

# GOVERNANCE OF HIGHER EDUCATION IN INDIAN SYSTEMS OF MEDICINE: ISSUES, CONCERNS, AND CHALLENGES

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## General Background:

Ayurveda is the native Indian system of healthcare that is currently used by millions of people for their day-to-day healthcare needs. In ancient India, the 'Gurukula' system of training was the model of Ayurveda education that was generally followed. In 'Gurukula', a teacher or 'Guru' used to live with his family and establishment, and used to train the students in eight specialized branches of Ayurveda on the basis of the textbooks known as 'Samhita's that were authored around 1000 BC. This model suffered a setback during the medieval and colonial periods of Indian history [1].

The literature of Siddha system of medicine, one of the very old among its counterparts, is in Tamil language and is practised largely in Tamil speaking regions of India. The system uses metals and minerals liberally in the therapeutic processes [2].

Unani system of medicine originated in Greece and passed through many countries before establishing itself in India during the medieval period. This system is based on the teachings of Hippocrates and Gallen, which were developed in to a complete system of healthcare by Arabs like Rhazes, Avicenna, Al-Zahravi, Ibne-Nafis and others [2]. It emphasizes the use of naturally occurring herbal, animal, marine and mineral forms of drugs [3].

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## **ASU education: Current Organizational Structure**

Today, India officially recognizes ASU systems of medicine along with the conventional biomedicine (Allopathy). To patronize and promote these indigenous systems, the Government of India established a separate department for Indian Systems of Medicine and Homeopathy (ISM&H) in 1995 which is now known as AYUSH [2]. The Central Council of Indian Medicine (CCIM), which was established through Indian Medicine Central Council Act of 1970, is the governing body that monitors the matters related to ASU education in India [4].

So far, a total of 290 colleges/institutions have been permitted by CCIM to undertake undergraduate / post graduate programs and these colleges are affiliated with 57 recognized universities throughout the country including two exclusive Ayurveda universities and six Health Universities [3].

Among ASU systems, presently, Ayurveda holds a prominent position and a major share in the infrastructural facilities in terms of the number of hospitals, dispensaries, drug manufacturing units, educational institutions and also in terms of the total number of registered medical practitioners [3].

## **Ayurveda: The Current Global Scenario**

Perceptions about Ayurveda in India and abroad have undergone a huge change during the last 20 to 25 years. On one hand, a large population from all over the world is being attracted towards Ayurveda because of the terms like ‘Holistic’, ‘Natural’, and ‘Spiritual’ that are associated with it. The increasing use of Ayurveda medicines is being accepted as a reality in the developed countries like US as well. For example, according to the 2007 National Health Interview Survey, more than 200,000 US adults had used Ayurveda medicine in 2006 alone [5]. Many medical schools and other institutes all over the world have started offering some degree or diploma programs in Ayurveda. Several publication houses of international repute have started publishing literature on Ayurveda. Even the individuals with no formal Ayurveda education have started authoring books and research papers on Ayurveda [6]. Ayurveda is also being seen as a rich resource for new drug development by modern day pharmacologists [7].

On the other hand, questions on safety and efficacy of Ayurveda products are also being raised. In 2004, the Journal of American Medical Association (JAMA) published a research paper, which concluded that one out of the five Ayurveda Herbal Medicine Products available in Boston South Asian grocery stores contained potentially harmful levels of lead, mercury and/or arsenic. The paper also suggested that the users of

Ayurveda medicine may be at risk for heavy-metal toxicity [8]. This concern has led some countries like Canada to curb the import of Ayurveda preparations from India [9]. JAMA published a similar research paper in 2008 too, that raised an alarm against the use of Ayurveda products sold through internet, because of possible heavy metal contamination [10]. Recently, the New South Wales department of health issued a warning through media asking its citizens to be careful while taking traditional Ayurveda medicines purchased from India. This warning was issued following the hospitalisation of a man with lead poisoning who consumed Ayurveda medicines purchased through internet [11]. The Government of India too, in its National Policy on Indian Systems of Medicine and Homeopathy, 2002 had admitted that the safety, efficacy, quality of drugs and their rational use were not assured in India [12]. Thus, Ayurveda is globally being perceived in several contradictory ways.

