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## Faculty Development Program for IIHMR Group of Institutions

### Gender before birth in India

### Walking the fine line between science and culture

Date: September 18, 2021



**Sutapa Bandyopadhyay Neogi**

Director  
IIHMR Delhi

Dr Sutapa B Neogi is a public health specialist actively engaged in research and teaching at Indian Institute of Public Health- Delhi (IIPHD), Public Health Foundation of India (PHFI). An MBBS from Nil Ratan Sircar Medical College, Calcutta and MD in Community Medicine from Post Graduate Institute of Medical education and Research (PGIMER), Chandigarh, and Diplomate of National Board (DNB) in Maternal and Child Health, she has excellent academic credentials. She received the 'Kataria Memorial Gold Medal' for being the best outgoing student of PGIMER, Chandigarh. She has a rich experience in public health and is particularly interested in implementation of projects that is relevant to national policies and programmes. She has authored several research papers and is a reviewer of many national and international journals. She is an associate Editor of BMC Pregnancy and Childbirth. She offers her technical services to various academic and research bodies in the country. Her goal is to mentor students who can be change agents in future, those who can see through problems, explore them scientifically, be a link between disciplines (eg engineering and medicine, social science and medicine), generate synergy between research and programs and promote interdisciplinary research in the country by leading and being a part of an able team.

# Gender before birth in India

*Walking the fine line  
between science and culture*

***Sutapa Bandyopadhyay Neogi,  
Director***



# RCH course for Medical officers

22<sup>nd</sup> Oct 2002, SIHFW, Panchkula



A MO “5 cases of spina bifida in her PHC in a month. All cases negative for the usual causes”

Another participant of next batch:

*“These could be because people in this region take medicines for a male child. We cannot think of any other cause”*

# Exploratory study

- Started exploring it by asking field workers
- Lot of resistance
- Snow ball technique to identify key informants
- At least 50 KIs interviewed
  - Dais, health workers- male/ female, faith healers, Ayurvedic doctors, allopathic doctors, village women



# Key messages

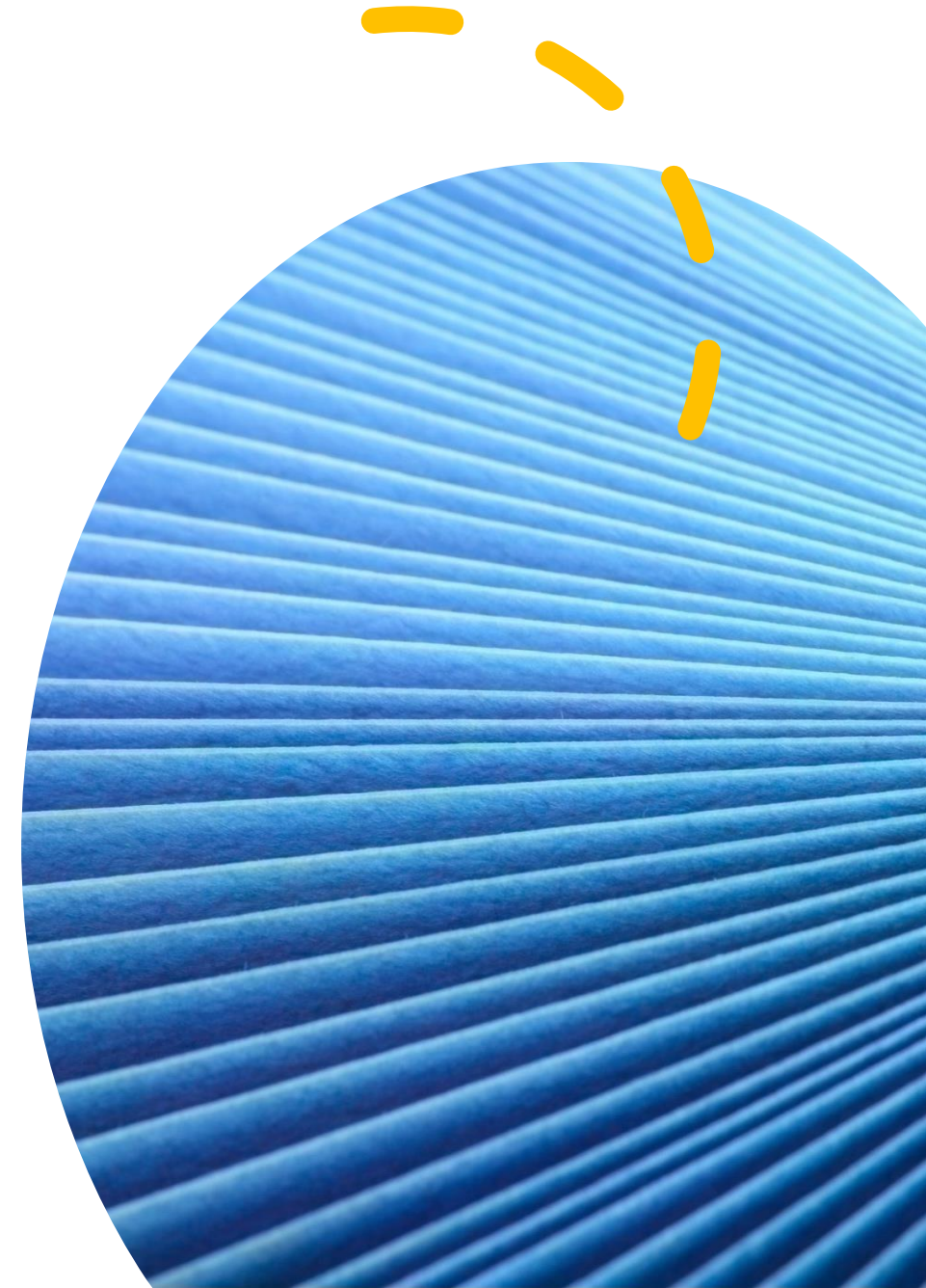
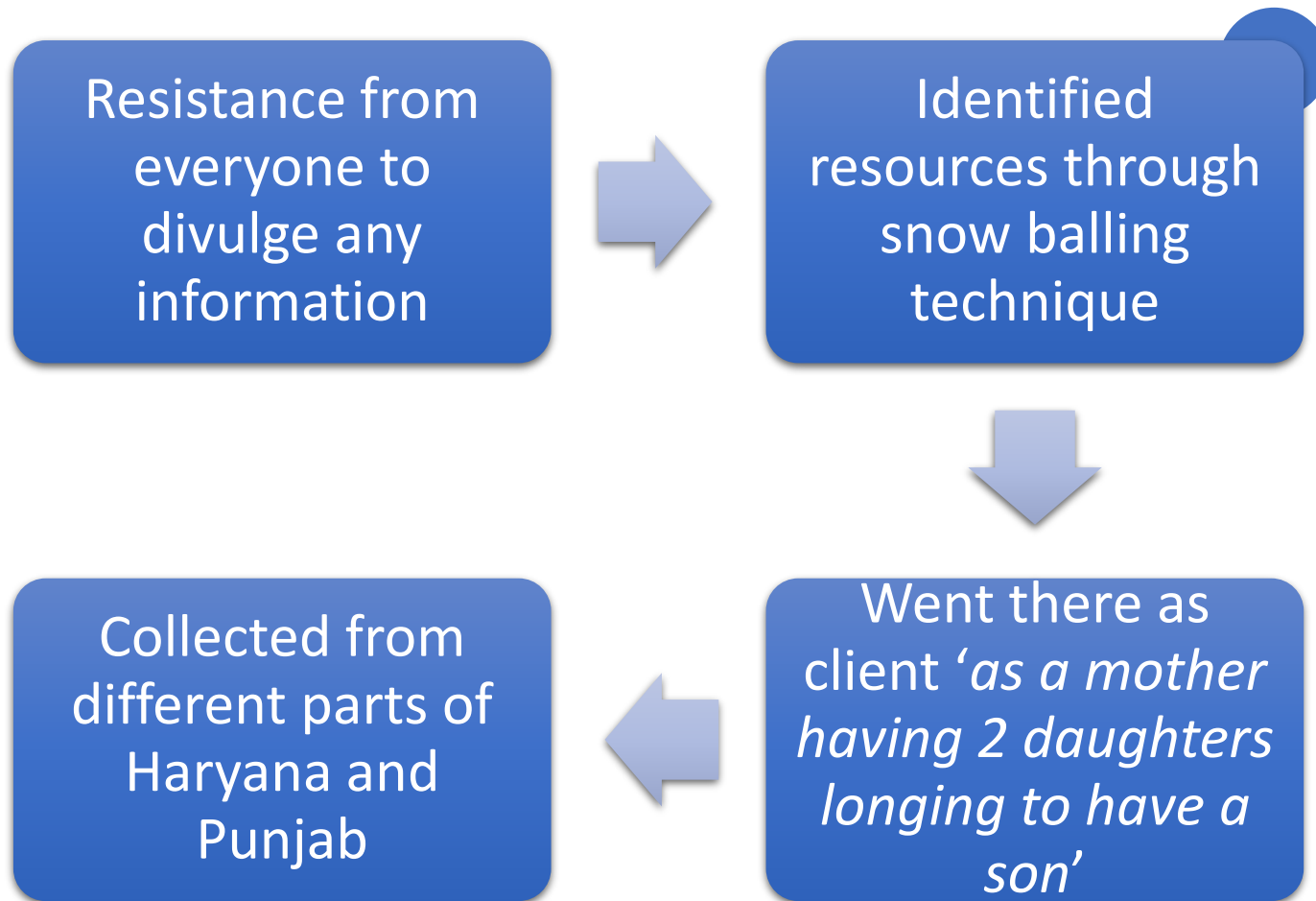
- It is a common practice referred to as “*su badalne ki dawai*”
- Indigenously prepared
- Taken by women during 1 ½ - 2 months of pregnancy
- To be consumed with milk obtained from a bull calf
- *Shivlingi, Majuphal, Mor pankh ka chand-* common ingredients
- We labelled them as Sex selection drugs (SSD)

# Community and hospital based survey

Profile of women taking SSDs

Number of children	Community based (n=110)		Hospital based (n=140)	
	Yes	No	Yes	No
None	1	5	5	45
$\geq 1$ child, at least 1 son	0	55	5	28
$\geq 1$ child, no son	49	0	33	24
<b>Total</b>	<b>50 (45.5%)</b>	<b>60 (54.5%)</b>	<b>43 (31%)</b>	<b>97 (69%)</b>

# Collection of samples



Sex se

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## सेवन विधि "पुत्र दाता गोलियां"

(रजिस्टर्ड)

गर्भवती स्त्री 50 और 70 दिनों के बीच किसी शुभ दिन प्रातः ही उठ कर, शौचालय जाकर, स्नान करके ईश्वर से पुत्र के लिये प्रार्थना करते एक चिन्नी की चीनी गोलियां एक-एक करके दूध से

