbha*. Since *ksheera* and *oja* share similar properties, the administration of *ksheera* and *ghrita* helps in increasing and stabilizing *oja*.

Ninth Month

The ninth month of pregnancy is a crucial period, as labour may occur at any time. From the first day of the ninth month until the end of the tenth month, it is considered the normal period of labour. At the onset of labour, the foetal head descends and moves forward, preparing for delivery.

Prasooti Maruta can be considered as *Apana vata*, which is responsible for *garbha nishkramana kriya* (expulsion of the fetus). Most of the *prajayini lakshana* and *asanna prasava lakshana* are caused by the proper functioning or vitiation of *Apana vata*. As *basti* is considered the best treatment for *vata* disorders and is safer and easier to administer than *vamana* and *virechana*, *anuvasana basti* and *yoni pichu* are indicated during the ninth month to maintain the normal functioning of *Prasooti maruta*.

Benefits of following *garbhini paricharya* for the foetus

Vayu and *Ushma* play an important role in the development of the *garbha* during the first, second, and third months of pregnancy. The growth and development of the fetus occur due to the combined action of *vayu* and *ushma*. According to Acharya Harita, *Panchabhootagni* helps transform the *kalala* into *pinda*, while different types of *vayu* contribute to the formation of various *avayavas*. *Vyana vayu* is responsible for the formation of *hasta* and *pada*. *Udana vayu*, situated in the *gala* and *hridaya*, is responsible for the formation of the openings in the *mukha pradesha*. *Apana vayu* is responsible for the formation of openings in the *adho bhaga*. Thus, the various forms of *Vayu* move in different directions and contribute to the formation of the *navadvara* and other body structures.

As the remaining *avayavas* are formed by the predominance of different *mahabhootas*, maintaining the normalcy of *vayu* and *agni* plays a crucial role in fetal development. Therefore, Acharyas have recommended *ghrita* and *madhu*, which possess *agni-deepana* properties, while *ksheera* and *ghrita* help maintain *vata* balance due to their *vata-shamaka* properties.

Milk

- It is the complete food that provides macro and micro nutrients required during the pregnancy. High quality proteins present in the milk are necessary for the cell division, tissue formation, organ development and muscle growth
- Milk is rich in Calcium and phosphorous which are responsible for the bone formation in the foetus and prevents calcium depletion in mother
- Vitamin D helps in calcium absorption and bone mineralisation, Vitamin A supports growth and development of organs, vision & immunity
- Vitamin B complex helps in neural development

Ghee

- Ghee contains essential fatty acids that are responsible for brain development, myelination of nerves and cognitive growth of the foetus
- It contains fat soluble vitamins like vit-A helps in cell differentiation development of organs skin and eye, vit-D helps in calcium absorption, foetal bone mineralisation, vit-E protects the foetal cell from the oxidative stress vit-K helps in normal blood clotting mechanism.
- Fats are required for the synthesis of hormones such as progesterone and oestrogen essential for the maintenance of pregnancy and uteroplacental blood flow

Honey

- Glucose is the primary energy source for the foetal brain development so honey helps maintain maternal blood glucose levels.
- Adequate carbohydrate intake from honey prevents maternal ketosis which can adversely affect the foetal development.

Foetal complications due to inadequate maternal nutrition during pregnancy.

- Developmental cardiovascular diseases²¹
- Low maternal dairy intake leads to the risk of hypospadias in male foetus²²
- Low birth weight due to restricting milk consumption and vit-D intake²³
- Low IQ, altered visual acuity, Altered cognitive, language, motor development due to the insufficiency of fatty acids like omega -3 and omega-6.²⁴
- Intrauterine growth retardation of the newborn due to the low milk intake in pregnancy.²⁵

Conclusion

Garbhini paricharya is a comprehensive antenatal care regimen described in ayurveda for ensuring the health of both the mother and the foetus throughout pregnancy. The month-wise dietary and lifestyle measures advocated by Acharya Charaka are designed to meet the physiological demands of each stage of gestation, promote proper foetal growth and development, maintain maternal strength, and facilitate smooth and uncomplicated labour. The use of *ksheera*, *ghrita*, *madhu*, and other prescribed substances provides nourishment, supports tissue development, maintains *ojas*, and helps alleviate pregnancy-related discomforts. Furthermore, the avoidance of *garbhopaghatakara bhavas* plays a significant role in preventing maternal and foetal complications. In the present era, where lifestyle-related disorders and obstetric interventions are increasing, the principles of *garbhini paricharya* offer a holistic and preventive approach to antenatal care. Therefore, proper understanding and implementation of this regimen can contribute significantly to achieving healthy pregnancy outcomes and enhancing maternal and foetal well-being.