### **Issues, Concerns and Challenges of ASU education:**

Almost no systematically conducted study is available that addresses the issues, concerns and challenges in relation to ASU education in India, though, a few scattered papers based on individual perceptions are available. Our team completed a nationwide survey on Ayurveda education in 2008 that included interns, postgraduate students and teachers from 32 Ayurveda institutions spread across 18 states of India. We have reported our findings in the form of different research papers [1, 13, 14, and 15] because the data we collected was too huge to be incorporated in a single paper and the questions that we addressed in each paper were substantially different from those addressed in others. As a summary, we concluded that the exposure to basic clinical skills was insufficient during the graduate level Ayurveda education [1]. Our study also threw some light on certain global challenges and concerns that Ayurveda education sector was facing [14]. We have also suggested some curricular reforms to tackle these challenges [13, 16].

The major issues, concerns, and challenges of Ayurveda education that we have recognized, have been summarised in the following paragraphs, which certainly share some common points with Siddha and Unani systems too.

### **Question of Policy Model:**

A major concern that is being voiced in relation to the overall scenario of medical education in India is that of medical pluralism. This is because, currently, India follows the policy model of 'parallel approach', where, traditional systems of medicine and modern system of biomedicine are isolated within the national health system. This model has led to many problems like, legal conflicts related to cross prescriptions [17],

generation of hybrid curricula, and production of substandard graduates who are neither acceptable to ASU systems nor to modern biomedicine [18]. Whether a physician institutionally trained in ASU systems is eligible to practice modern biomedicine or not - has become a debatable question even at legal platforms and has given rise to contradictory judgements [19, 20]. This situation has also given rise to problems that have limited the potential participation of ASU experts in health programmes of National importance like immunization, and programmes on tuberculosis, leprosy, AIDS etc.

Adaptation of the policy model of 'integrated approach', where, all streams of medicine are integrated at all the levels of medical education and practice, may be the eventual solution for this problem. This model is being followed in some countries such as China and Vietnam and has witnessed a considerable magnitude of success [18, 21]. In addition to this, the idea of practical integration of Complementary and Alternative Medicine (CAM) with the modern biomedicine is gaining momentum in countries like Germany, Italy, Russia and Sweden [22, 23, 24, and 25]. 'Bilateral Education' model can be the other alternative, where, students from one tradition are cross-taught by the experts from the other tradition, imparting knowledge and values in concurrence [26].

### **Question of Mainstreaming:**

The department of AYUSH has been stating that bringing AYUSH systems into mainstream is one of its key aims [3]. However, a working model of education is yet to be evolved for achieving this goal. For example, there are very few options available for ASU graduates for furthering their education. There is a need of considering these graduates to be eligible for pursuing some mainstream science programs like MSc in Botany, Biochemistry, Physiology, Microbiology, Pharmacognosy etc. A few universities like University of Madras and Manipal University are already offering such advanced courses for Ayurveda and Siddha graduates. Also, there is a need of considering these graduates eligible for pursuing advanced programs in clinical research, hospital management, telemedicine, medical informatics etc. By doing this, not only these graduates will have more options to evolve their careers, but also they will be able to carry out quality research in ASU systems. However, to achieve this, the quality of graduate level ASU programs is required to be improved by incorporating some essential information related to these fields and by reducing some impractical, textbook-oriented and literature-oriented points from the existing syllabi [1, 13].

Creating some service opportunities for ASU experts in some government sectors like defence and railways may also help in mainstreaming these systems. Also, in Indian Civil Services, ASU subjects are required to be included just like modern medicine.