दूध जीवित बछड़े वाल कर ठण्डा करके चीनी

सफेद पाऊंडर जो डिब्

दवा से पहले कुछ न रु इच्छा हो दूध चावल व और कुछ न खाएं ।

गर्भ के दिन मासिक 8 डिब्बी की गोलियां भी

गोली 12 नमूने 10-15 मिनट (10-15) ले ।

## पुंसवनम्

जिनके घर कन्याएं ही जन्म लेती हों उन्हें ठीक समय पर गर्भाधान के दो मास पूरे होते ही तीसरे मास के पहले सप्ताह में दवा सेवन करने से 95 प्रतिशत सफलता मिलती है । पांच प्रतिशत की कमी दवा सेवन काल की असावधानी या ईश्वरेच्छा ही बलवती समझें ।

इस कोर्स में 21 कैप्सूल हैं । सवेरे स्नानादि के बाद बिना कुछ खाये पाये पूर्व की ओर मुह करके पुत्र प्राप्ति की इच्छा रखते हुए थोड़े चावल डाल कर सूर्य को जल दें ।

जल देने से पहले बच्चे वाली गाय का ताजा दूध गर्म कर मीठा डाल पीने योग्य कर लें । सूर्य को जल देने के बाद इस दूध से एक-एक करके दो कैप्सूल निगल लें । एक कैप्सूल शाम को भोजन से एक घण्टा पहले गाय के दूध से लें । इस प्रकार इन्कीस कैप्सूल सात दिन लें ।

दोपहर के भोजन में दूध, चावल या खीर का प्रयोग करें । यह बहुत जरूरी है । शाम को इच्छानुसार सादा भोजन करें । खीर चावल आदि दवा सेवन काल में ही लें । बाद में जरूरी नहीं ।

**परहेज :-** गुड़, लाल मिर्च, गर्म मसाले तेज वस्तुएं तेल या घी में तली हुई चीजें न खावें । भार न उठावें । सुने घर में अकेली न सोवें । पति से परहेज रखें । अश्लील गन्दे चित्र, सिनेमा टेलीविजन आदि न देखें । बच्चा होने के बाद भी पन्द्रह दिन तक सूतक - पातक में किसी के घर न जावें । न दूसरे के घर का कुछ खावें । उछले कूदे नहीं ।

**नोट :-** हमारे यहाँ गर्भधारण कराने की तथा गर्भपात आदि रोकने की चिकित्सा की जाती है ।





157E  
17-10-2003

From The Govt. Analyst Punjab,  
Sector-11, Chandigarh.

To Dr. Sutapa  
P.G.I.  
Chandigarh.

Subject:- Testing for the presence of Steroid (Testosterone)  
Reference your letter no. Nil dt. 8.9.2003 on the  
subject cited above the test report of eight samples as required  
is given below :-

L.No. 1435

1) Description :- Yellow - brownish coloured mass.  
TLC - No spot or streak observed.

2) L.No. 1436

Description :- Green yellowish brown coloured coarse mass.  
TLC - Shows a spot corresponding to testosterone standard

3) L.No. 1437

Description :- Greenish yellowish coloured mass.  
TLC - A streak showing the presence of natural steroid.

4) - L.No. 1438

Description :- Dark brownish coloured granular mass.  
TLC - No spot or streak is observed.

5) L.No. 1439

Description :- Brownish coloured mass.  
TLC - No spot or streak is observed.

6) L.No. 1440

Description :- Yellowish brown mass.  
TLC - No spot or streak is observed.


7) L.No. 1441

Description :- Green brown coloured mass.  
TLC - Spot corresponding to Ref. standard testosterone is  
observed.

8) L.No. 1442

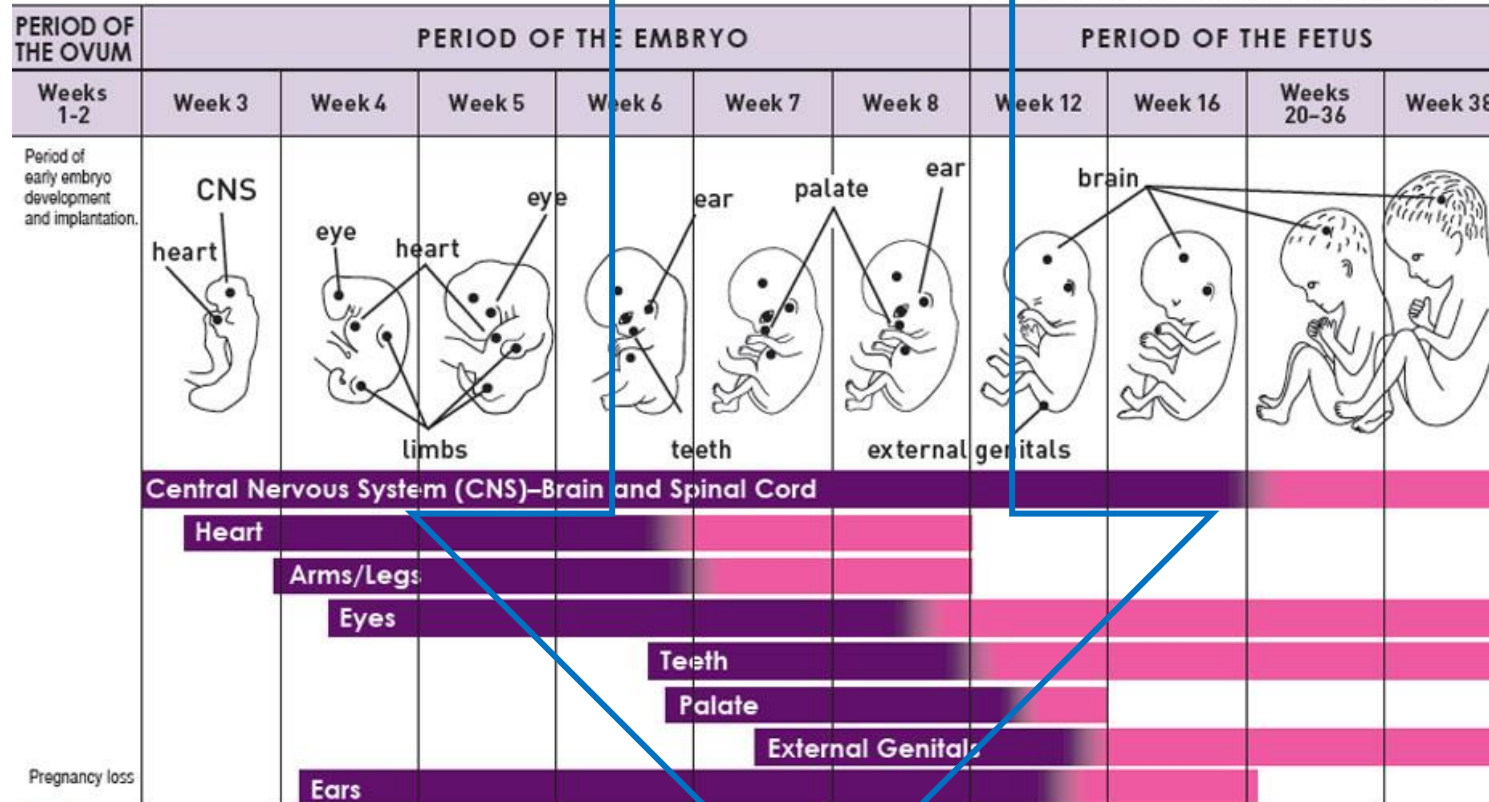
Description :- Greenish brownish coloured mass.  
TLC - Spot corresponding to Ref. Standard progesterone is  
observed.

The above is for your information please.

  
*[Signature]*  
S. MEHTA, 10-2

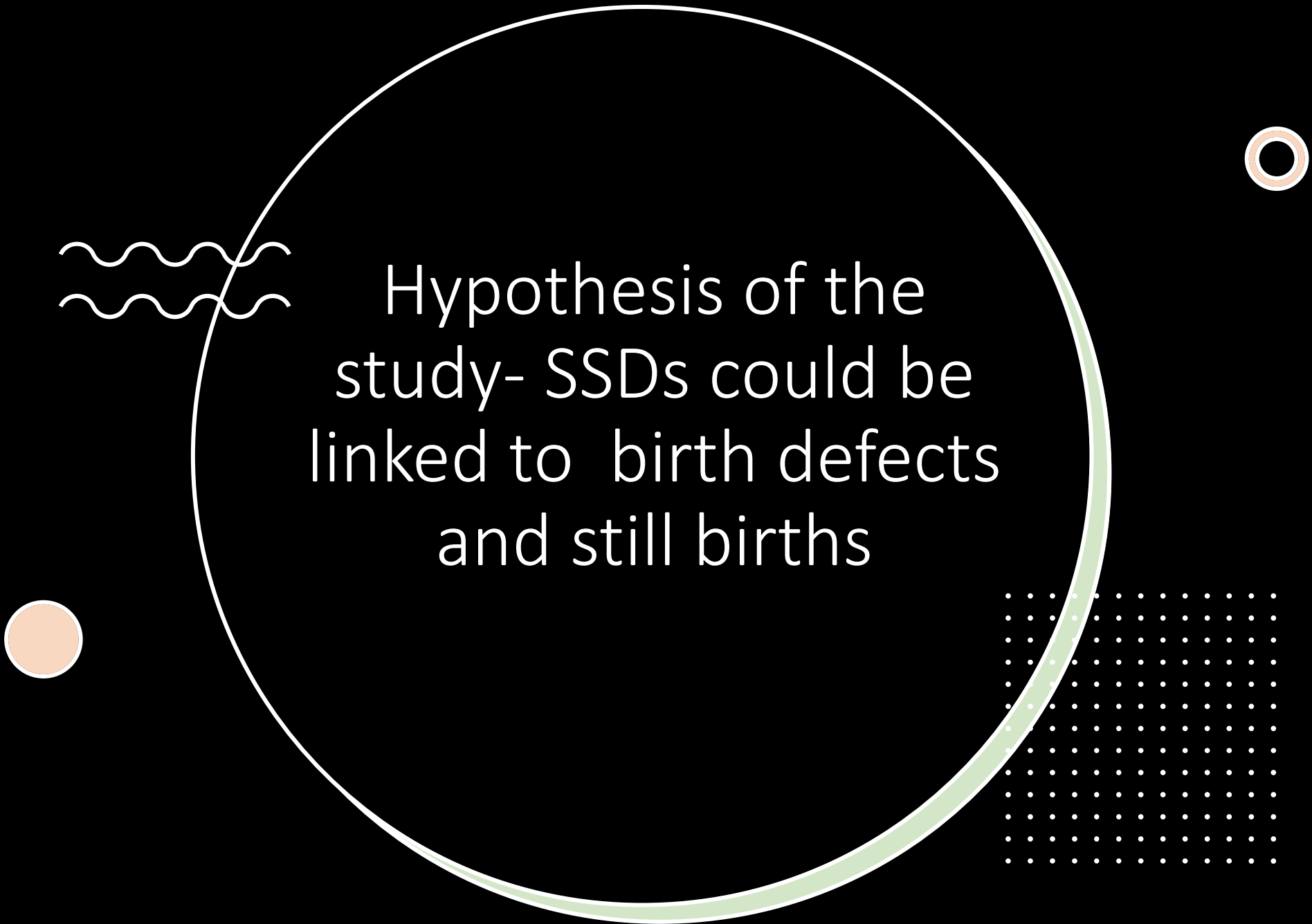
# FETAL DEVELOPMENT CHART

This chart shows vulnerability of the fetus to defects throughout 38 weeks of pregnancy.\*  
 • = Most common site of birth defects



Period of development when major defects in bodily structure can occur.  
 Period of development when major functional defects and minor structural defects can occur.