REFERENCES

1. Raja Radhakanta Dev. editor. Shabdakalpadruma dwitiya Kanda. Reprint ed. New Delhi. Nag Publishers.2006. p.326
2. Oka Govind Krishnaji(editor) The Namalinganusasana(Amarakosha) of Amarasimha. Ed. Poona. Law Printing Press.1913.270
3. Vaman Shivram Apte. The practical Sanskrit- English Dictionary. Reprint ed. New Delhi. Motilal Banarsidass Publishers.2004.401
4. Raja Radhakanta Dev. editor. Shabdakalpadruma Tritiya Kanda. Reprint ed. New Delhi. Nag Publishers.2006. p .58
5. Raja Radhakanta Dev. editor. Shabdakalpadruma Tritiya Kanda. Reprint ed. New Delhi. Nag Publishers.2006. p .58
6. Vaman Shivram Apte. The practical Sanskrit- English Dictionary. Reprint ed. New Delhi.Motilal Banarsidass Publishers.2004.593
7. Acharya Yadavji Trikamji(ed.) Charaka Samhita with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia ;2021. p.346
8. Acharya Yadavji Trikamji(editor). Sushruta Samhita with Nibandha Sangraha commentary of Dalhanacharya and Nyayachandrika Panjika of Sri Gayadasacharya on Nidanasthana. Reprinted ed. Varanasi: Chaukhambha Sanskrit Sansthan.2019. p.387
9. Hari Sadasiv Sastri Paradakara(editor). Ashtanga Hrudayam of Vagbhata with Sarvanga Sundara of Arunadatta & Ayurvedarasayana of Hemadri. Varanasi Chaukhambha Surbharati Prakashan.2022. p.369-373
10. Vaidya Jaimini Pandeya. Harita Samhita with Nirmala hindi commentary. Varanasi Chaukhamba Vishwabharati .2020.p.467
11. Acharya Yadavji Trikamji(ed.) Charaka Samhita with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia ;2021. p .34
12. Acharya Yadavji Trikamji(ed.) Charaka Samhita with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia ;2021. p .343

13. Acharya Yadavji Trikamji(ed.) Charaka Samhita with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia ;2021. p.165
14. Bulusu Sitaram, editor. Bhavaprakasha ed. Varanasi:Chaukhambha Orientalia,2018. p.524
15. Bulusu Sitaram, editor. Bhavaprakasha ed. Varanasi:Chaukhambha Orientalia,2018. p.524
16. Bulusu Sitaram, editor. Bhavaprakasha ed. Varanasi:Chaukhambha Orientalia,2018. p.537
17. Acharya Yadavji Trikamji(ed.) Charaka Samhita with Ayurveda Dipika commentary of Chakrapani in Sanskrit. Reprinted ed. Varanasi: Chaukhambha Orientalia ;2021. p.166
18. Bulusu Sitaram, editor. Bhavaprakasha ed. Varanasi:Chaukhambha Orientalia,2018. p.550
19. Bulusu Sitaram, editor. Bhavaprakasha ed. Varanasi:Chaukhambha Orientalia,2018. p.536
20. Hiralal konar (ed) DC datta. Textbook of obstetrics. Jaypee brother's medical publishers. Seventh edition,2013. p. 64-71
21. Cui S, Deng F, Lu M, Zhang M, Yang Z, Ma Y, Fan L, Gao Q and Feng D (2026) Maternal nutritional imbalance during pregnancy and the development of fetal-origin cardiovascular diseases.Front. Nutr. 13: 1717069.doi: 10.3389/fnut.2026.1717069
22. Huang D, Wu Q, Xu X, Ji C, Xia Y, Zhao Z, Dai H, Li H, Gao S, Chang Q and Zhao Y (2022) Maternal Consumption of Milk or Dairy Products During Pregnancy and Birth Outcomes: A Systematic Review and Dose-Response Meta-Analysis. Front. Nutr. 9:900529. doi: 10.3389/fnut.2022.900529
23. Mannion CA, Gray-Donald K, Koski KG. Association of low intake of milk and vitamin D during pregnancy with decreased birth weight. CMAJ. 2006 Apr 25;174(9):1273-7. doi: 10.1503/cmaj.1041388. PMID: 16636326; PMCID: PMC1435952.
24. Cortés-Albornoz MC, García-Guáqueta DP, Velez-van-Meerbeke A, Talero-Gutiérrez C. Maternal Nutrition and Neurodevelopment: A Scoping Review. Nutrients. 2021 Oct 8;13(10):3530. doi: 10.3390/nu13103530. PMID: 34684531; PMCID: PMC8538181.
25. Ludvigsson JF, Ludvigsson J. Milk consumption during pregnancy and infant birthweight. Acta Paediatr. 2004 Nov;93(11):1474-8. doi: 10.1080/08035250410018319. PMID: 15513575.