## **Curricular Reforms:**

Certain essential topics related to medical practice including cost effective medical practice, quality assurance, practice management, clinical decision making, care of hospitalized patients, ethical decision making and medical record-keeping are not there in the present curriculum [27]. The fundamental knowledge related to the methods of quantitative and qualitative analysis of chemical components of Ayurvedic preparations, essential information related to recent advances in pharmacodynamic / pharmacognostic / phytochemical attributes of various Ayurvedic herbs and methods of evaluation of their pharmacological effects are also to be included in the curricula of graduate programs along with the basic knowledge related to various technologically advanced methods of 'Drug Standardization'. Furthermore, at present, the essential knowledge related to patenting procedures, intellectual property rights and related international laws is not included in the Ayurveda curricula and is required to be included [13, 14 and 15].

A multi-disciplinary approach in education system will be the ideal model for ASU education. For example, some teachers from analytical chemistry, phyto-chemistry, botany, pharmaceutical chemistry may have to be recruited in teaching institutions to impart the required training [13, 16].

Another option could be to introduce some of these subjects as 'electives' and implementing the Choice Based Credit System for ASU education. This will open up more career opportunities for a graduate in main stream science subjects.

## **Need to Reduce the Duration of the Programs:**

A general tendency of disinterest to take up medical profession as a career choice is being observed among young students across the globe. In India, this is mainly because of the fact that technical profession is becoming more attractive than the medical profession. The important reasons for this declining popularity of medical profession are: i) a very long duration of study that is required to acquire some specialization and associated expenditure of the resources; and, ii) a better earning that a short term technical education promises. To tackle this situation, some scholars recommend that the duration of medical education needs to be shortened by a year or two [28, 29].

This applies to ASU education as well. This can be practically done either by introducing some optional early exit point from the existing programs or by combining the graduate and post graduate levels of programs and reducing the total duration of the program by one year or so.

In these circumstances, the recent proposal of CCIM to introduce a 7.5 years' graduate program in Ayurveda, set to commence just after the completion of secondary school education, is being criticised from many corners. 'Are our students mature enough to take a decision on their career, just after completing their secondary education?' is the question that most of the critics are asking. Similarly, this author finds the recent decision of CCIM to start 2 years of post graduate diploma education in many subjects, also to be non-convincing (16).

### **Quality of Institutions:**

Another very significant concern that is being articulated from many corners is about the mushroom growth in the number of substandard Ayurveda colleges during the last 2-3 decades [1]. This mushrooming has been mainly because of the 'profit making attitude' of private partners. While one should recognize the significant contribution of the private sector in the field of higher education in India, one must also accept the fact that many institutions see education simply as a profit making business. A heavy capitation fee these institutions charge has made education an 'out of the reach' commodity for the students belonging to economically backward classes. Corruption in the governing bodies, loopholes in the existing Acts, and non-willingness among the academicians involved in this sector to ensure the quality of education have been the major causes of this mushrooming. Though, CCIM has proposed several minimum standards that are required to be ensured in an institution for it to be recognised [30], implementation of these regulations has been poor. Many institutions, including government-managed ones, do not provide basic infrastructural facilities like well equipped laboratories, good hospital facilities, good herbal garden, well equipped pharmacy, and library with internet facilities.

Enhanced State-funding to the private colleges, and support to the industry - academia partnership programs may be required to ensure that cost of the education does not become unaffordable while guaranteeing the quality of education.

### **Quality of Teachers:**

There exists no mechanism at present to ensure that only those candidates having an inclination and aptitude for teaching enter the teaching profession. Interviews conducted for the purpose of selection are usually not well organized [31]. Often, teaching and communication skills are not assessed while recruiting the teachers. There is no National Eligibility Test (NET) like mechanism that takes care of this concern in ASU systems. Therefore, a NET like eligibility test is needed to be introduced [32].