Adapted from Moore, 1993 and the National Organization on Fetal Alcohol Syndrome (NOFAS) 2009  
 \*This fetal chart shows the 38 weeks of pregnancy. Since it is difficult to know exactly when conception occurs, health care providers calculate a woman's due date 40 weeks from the start of her last menstrual cycle.



Hypothesis of the study- SSDs could be linked to birth defects and still births

# Documentation

**Tribune, Aug 5, 2003**

## **Punjab, Haryana continue to love sons not daughters Imbalance in sex ratio could trigger a major turmoil**

However, the ban on pre-selection of sexes under the PNDT Act has failed to check the malady. A study by Dr A J Singh and Dr Sutapa Bandyopadhyay, Department of Community Medicine, PGI, Chandigarh on "Traditional Practices for Family Welfare in Rural North India," shows that (mis)conceptions catering to this preference of male child in rural areas of Punjab and Haryana are rampant.

**These days a strange medicine, referred to as Sau Badalne ki dawai, in common lingo, is being distributed in villages. The woman is required to take this medicine, between one and a half to two months of her pregnancy, at dawn and with an intense desire for having a male child. The medicine is supposed to be taken with milk of a cow known to have a living male calf. The study, based on the experiences of health workers and anganwadi workers in the two states, shows that most ruralites have great faith in the effectiveness of this medicine." Though failure cases are known, people blame it on the wrong time of taking the medicine," says Dr Sutapa.**

# Gen-Select invites parents-to-be to select the sex of their unconceived child through 'Fully Integrated Programme'

## US sex-selection product targets market, ministry unaware

ANUPREETA DAS  
NEW DELHI, NOVEMBER 20

HERE'S a potential additive to India's plummeting female-male ratio: A product called Gen-Select which claims to influence the "natural gender selection process in a couple's favour before conception, with a success rate of 96 per cent."

Although it has been manufactured and marketed by a US-based company since July, Gen-Select's target market, obviously, is India. The company has been advertising its product in a leading national daily for the past few days, it's an innocuous-enough advertisement at first glance, with the picture of a bonny baby. Then, in bold black typeface: "Gender selection is now a reality."

No Indian agent or distributor is mentioned, only a US toll-free number; if you visit their website, an India-only phone number is prominently displayed.

Despite repeated attempts by *The Indian Express*, the product's manufacturers, based in Orangberg, South Carolina in the

US, wasn't available for comment.

Gen-Select invites parents-to-be to select the sex of their unconceived child through what they call the Fully Integrated Programme.

According to literature on the website, several factors, such as the "frequency of ejaculation, cervical mucus and vaginal secretions" determine the sex of a child. Their "scientific research" has now resulted in a neat little kit — blue for a boy, pink for a girl — consisting of nutraceuticals and specially formulated douches that can be used by couples prior to conception. These kits, costing \$119.95 (or about Rs 6,000) each, can be ordered through an e-form, or over telephone.

"There is no scientific proof whatsoever

NEW From The UNITED STATES

Up To 96% Effective!

### Gender selection is now a reality!

Couples are now able to choose the gender of their next child with Gen-Select. This integrated approach allows the naturally occurring gender selection factors to be utilized in a couple's favor to effectively select the sex of their next child. Gen-Select was developed by top U.S. physicians to be safe, easy-to-use, very effective and used in the privacy of your own home.



that a child's gender can be pre-selected. It's only a random interplay of chromosomes that determine gender and there is a 50-50 chance of a male or female child," says Dr. Sudha Salan, gynaecologist and president, Delhi chapter of the All India Association of Obstetrics and Gynaecologists.

"Any such claim is nothing more than a marketing gimmick. It's utter rubbish," she adds.

The Union Health Ministry hasn't yet woken up to the implications of the advertisement.

"It will first have to be looked into, and only then can we comment," says a Health Ministry official. But NGOs working with health issues and the National Commission of Women are already up in arms. NCW Chairperson Vibha Parthasarathi says, "We're aghast that such an ad has been carried in the year when

our demographic profile has shown a sharp decline in the female-male ratio. The NCW has asked its lawyers to look into the fine print of the Pre-Natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, 1994 to ascertain whether the ad is illegal.

"It's also unethical," adds Salan. As per the Census 2001 figures, India now has 927 females for 1000 males in the 0-6 age group, a sharp decline from 945/1000 a decade ago.

In May 2001, the Supreme Court had directed the Central and state governments to "review and monitor the implementation of the (PNDT) Act", Section 22 of the Act prohibits advertisements "regarding facilities of pre-natal determination of sex"; a contravention is punishable up to three years with a fine of up to Rs 10,000. Though there is no clear instruction prohibiting sex determination before conception in the PNDT Act, lawyer Indira Jaising says, "There is a proposed amendment to the present law on pre-selection by testing, to include any assistive selection as well."

Also, as Delhi High Court Counsel Mala Narayan points out, Gen-Select can be prevented from being sold in India since it can be inferred as infringing on the Right to Equality, under Article 14 of the Constitution.

"You can easily get a stay order on a simple PIL," she explains.

# प्रगनेसी में डॉक्टर से पूछें दवा

बगैर सलाह दवा लेने से बच्चा हो सकता है एब्नॉर्मल

वंदना गुप्ता, चंडीगढ़

13/9/08

पीजीआई स्टडी

अगर आप गर्भवती हैं और इस दौरान आपको मामूली सिद दर्द या हल्का बुखार हो तो भी बिना डॉक्टर की सलाह से कोई दवा न खाएं। इसका प्रभाव आपके आने वाले बच्चे पर पड़ा सकता है। यह स्टडी है पीजीआई की। पांच साल तक की गई इस स्टडी में 200 महिलाओं को शामिल किया गया था। यह स्टडी 1 दिन से 5 साल तक के बच्चों पर की गई।

कम्युनिटी मेडिसिन डिपार्टमेंट की इस स्टडी में यह पता चला है कि जिन बच्चों में विभिन्न तरह की एब्नॉर्मलिटी पाई गई, उनकी माताओं ने प्रेगनेसी के दौरान डॉक्टर की सलाह के बिना एलोपैथी या आयुर्वेदिक दवा ली थी।

■ 48 फीसदी बच्चों को डाइजेस्टिव और कार्डियो वैस्कुलर डिजीज

■ 16 फीसदी को जेनीटो यूरीनरी सिस्टम में एब्नॉर्मलिटी

■ 15 फीसदी में नर्वस सिस्टम में डिफेक्ट पाया गया

■ 18 फीसदी को क्लेफ्ट लिप,

# पुत्र की चाह में मोर पंख खा रहीं महिलाएं

प्रदीप नारायण, रेवाड़ी.

बेटा होने की चाहत इंसान को कितना अंधा बना देती है इसका जीता-जागता प्रमाण है आठ महिलाएं। जिन्होंने अपने गर्भ में पल रहे भ्रूण के लिंग परिवर्तन



यानी लड़का होने के लिए कॉपर के साथ मोर के पंख तक का सेवन किया। नतीजा भ्रूण जन्मजात विकार में तब्दील हो गया।

## विकारों को देख डॉक्टर हैरान

अप्रैल-मई में शहर के निजी अस्पतालों में जन्मजात विकारों के केसों की संख्या में एकाएक बढ़ोतरी होने से डॉक्टर हैरान हैं। महिलाओं से बातचीत में जो खुलासा हुआ उसने कन्या भ्रूण हत्या की ऐसी भयावह तस्वीर पेश कर दी जिसकी कल्पना शायद ही किसी ने की होगी।

## जन्मजात विकार के लक्षण

- गर्भ में भ्रूण के हाथ-पैर का नहीं बनना
- कमर में फोड़ा बन जाना
- पैर की आंती में विकार
- सिर का नहीं बनना

## मोर पंख पीस गुड़ के साथ खिलाया

महिलाओं के अनुसार लड़का होने की उम्मीद में उन्हें परिवार के सदस्यों ने किसी के कहने पर मोर के पंख को पीस कर गुड़ के साथ खिलाया। कभी-कभार कॉपर भी खाने को दिया गया। ललिता मैमोरियल अस्पताल की संचालिका डॉ. सीमा मित्तल व स्त्री रोग विशेषज्ञ डॉ. ऊषा सचदेवा के मुताबिक उमके कैरियर में जन्मजात विकार के इतने केस कभी नहीं आए जितने हाल ही में आने शुरू हुए हैं। करीब आठ महिलाओं ने लड़का होने के लिए मोर के पंख तक का सेवन किया। कुछ महिलाओं को कॉपर तक खिलाई गई।

## हर माह विकार के 15 केस

डाक्टरों के मुताबिक हर माह 10-15 जन्मजात विकार के केस सामने आ रहे हैं। इससे पूर्व एक साल में जन्मजात विकार के एक-दो केस सामने आते थे। डॉक्टरों की माने तो कन्या भ्रूण हत्या को लेकर बनाए गए सख्त कानून से बचने के लिए भी यह प्रयोग किया जा रहा है। डाक्टरों का यह भी मानना है कि खान-पान में कैमिकल के बढ़ते प्रयोग का असर भी जन्मजात विकार का कारण होता है लेकिन इसका प्रभाव बेहद कम होता है।

# Documentation

## Comments of reviewers:

- Sex cannot be changed after birth
- There is no scientific validity
- Publication of such types of articles may promote use of such drugs which is unethical

## **Sex Selection Through Traditional Drugs in Rural North India**

S Bandyopadhyay, AJ Singh

- Indian Journal of Community  
Medicine Vol. 32, No.1, January  
2007



Query from: subah P, United States, 06/28/07

Topic: PARENTING Submitted on: [Ammas.com](http://Ammas.com)

**Subject: Ayurvedic approach to beget a male child**  
**Dear ammas,**

**I would greatly appreciate your help. We have been blessed by a beautiful 2 yr. old daughter. My husband would really like a son next. Ofcourse he would love another daughter too with all his heart.**

**The question that I am asking is: My ma-in-law told me that shivlingi seeds (Bryonia laciniosa) and putrajeevak seeds are prescribed by Swami Ramdev to those who desire a son. The time to start these medicine is a month after the pregnancy has started. I am a little confused by this: Modern science tells us that the sex of the child is determined the moment conception happens i.e. the moment the sperm meets the egg. So how is it possible to change the sex later?**

**Has there been any research which would assure that no birth-defects are caused and there are no harmful affects on the fetus?**

**What does the medicine contain? If the herb is a female herb would it**

**Response from: [Indumukhi A.](#)**

**Council Member on [Ammas.com](http://Ammas.com)**

**Source: This information comes from my own knowledge.**

Hi, dear. You are right to be concerned. Personally, I have heard these things said, too, but the major proof for them to be false (as I believe) are that even though this is wide folk wisdom in parts of India, people still have baby girls. Let's face it, if in India there were any foolproof method to have a boy, few people would be having daughters. Sad, but true.

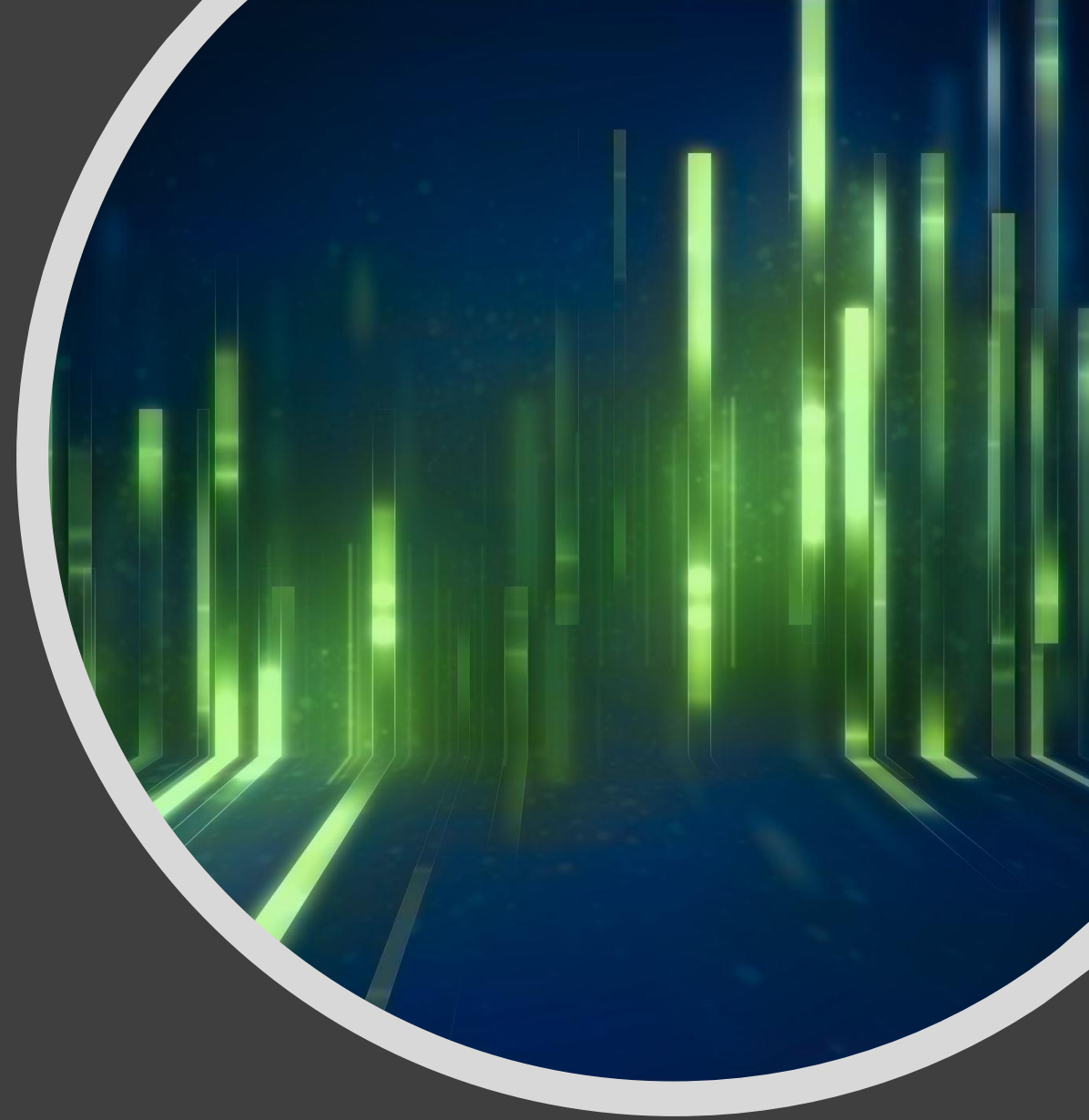
Anyway, I found a study by S Bandyopadhyay and AJ Singh which found that these "sex selection" remedies are used widely in North India. Indeed when these supplements were analyzed in a laboratory they were found to have a high content of anabolic steroids/testosterone.

# Next phase

Developed a proposal- shared with many but not accepted

3 students' MSc dissertation from Biotechnology Department, Thapar University: Biochemical analysis of SSDs (2010, 2011)

- *These preparations contain phytoestrogen and testosterone, content much higher than permissible range*



## **Congenital Malformations: Unexplored Causes**

INDIAN PEDIATRICS 941 VOLUME  
44\_\_DECEMBER 17, 2007

Rates of some congenital malformations in India is one of the highest in the world(1,2). Many studies to prevent the malformations are underway. Apart from consanguineous marriage, infections

## **Sex selection: an Indian perspective**

Sutapa Bandyopadhyay Neogi, *India.*  
*Online comment in lancet, 2006*

## **Q & A: FETAL "GENDER SELECTION"**

Sutapa Neogi speaks with epiNews about  
India's growing problem

2006 December

**epiNews: What else could or should be done scientifically? (Should a registry be established to track subtle birth defects and parental use of these products? Or do you believe import bans need to be instituted?)**

A lot of things need to be done.

Registries to track birth defects do exist in some hospitals but that is not representative of the population at large. Moreover it is time consuming and entails a huge cost since a large population needs to be studied to yield valid results. Prevalence of birth defects in relation to birth order, family size would give useful information.

**A case-control study (taking congenital malformation as the cases) in selected areas to determine the use of any sex selection technique can also be done.**

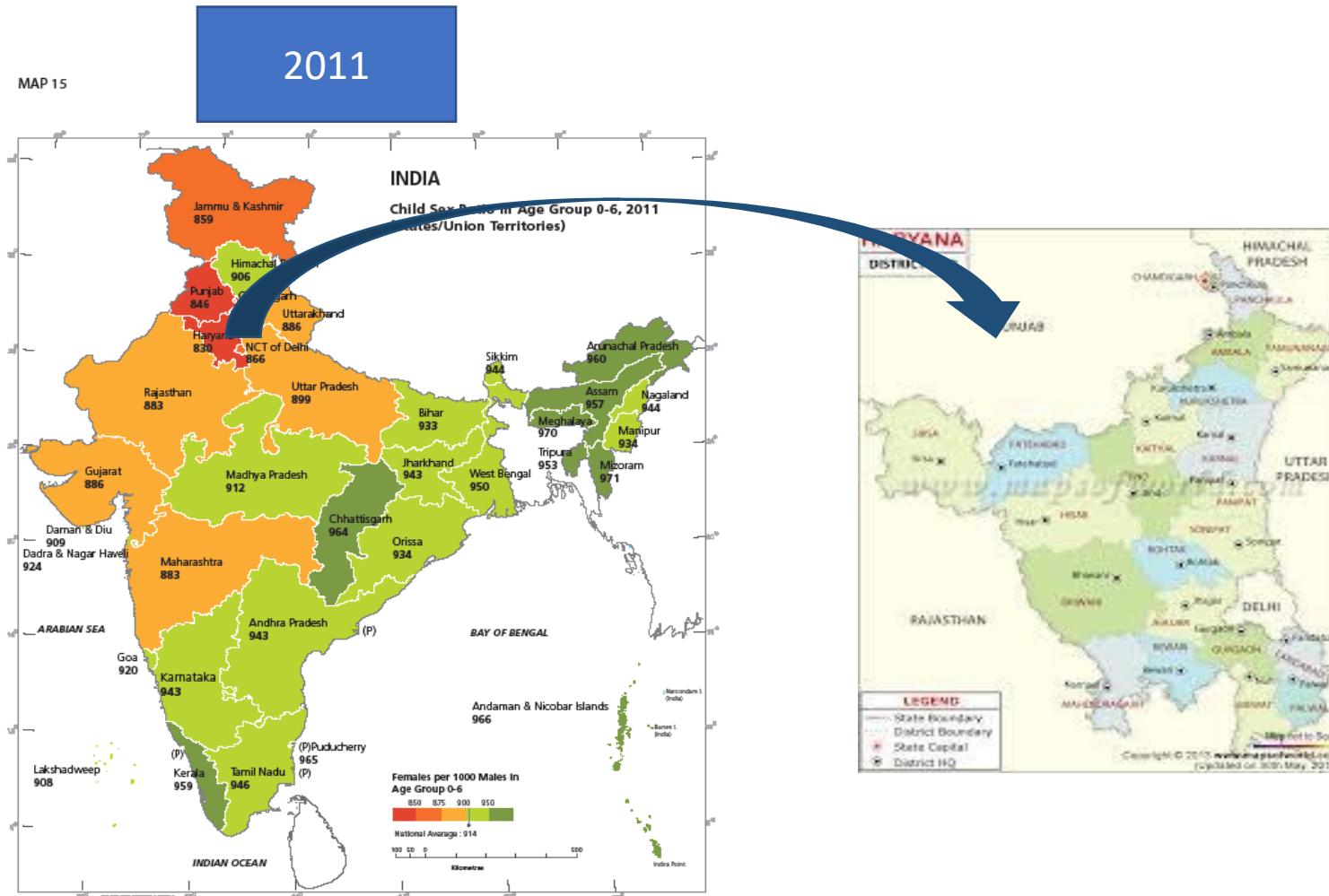
**There is a need to study sex selection drugs in greater details- types of drugs in different regions, biochemical analysis of each constituent present, etc.**

**A probable impact can be known from animal studies e.g. Infuse the drug in experimental animals during pregnancy and watch for the effects on fetus.**

# Next phase

- Request from MD, National Health Mission, Haryana (29<sup>th</sup> December 2013) for SSD proposal
- Topic: Risk factors of CMF in Haryana

# Study site- Haryana- lowest sex ratio in India



# Intake of SSDs and its association with birth defects

## **Primary study objective:**

To study the risk factors of birth defects (visible structural defects) in Haryana.

# Methodology

- **Study design:** Population based case-control (1:1) study
- **Study setting:** All districts of Haryana (21 districts)
- **Study population:** Deliveries in the past 20 months or from 1<sup>st</sup> October 2012 to 31<sup>st</sup> May 2014
- **Sample size-** 175 cases and 175 controls
  - Power= 80%, alpha= 0.05, prevalence of intake of drugs during pregnancy to have a male child was taken as 20% as reported from a previous study, OR 2*
- **Data collection-** Interviews conducted at homes using a pre tested, structured questionnaire

# Methodology

## *Exposures:*

The known risk factors include

- lack of folic acid supplementation during the peri-conceptual period,
- consanguineous marriage,
- infections during pregnancy,
- exposure to radiation during first trimester,
- intake of drugs during pregnancy,
- conception induced by medications or treatment,
- increased maternal and paternal age

All these are elicited by taking history.