At present, the minimum number of teachers recommended by CCIM is often not adhered to, and instead, teachers are hired by some fraudulent methods especially by private institutions. Many institutes ask these teachers to deposit their certificates and ask them to appear before the inspection committees only once or twice in a year. They are not required to be present in the college throughout the remaining period of the year. For this favour, they are often paid a monthly salary, which is obviously a compromised amount. Unfortunately, this practice has evolved as a convenient method of ensuring mutual profit. This is true for many of the private medical colleges regulated by Medical Council of India (MCI) also [33].

Another problem with the private Ayurveda colleges is that the salaries they pay for regular teachers are far less than the ones that are paid in government institutions. Even in the government institutions, salaries vary from one state to another. There is no regulatory body that monitors and ensures a respectable minimum salary to these teachers [32]. Similarly, in most of these colleges, no mechanism exists to ensure uniform career advancement for the teachers. This situation has resulted in development of an attitude of reluctance among the able clinicians that de-motivates them from entering into the teaching profession.

Policies of recruitment of teachers are not transparent in most of the institutions. Even in government sector, the criteria for recruiting the teachers are not uniform. Private institutions often neglect the standard procedure of recruitment, like advertising the vacant post, standard procedure of fixation of pay, constituting a proper selection committee, ensuring the minimum teaching experience required for a higher post etc.

However, if the proposed 'Prohibition of Unfair Practices in Technical Educational Institutions, Medical Educational Institutions And Universities Bill, 2010' and 'Educational Tribunals Bill, 2010' come into force, many of these concerns will hopefully be addressed [34].

### **Educational Research and Teachers' Training:**

Recently, many Reorientation Training Programs (RoTP) for teachers are being convened at various institutions all over India, which is a promising development. These programs are being organised through Rashtriya Ayurveda Vidyapith (RAV) However, during these programs, the required emphasis on the effective teaching methods, using the e-content, writing the research papers, development of standard research protocols etc. are usually left untouched. Incorporation of experts from fields other than Ayurveda is also required to be encouraged in such training programs. Most of these programs are being criticised because of their monotonous nature which is not very different from the routine teaching sessions in the colleges.

Also, only a limited amount of literature is available on ASU educational research at present. Therefore, a mechanism to conduct continuous educational research so as to ensure the relevance of education and also to put forth recommendations from time to time to improve the standards of education is required to be developed [32].

### **Pharmacy Education:**

Ultimately it is the quality of medicinal preparations that brings identity to Ayurveda in the society. There were 9173 AYUSH licensed pharmacies in the country in 2008. Out of these drug manufacturing units, 86.23% pharmacies belonged to Ayurveda [3]. However, in recent years, Ayurveda is being targeted world over for the heavy metal content in many of the medicinal preparations [8, 9, 10, 11, 35, 36, 37 and 38]. Several clinical cases have been reported, wherein, the clinical toxicity has been ascribed to the consumption of Ayurveda medicines. This has had a negative impact on the exports of Ayurveda medicines [39].

The most important cause for this scenario is that the pharmacy education in Ayurveda is not well organized. Several programs of varying durations, like D. Pharma (Ay), B. Pharma (Ayurveda), M. Pharma (Ayurveda), PG Diploma in Ayurvedic Pharmaceutics etc are being run which are not adequately regulated. The demarcation between M.D.(Ay) Rasashastra / M.D.(Ay) Bhaishajya Kalpana and these programs is not very clear. Though some regulatory norms like Good Manufacturing Practices (GMP) and programs on Pharmaco-vigilance have been implemented [37], the quality of medicinal preparations being marketed through the internet, especially in overseas is not well-controlled.

A bill (The Indian Medicine and Homoeopathy Pharmacy Bill) that was introduced in 2005, and was intended to take care of most of these concerns is pending before the parliament [34], and, if this comes into force, will definitely prove beneficial.