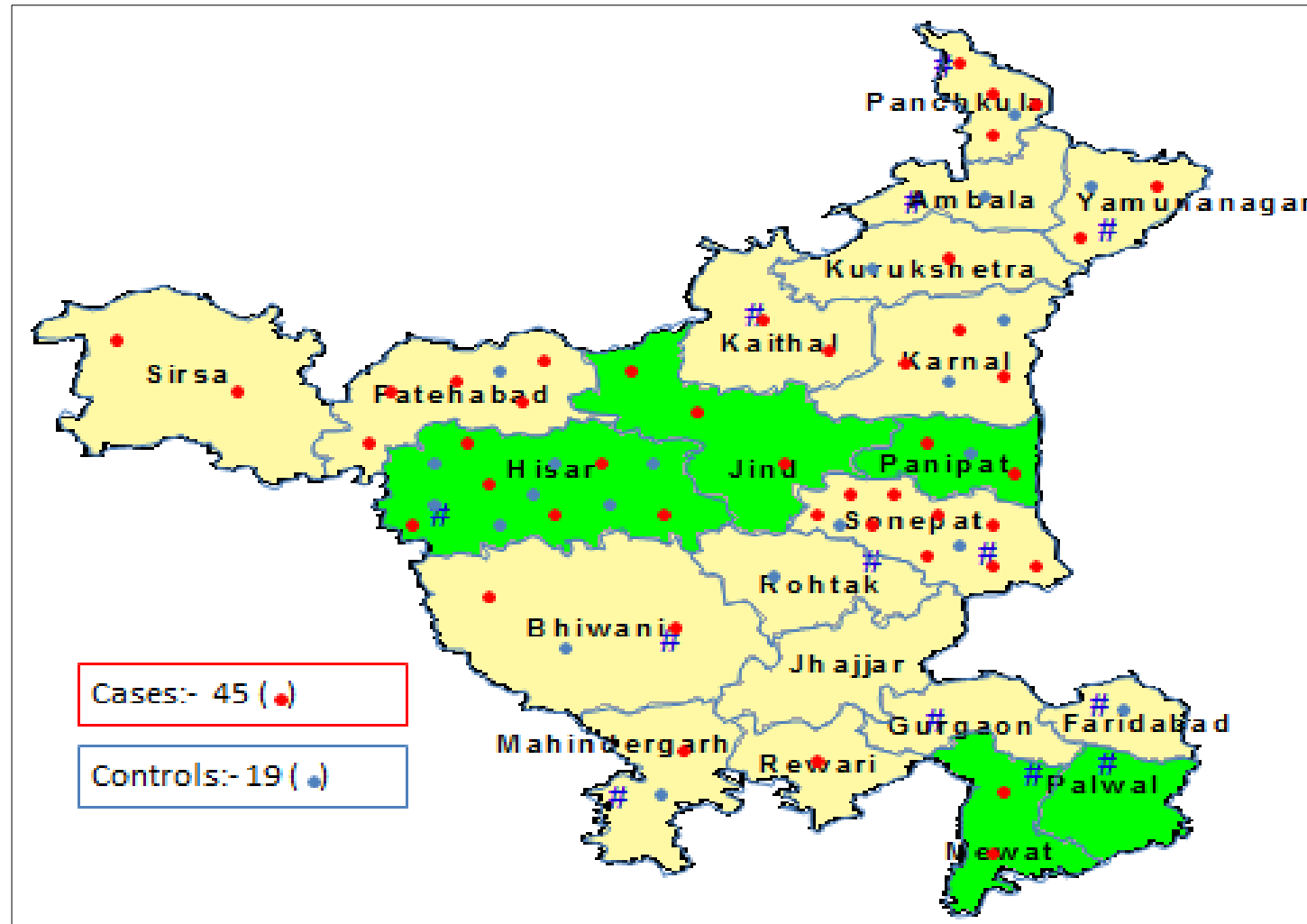


# Results

Sociodemographic features were similar among and controls

- Age of child
- Sex of child
- Age of mother and father
- Education of mother and father
- Occupation of mother and father

## Distribution of families who gave a positive history of intake of SSDs



# Risk factors for birth defects

Number of living children				
More than two	42 (24.0)	26 (15.9)	1.6 (1.04-2.4)	0.04
Two or less	133 (76.0)	138 (84.1)		
Family history of congenital malformation	07 (4.0)	06 (3.4)	1.5 (0.2-9.1)	0.65
History of infections during pregnancy	08 (4.6)	02 (1.1)	0.2 (0.05 -1.1)	0.054
History of fever with/without rash during pregnancy in first trimester	05 (2.9)	03 (1.7)	0.6(0.14-2.5)	0.48
History of intake of drugs during first trimester	13 (7.4)	5 (2.9)	2.9 (0.7- 11.9)	0.13
History of intake of indigenous drugs for a male child in the first trimester (sex selection drugs)			2.8 (1.6 -5.1)	<0.001
Yes	45 (25.7)	19 (10.9)		
No	130 (74.3)	156 (89.1)		
History of intake of indigenous drugs for a male child if the first child was a female (n=182)**			3.4 (1.7-6.9)	<0.001

Multivariable analysis  
for risk factors of  
birth defects

*Neogi et al, Drug Safety 2015*

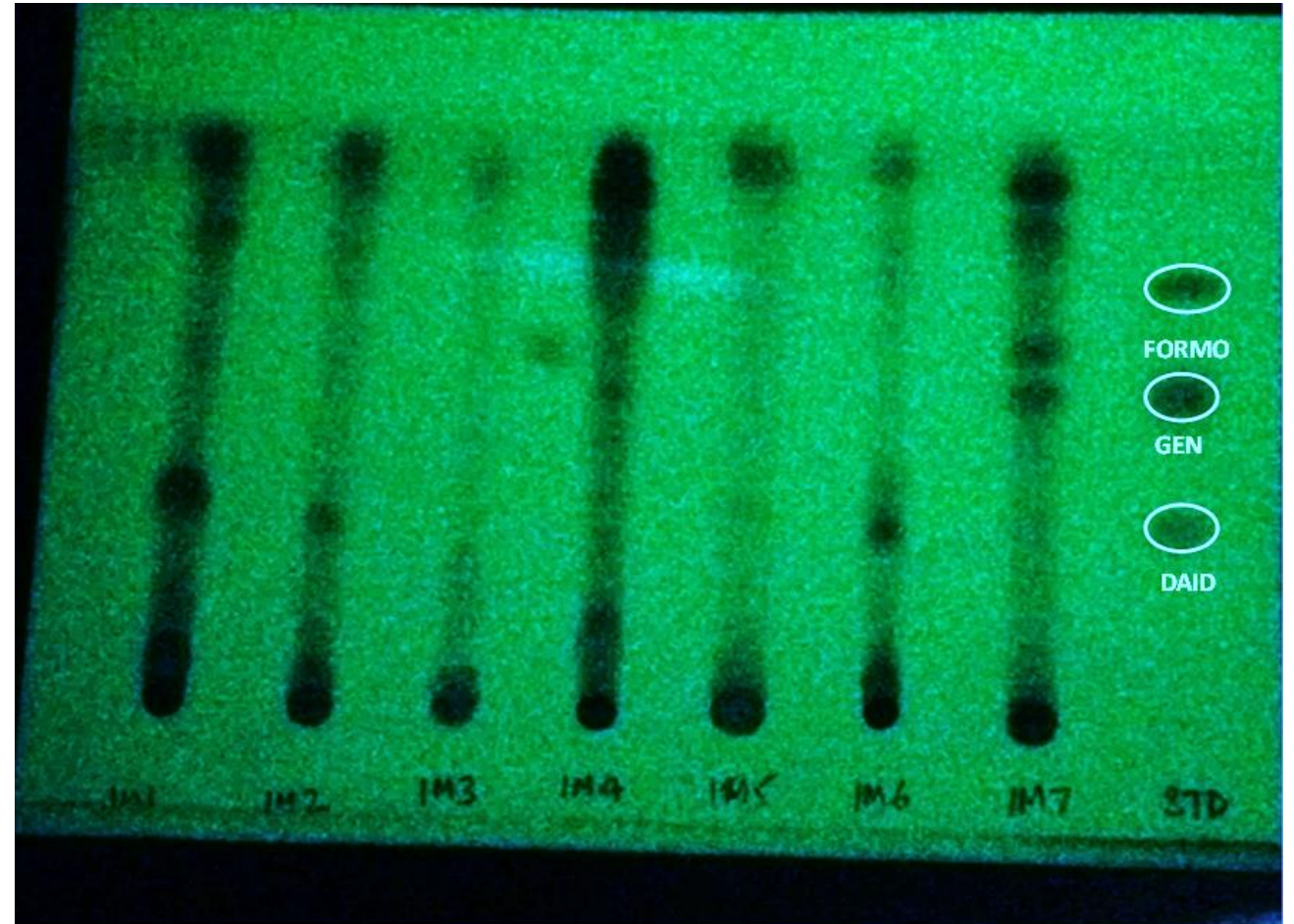
Risk factor	Odds Ratio	95% CI	p value
History of intake of indigenous drugs for a male child	3.0	1.7 – 5.6	<0.001
Number of living children (more than 2)	2.0	1.1 - 3.4	0.021

# Multivariable analysis for risk factors of stillbirths

Risk factor	Full model	Final model
	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Sex of child	1.2 (0.9-1.7)	-
Multiple pregnancy	1.4 (0.5-3.5)	-
Exposure to active or passive smoking	1.3 (0.9-1.8)	-
History of bleeding during pregnancy	1.6 (0.7-3.1)	-
Persistent abdominal pain during pregnancy	1.1 (0.8-1.6)	-
High BP during pregnancy	1.7 (0.9-3.0)	1.8 (1.04- 3.1)
History of fever during pregnancy	1.3 (0.9-2.1)	-
Intake of Sex selection drugs during pregnancy	2.5 (1.4-4.3)	2.6 (1.5-4.5)
Pre term delivery (less than 37 weeks)	3.6 (2.1-6.1)	3.5 (2.1-6.0)
Any history of previous stillbirths	3.7 (1.9-7.2)	4.0 (2.1-7.8)
Any complication during Labour#	3.3 (2.0-5.3)	3.3 (2.1-5.3)

# Biochemical analysis of SSDs

- Thin layer chromatography (TLC)
- High performance liquid chromatography (HPLC)



# Biochemical analysis of SSDs

	Daidzein (mg/g)	Genistein (mg/g)	Formonetin (mg/g)
Median (mg/g)	15	8.6	5
Mean (mg/g)	14.10	8.52	5.09
SD	3.01	0.58	0.53

*Neogi, 2015*

Average concentration: 10 times more than the permissible limits for phytoestrogens

3 out of 15 samples tested positive for testosterone

*Neogi et al, BMC Pregnancy and Childbirth, 2015*

Two thirds of samples contain steroids

*Bandyopadhyay S et al. 2007*

# Project approved by DST and S&T, Haryana

- For biochemical analysis
- For in vivo and in vitro experiments



# Catalogued and stored



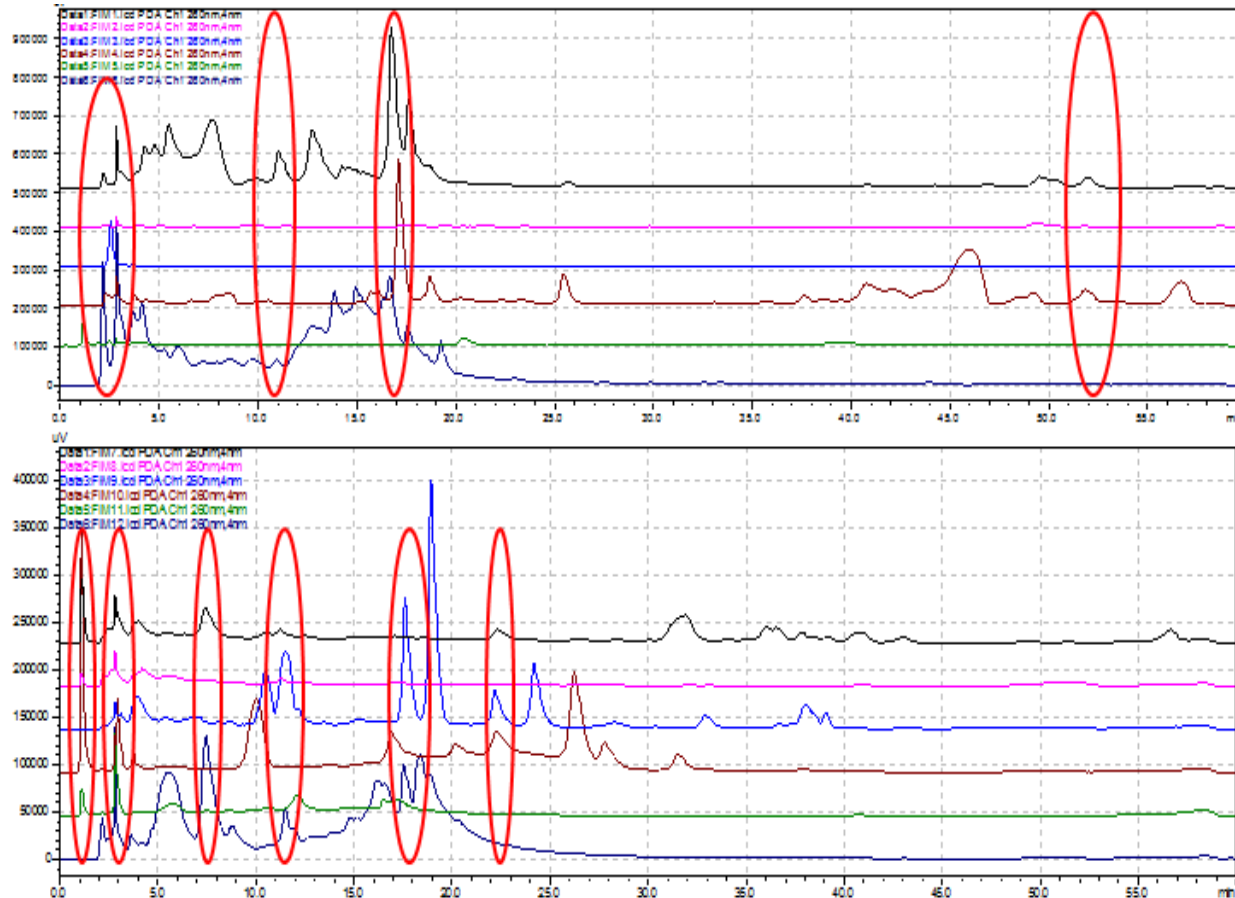
Samples stored in air tight containers, catalogued properly



Samples stored in air tight desiccators

# High performance liquid chromatography analysis

Repeat analysis using 48 samples



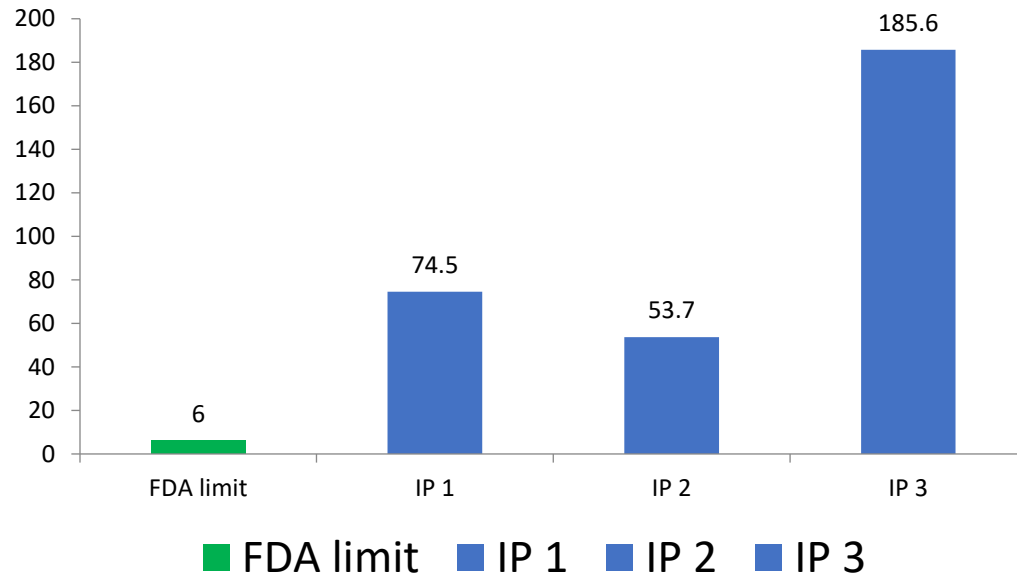
The characteristic UV maxima 250-260 nm, 270-280 nm and 310-330 nm- presence of phenolic compounds (flavones and isoflavones) in fingerprint chromatograms.