### **Paramedical Education:**

There are around 70 institutions that offer paramedical education in AYUSH systems in India at present [3]. Various heterogeneous programs like Compounder Training Course (Ayurveda), Diploma in Ayurveda Pharmacy, Ayurveda Pharmacist Training Course, Ayurveda Compounder Certificate Course are being run in these institutions [3]. This sector of education is also largely unregulated. There are no regulatory norms to monitor and to ensure quality education in these institutions. Paramedical education to produce good Ayurveda nursing staff, Panchakarma therapists and Pharmacists requires to be properly regulated.



### **Education on cultivation of medicinal plants:**

Gujarat Ayurveda University runs a program called MSc in medicinal plants, which, an Ayurveda graduate is eligible to pursue. Apart from this, only a few institutes of agriculture sciences in India offer education on cultivation in medicinal and aromatic plants. An Ayurveda graduate, however, is not eligible to be registered under these programs. Therefore, some mechanism is required to be introduced to ensure education in this area so that quality medicinal and aromatic plants are cultivated and quality of medicinal preparations is not compromised. Good Agricultural Practices, as practiced in China, is another domain that needs attention so that the uniform quality of herbs is maintained [21, 39].

### **Accreditation Mechanism Required:**

A bill is pending before the parliament (The National Accreditation Regulatory Authority for Higher Educational Institutions Bill, 2010) that seeks to make it mandatory for every higher educational institution (other than institutions engaged in agricultural education) to be accredited by an independent accreditation agency in order to maintain academic quality [34]. Absence of such a mechanism so far has been a drawback and a motivation to achieve higher standards was lacking among the institutions. If this proposed mechanism comes into force, a healthy competition can be expected to develop among the institutions offering higher education. This will also serve as a guideline for the aspiring students while deciding their choices regarding the institutions.

### **Academic Dishonesty and need for Value Education:**

Though this topic is not much talked about, there is sufficient evidence to say that academic dishonesty pervades all levels of medical education in India, and Ayurveda education cannot be an exception. This dishonesty varies from seemingly trivial acts like students copying during a class-test to serious acts like academicians ignoring or encouraging plagiarism or allowing some cooked data to be incorporated in the dissertations of their students [40]. The act of administrators submitting a falsified number of teachers and other infrastructural facilities available in the colleges, also falls under the category of academic dishonesty [40]. Copying the materials from the resources available on the internet and incorporating them as if they are their own while authoring papers/ textbooks is another form of dishonesty that is widely practiced. All these problems can be tackled only if some mechanism to fix the responsibility is put into place. Incorporating the value education in the education system may also contribute its share in this aspect.

## Conclusion:

In a nutshell, it may be stated that reforms are required at every level of ASU education to be able to produce skilful, resourceful and knowledgeable graduates who can positively contribute to the cause of humanity.

## References:

1. Patwardhan K, Gehlot S, Singh G and Rathore HCS. *The Ayurveda Education in India: How Well are the Graduates Exposed to Basic Clinical Skills?* Evidence Based Complementary and Alternative Medicine. [In Press]. doi:10.1093/ecam/nep113
2. Department of AYUSH. *Background*. Available at <http://www.indianmedicine.nic.in/background.asp> [date last accessed August 29, 2010].
3. Government of India. *Draft copy of AYUSH in 2008*. Available at [http://www.indianmedicine.nic.in/AYUSH2008%20Draft%20\(For%20Website\)/Cover%20and%20Contents/0.0.C.%20Index.pdf](http://www.indianmedicine.nic.in/AYUSH2008%20Draft%20(For%20Website)/Cover%20and%20Contents/0.0.C.%20Index.pdf) [date last accessed Aug 29, 2010].
4. Central Council of Indian Medicine. *About CCIM*. Available at [http://ccimindia.org/introduction\\_ccim.html](http://ccimindia.org/introduction_ccim.html) [date last accessed August 29, 2010].
5. The National Center for Complementary and Alternative Medicine, USA. Available from: <http://nccam.nih.gov/health/ayurveda/introduction.htm#ususe> [date last accessed Aug 29, 2010].
6. Wujastyk D, Smith FM, editors. *Modern and Global Ayurveda, pluralism and paradigms*. State University of New York Press. ISBN: 9780791474891.
7. Patwardhan B, Vaidya AD, Chorghade M. *Ayurveda and natural products drug discovery*. Current Science 2004;86:789-99.
8. Saper RB, Kales SN, Paquin J, Burns MJ, Eisenberg DM, Davis RB, Phillips RS. *Heavy metal content of ayurvedic herbal medicine products*. Journal of American Medical Association 2004; 292:2868-73.
9. News Report. *Export of Ayurvedic medicines affected due to high heavy metal content*. Available from: <http://www.bio-medicine.org/medicine-news/Export-Of-Ayurvedic-medicines-Affected-Due-To-High-Heavy-Metal-Content-6365-1/> [date last accessed Aug 29, 2010].
10. Saper RB, Phillips RS, Sehgal A, Khouri N, Davis RB, Paquin J, et al. *Lead, Mercury, and Arsenic in US- and Indian-Manufactured Ayurvedic Medicines Sold via the Internet*. Journal of American Medical Association 2008;300:915-23.