Shivalingi was found to contain daidzein and genistein

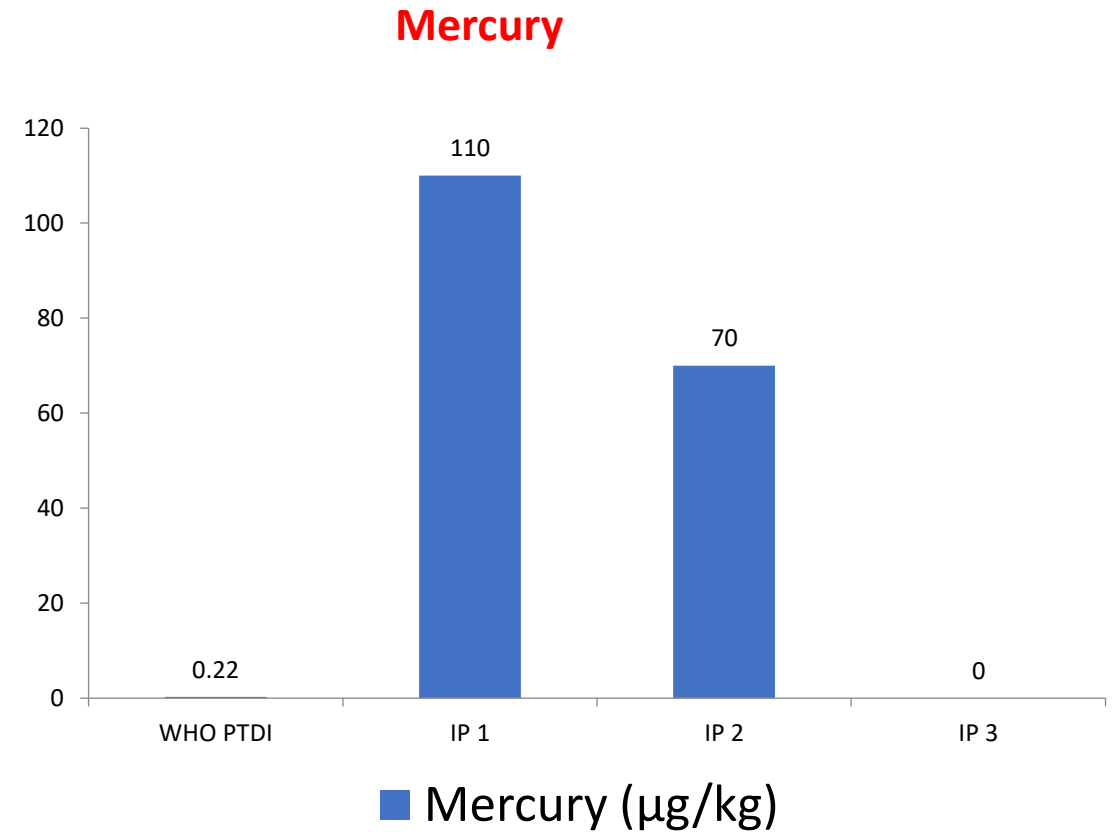
67% contain steroids

*Rai et al 2019*

# Analysis of heavy metals



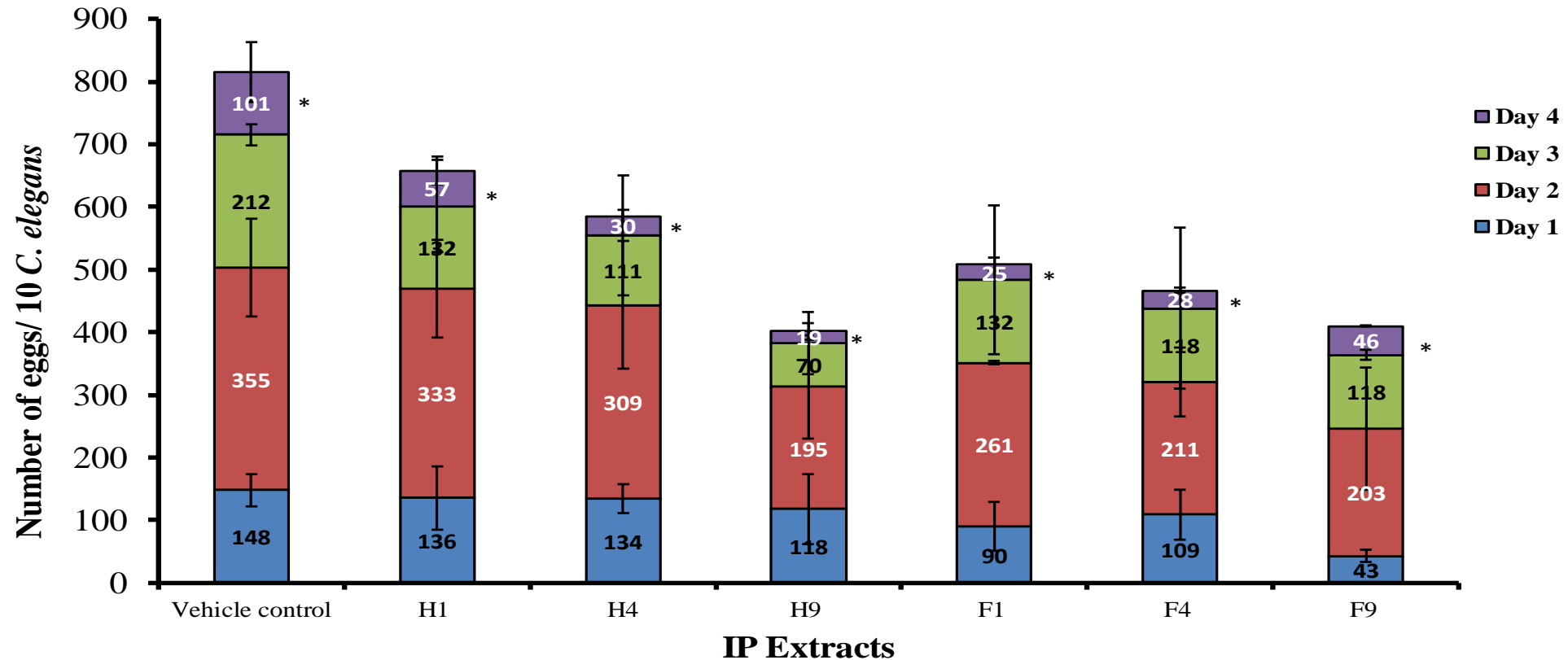
**Lead**



*Ganguli et al 2018*

# In vitro experiment: On *C. elegans*

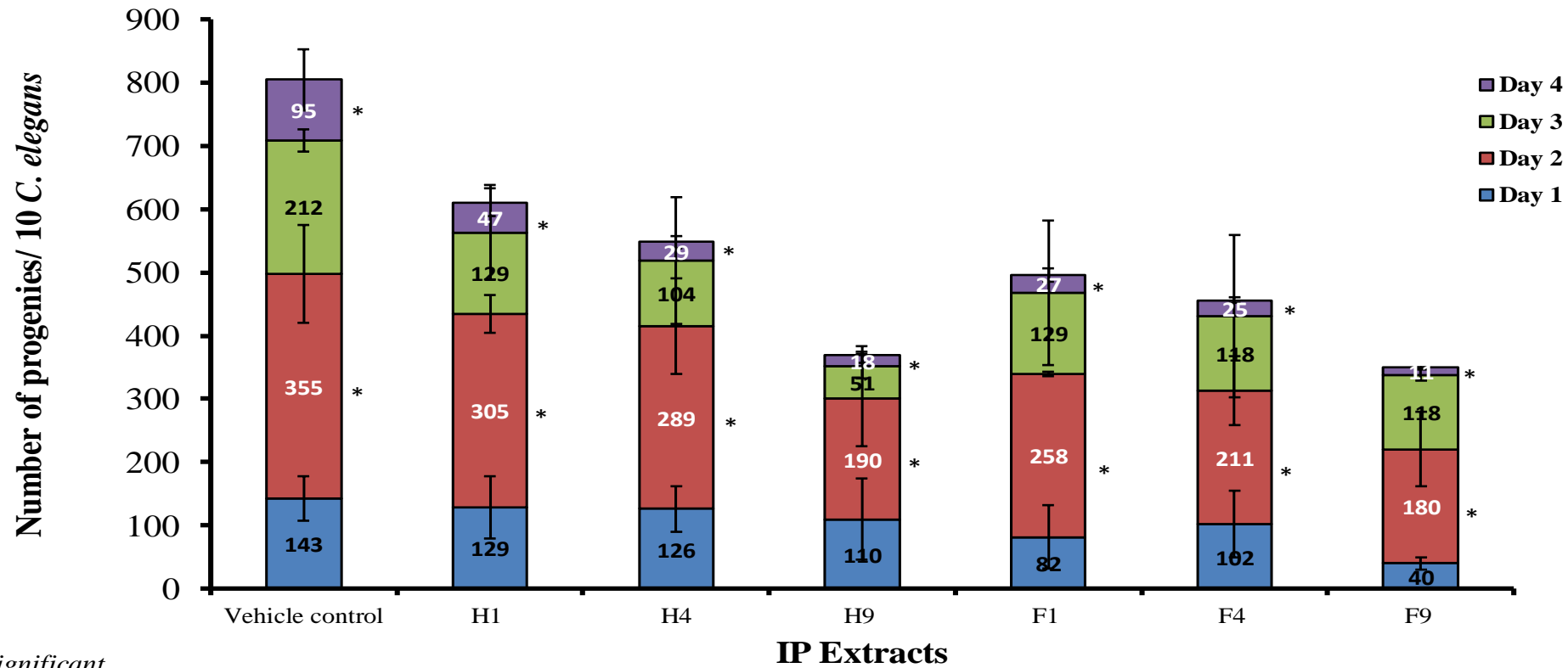
## Comparative analysis of egg count of IP samples and vehicle control



\*significant

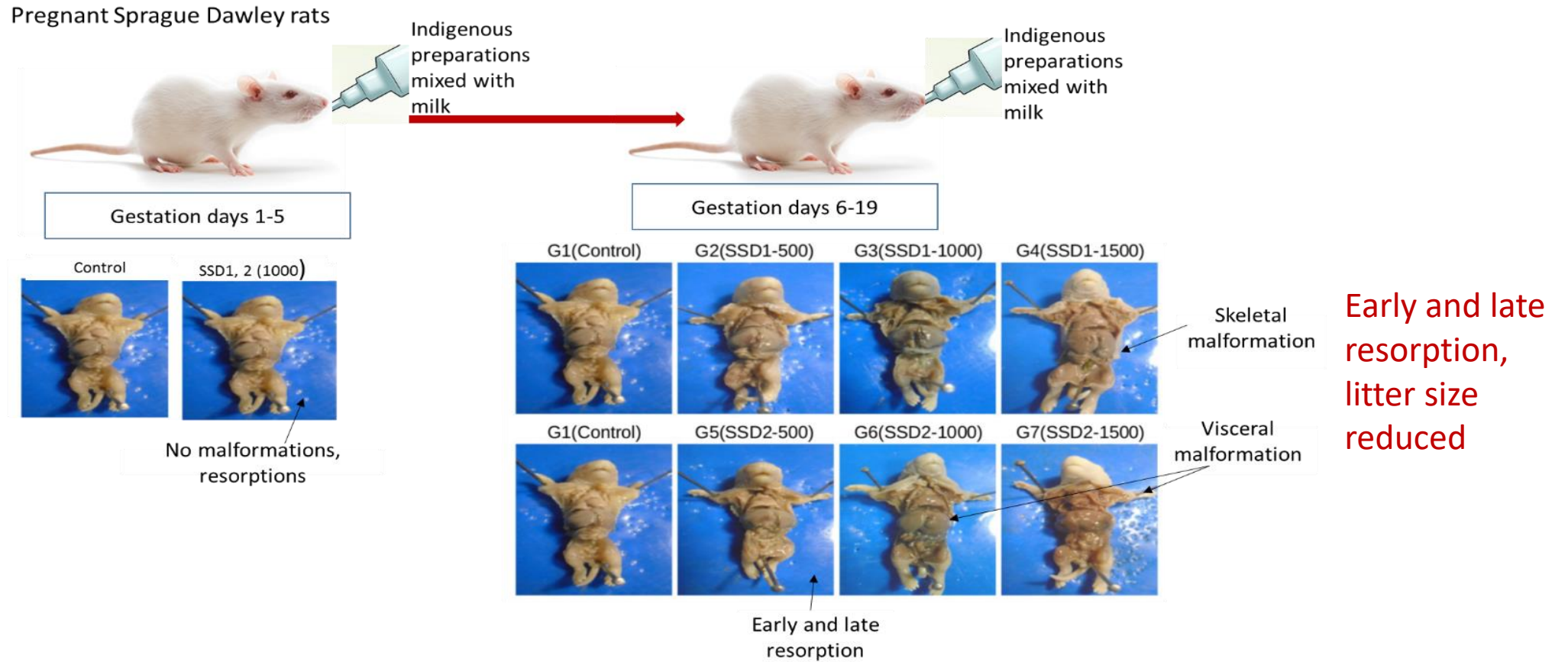
Rai et al 2019

# Comparative analysis of progeny count of IP samples and vehicle control



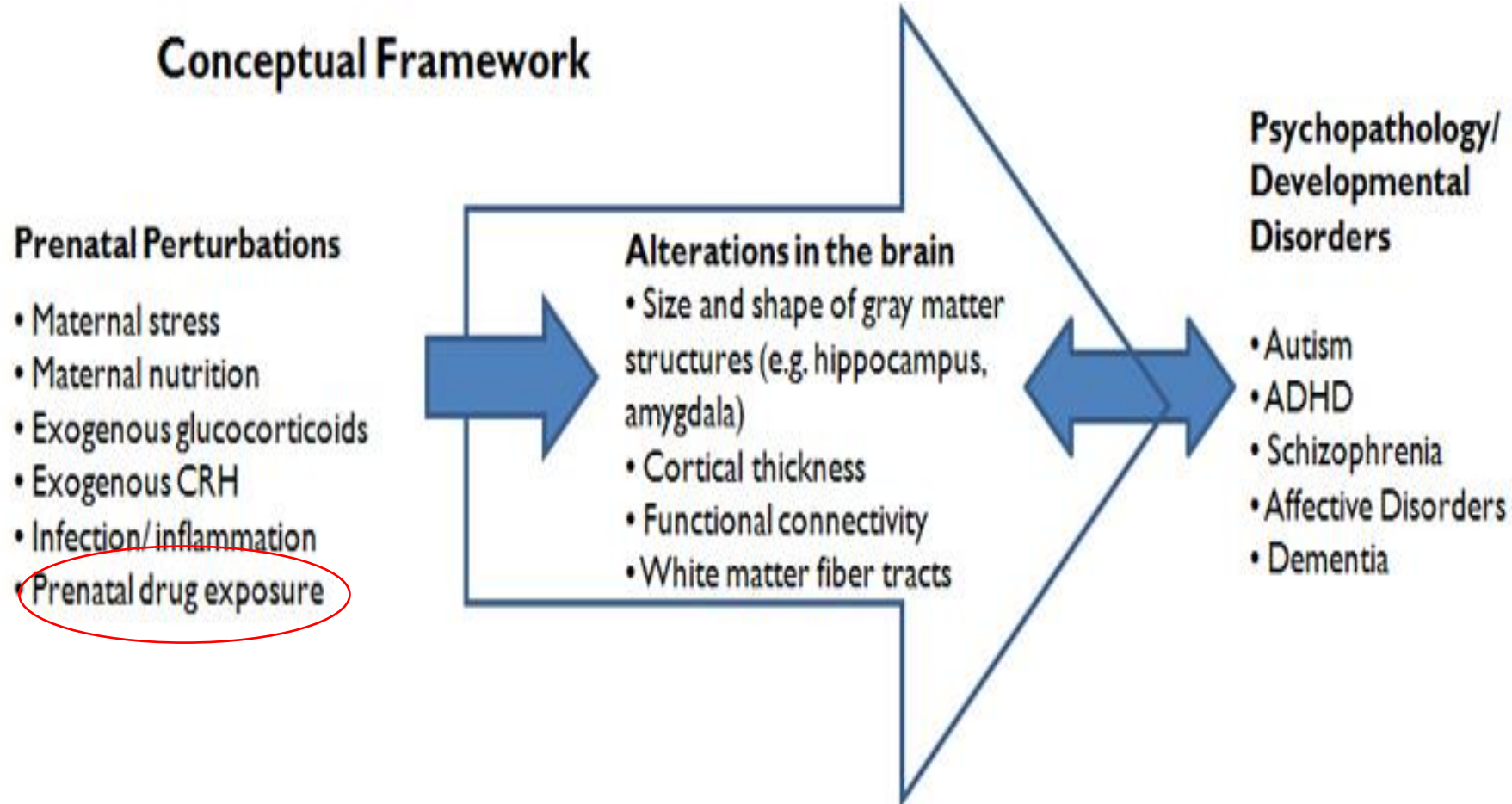
Rai et al 2019

# In vivo studies in rat models



No effect on sex ratio

# Can SSD lead to psychological problems?



# Dissemination to the community

**HT SUNDAY SPECIAL**

## Sex-selection drugs linked to birth defects

**Prayanka Verma**  
\* prayanka@hindustantimes.com

**MUMBAI:** Illegal sex-selection drugs (SSD) consumed by pregnant women could be causing birth defects among children, said a study which established a link between the use of these drugs and congenital malformations.