11. NSW Health. *Warning on lead poisoning from imported traditional Indian (Ayurvedic) medicine issued on August 4, 2010*. Available from: [http://www.health.nsw.gov.au/news/2010/20100804\\_01.html](http://www.health.nsw.gov.au/news/2010/20100804_01.html) [date last accessed August 29, 2010].
12. Government of India. *National Policy on ISM&H [2002]*. Available from: [http://www.whoindia.org/LinkFiles/AYUSH\\_NPolicy-ISM&H-Homeopathy.pdf](http://www.whoindia.org/LinkFiles/AYUSH_NPolicy-ISM&H-Homeopathy.pdf) [date last accessed Aug 29, 2010].
13. Patwardhan K, Gehlot S, Singh G and Rathore HCS. *Graduate level Ayurveda Education: Relevance of Curriculum and Teaching methodology*. Journal of Ayurveda. National Institute of Ayurveda. Jaipur. 2009; 3[2]:73-82.
14. Patwardhan K, Gehlot S, Singh G and Rathore HCS. *Global challenges of graduate level Ayurvedic education: A survey*. International Journal of Ayurveda Research. 2010;1[1]: 49-54. doi:10.4103/0974-7788.59945
15. Patwardhan K, Gehlot S and Rathore HCS. *Problems of Graduate Level Ayurvedic Education in India*. University News. 2009;47[49]:07-13.
16. Patwardhan K. *How practical are the 'Teaching Reforms' without 'Curricular Reforms'?* Journal of Ayurveda and Integrative Medicine. [In press].
17. Verma U, Sharma R, Gupta P, Gupta S, Kapoor B. *Allopathic Vs Ayurvedic Practices in Tertiary care Institutes of Urban North India*. Indian Journal of Pharmacology. 2007;39[1]:52-54
18. Bodeker G. *Lessons on integration from the developing world's experience*. British Medical Journal 2001; 322:164–167.
19. Asian Tribune Report on Madras High Court Decision. *Ban to practice Allopathy by Traditional Doctors: Madras High Court ordered*. Available from: <http://www.asiantribune.com/news/2010/02/17/ban-practice-allopathy-traditional-doctors-madras-high-court-ordered> [Date last accessed: September 1, 2010].
20. The Times of India. TNN. News Report. *Unani and Ayurveda docs can conduct surgery: Madras HC*. Jul 30, 2010. Available from: <http://timesofindia.indiatimes.com/india/Unani-and-ayurveda-docs-can-conduct-surgery-Madras-HC/articleshow/6235009.cms> [Date last accessed: September 1, 2010].
21. Patwardhan B, Warude D, Pushpangadan P, Bhatt N. *Ayurveda and traditional Chinese medicine: a comparative overview*. Evidence based Complementary and Alternative Medicine. 2005;2:465–473.
22. Joos S, Musselmann B, Szecsenyi J. Integration of complementary and alternative medicine into family practices in Germany: results of a National Survey. In: Evidence based Complementary and Alternative Medicine. [Advance Access published on March 17, 2009]. doi:10.1093/ecam/nep019.

23. Nuzzi R. Book review. Non conventional medicine in Italy. History, problems, prospects for integration. In: Evidence based Complementary and Alternative Medicine. [Advance Access Published on January 8, 2008]. doi:10.1093/ecam/nem174.
24. Korotkov K. Book Review. The scientific basis of integrative medicine. Evidence based Complementary and Alternative Medicine. 2005;2: 425–6.
25. Sundberg T, Halpin J, Warenmark A, Falkenberg T. Towards a model for integrative medicine in Swedish primary care. BMC Health Services Res. 2007;7:107.
26. Stumpf SH, Shapiro SJ. Bilateral integrative medicine, obviously. Evidence based Complementary and Alternative Medicine. 2006;3:279–82.
27. Ayurveda Curriculum prescribed by Central Council of Indian Medicine. Available at [http://ccimindia.org/curriculum\\_ayurveda.html](http://ccimindia.org/curriculum_ayurveda.html) [date last accessed August 29, 2010].
28. Michael E. Whitcomb. *Who Will Study Medicine in the Future?* Academic Medicine. 2006;81[3]:205-206.
29. Chronicle of Higher Education. Monday, February 02, 2009. Available at <http://med.ucmerced.edu/2.asp?uc=1&lv12=30&lv13=30&lv14=41&contentid=175> [Date last accessed 5 September 2010]
30. Central Council of Indian Medicine. Minimum Standards of Education in Indian Medicine Regulations, 1986. Available at [http://ccimindia.org/curriculum\\_ayurveda\\_minimum\\_1.html](http://ccimindia.org/curriculum_ayurveda_minimum_1.html) [date last accessed 29th August 2010].
31. Sharma PD, Sharma OP. *Interviews in academics – need for moderation.* Current Science, 2010;99[1]:8.
32. Patwardhan K. *Author's reply.* International Journal of Ayurveda Research. 2010;1[2]:133-134.
33. Deshpande SR, Deshpande NGS. *Crass commercialization and corruption of the Indian medical education system and the resultant decay of the Indian Health Education in the last two decades. A case for urgent international review and monitoring.* Electronic Physician 2009;1:9-16.
34. PRS Legislative Research. Bills related to HRD/Labour/Health. Available at: <http://www.prsindia.org/index.php?name=Sections&id=6&category=43> [date last accessed August 29, 2010].
35. Gogtay NJ, Bhatt HA, Dalvi SS, Kshirsagar NA. *The use and safety of non-allopathic Indian medicines.* Drug Safety 2002;25:1005–19.
36. Johan van Schalkwyk, James Davidson, Barry Palmer, Virginia Hope. *Ayurvedic medicine: patients in peril from plumbism.* Journal of the New Zealand Medical Association, 05-May-2006, Vol. 119 No 1233.

37. Thatte U, Bhalerao S. *Pharmacovigilance of ayurvedic medicines in India*. Indian Journal of Pharmacology 2008;40:10-2.
38. Thatte UM, Rege NN, Phatak S, Dahanukar SA. *The flip side of ayurveda?* Journal of Postgraduate Medicine. 1993;39:179-82.
39. Aneesh TP, Mohamed Hisham, Sonal Sekhar M, Manjusree Madhu and Deepa TV. *International Market Scenario of Traditional Indian herbal drugs – India declining...* International Journal of Green Pharmacy. 2009: doi:10.4103/0973-8258.56271.
40. Gitanjali B. *Academic dishonesty in Indian medical colleges*. Journal of Post Graduate Medicine. 2004;50[4]: 281-284.

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