The study published in July by *Drugs Safety and Therapeutics Journal*, said pregnant women who are

such defect. Their mothers were asked whether they had consumed SSD during pregnancy. One out of every four mothers with a child with birth defects said they had consumed such drugs, while more than 50 per cent of mothers of children with malformations in the child had consumed such drugs — defects of the brain or spinal cord — oesophagus, heart, cleft lip palate, cleft

son and fused knees, apart from other visible physical defects. Neural tube defects result in paralysis, while oesophagus defects require corrective surgery to seal an opening between the wind and food pipes. Fetal malformations include premature sex belief that sex of the foetus can be altered after conception and SSDs can guarantee a male child.

**CONTINUED ON PAGE 8**

## गर्भस्थ शिशु की मृत का कारण बन सकती है बेटा पैदा होने की दवाएँ

गर्भस्थ शिशु की मृत का कारण बन सकती है बेटा पैदा होने की दवाएँ। यह एक अध्ययन के बाद एक खुलासा है।

एक अध्ययन के बाद एक खुलासा है कि गर्भस्थ शिशु की मृत का कारण बन सकती है बेटा पैदा होने की दवाएँ। यह एक अध्ययन के बाद एक खुलासा है।

**Sex selection**

It is impossible that the consumption of such drugs can change the gender of foetus but the study has not only established a link between the use of these drugs and congenital malformations but also found that the use of these drugs is on the rise in the country.

The study was conducted in a hospital in Mumbai. The researchers found that the use of these drugs was on the rise in the country. The study was conducted in a hospital in Mumbai. The researchers found that the use of these drugs was on the rise in the country.

**गर्भस्थ शिशु की मृत का कारण बन सकती है बेटा पैदा होने की दवाएँ**

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**होमोएज**

**होमोएज** एक नया उत्पाद है जो आपको अपने जीवन में बदलाव लाएगा।

**होमोएज** एक नया उत्पाद है जो आपको अपने जीवन में बदलाव लाएगा।

**लड़का पैदा होने की गारंटी देने वाली नहीं है कोई दवा**

लड़का पैदा होने की गारंटी देने वाली नहीं है कोई दवा। यह एक अध्ययन के बाद एक खुलासा है।

**कोख में बीमारी देती है 'बेटे वाली गोली'**

कोख में बीमारी देती है 'बेटे वाली गोली'। यह एक अध्ययन के बाद एक खुलासा है।

**दवाइयों के सेवन से बच्चे गर्भवती महिलाएँ: सिविल सर्जन**

दवाइयों के सेवन से बच्चे गर्भवती महिलाएँ: सिविल सर्जन। यह एक अध्ययन के बाद एक खुलासा है।

**सावधान! बेटा होने की दवा खाए तो मृत शिशु का हो सकता है जन्म**

सावधान! बेटा होने की दवा खाए तो मृत शिशु का हो सकता है जन्म। यह एक अध्ययन के बाद एक खुलासा है।

**गर्भावस्था के दौरान दवा खाने से गर्भस्थ शिशु में गंभीर समस्याएँ हो सकती हैं: सत्यप्रकाश**

गर्भावस्था के दौरान दवा खाने से गर्भस्थ शिशु में गंभीर समस्याएँ हो सकती हैं: सत्यप्रकाश। यह एक अध्ययन के बाद एक खुलासा है।

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सावधान! बेटा होने की दवा खाए तो मृत शिशु का हो सकता है जन्म। यह एक अध्ययन के बाद एक खुलासा है।

- Covered by Guardian, British Medical Journal, Wall Street Journal, Research Gate
- <https://www.bbc.co.uk/programmes/m00013lk>



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About this content  
*Sophie Cousins in Delhi*  
Thu 27 Oct 2016 05.00 BST

# India's war on the sex selection drugs linked to stillbirths



[The Wall Street Journal](#)

## Folk Remedies for Sex Selection are Risky, Study Finds

Traditional medicines taken by some Indian women to help them give birth to a boy are linked to an increased rate of stillbirths



Suryatapa Bhattacharya

July 4, 2016 11:22 a.m. ET

*New Delhi*



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# Sex selection drugs cause tens of thousands of stillbirths in India

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19th January 2016



## FEATURE

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### FETAL SEX SELECTION

# The promise of a boy: Indian women are being mis-sold drugs to change their babies' sex

The drugs don't work and may even cause miscarriage, but their use is shrouded in secrecy, writes **Sophie Cousins**

New Delhi

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HEALTH

# Medicines "Promising Male Child" Are Causing Stillbirths & Defects In Newborns

The Logical Indian

Published : 27 March 2017



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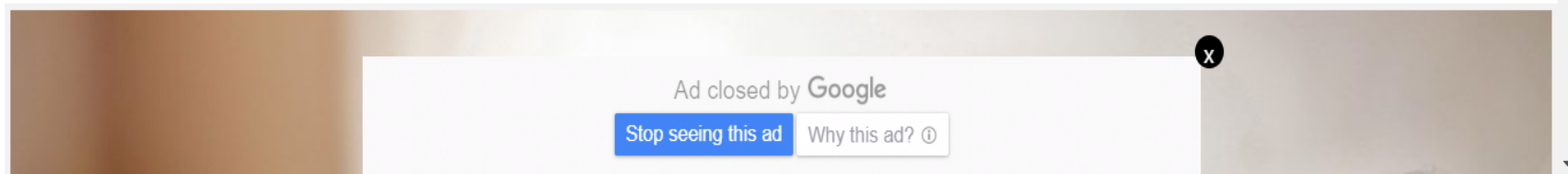
**SPEED AND EFFICIENCY TO BUILD A BETTER INDIA**  
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**HEALTH**

# The Dark Side of India's Indigenous Sex-Selection Drug Preparations

Traditional medicines are not subjected to regulation of chemically defined compounds. Indigenous preparations pose important ethical questions, especially when it comes to sex-selection drugs as it can lead to congenital malformations.



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# Promos circulated by CM's office, Haryana

## सावधान !



लिंग चयन दवाओं के बिक्री और सेवन से

यह पी.सी.पी.एन.डी.टी. अधिनियम के तहत अपराध है

ऐसी दवाइयों के उपयोग से बच्चा मरा या जन्मजात विकृतियों के साथ पैदा हो सकता है



हरियाणा सरकार और इंडियन इंस्टिट्यूट ऑफ पब्लिक हेल्थ- दिल्ली द्वारा जनहित में जारी

# Dissemination...

Dissemination to the community:

A play “Aakhir kyon”- in local language with SSD as the theme by an NGO





# From research to action...

- Short 50 secs video disseminating the harms of taking SSDs..[\..\PHFI sutapa\Ad\SSD Film7Feb18.mp4](#)
- Was aired by All India Radio on July 10, 2018

# Dissemination by DST

↻ You Retweeted



**DSTIndia** ✓  
@IndiaDST

In vitro study supported under SYST of SEED Division, @IndiaDST, on #Herbal formulations consumed by #pregnant #women in hope to beget a #male #child prove its #harmful effects on #foetus.

@drharshvardhan @Ashutos61  
@thePHFI @HaryanaNHM  
@MoHFW\_INDIA @PIB\_India



# SSD film shown in railway stations



# Research to action

Based on study reports, sting operation was conducted by Aaj Tak and this was telecasted in an episode on Oct 13 and 14, 2015

<http://aajtak.intoday.in/video/business-of-medicine-that-guarantees-birth-of-a-baby-boy--1-833030.html>

...court moved by Singh Gehlot the apex court. A spokesperson for Ambience despite collecting maintenance regularly." quired to be sensitized on this issue by the state government. Himachal Pradesh, according to the 2011 census, they are slaughtered in the slaughter houses. Following (law assembly) to shortly

od  
wers  
cash

from a rooftop being the handouts with an eagerness to catch the monkey hour. Capital of the state of Himachal Pradesh, has a ballooning monkey population and wildlife officials say the animals often harass residents and tourists. Monkeys are revered in Hindu-majority India - but the animals can be a menace, trashing gardens, sidwases and even people for food. n government has nkey men' tasked ing the screeches aggressive monkey. This is not the monkey has played

# Man running sex selection site arrested

## Nabbed In Undercover Operation, Was Caught Selling 'Boy Kits' For ₹6000

Shilpy Arora & Sanjay Yadav | TNN

**Gurgaon:** A website owner was on Tuesday arrested by the police in Gurgaon for allegedly peddling sex selection kits, a senior official said. State health secretary Rakesh Gupta said the accused, Sanjay Khatana, was nabbed from Jharsa Road in Gurgaon, in an undercover operation conducted by a joint team of the health department and food & drug administration, and two such kits have also been seized from him. The kit contains a 'BGC Boy Guide' in which the procedure for conceiving a male baby is described. It also contains food supplement and strip for checking ovulation. According to Gupta, Khatana was selling his kits through his website - www.babygenderchoose.com - which he ran from an office on Bristol Lawrence Road in Delhi, and has so far



The 'boy kit' containing pills, ovulation strips and food supplement

sold about 70 such gender selection kits, for Rs 6,000 each, to couples across Punjab and Haryana. He said that Khatana, an MA in Hindi, used to attract couples longing for a male child through his website, and after getting an order and money, he used to send them the kit through courier. An FIR has been lodged against the accused under Sections 6 A, 3A, 22(1), 22(2), 22(3) and 23 of the Prevention and Prenatal Diagnostic Techniques (Regulation of Sex Selection) which carries a maximum punishment of three years or a fine of Rs one lakh, or both. "The team, which included drug control officer Amandeep, and deputy surgeons, Saryu Sharma and Vijay, undertook the undercover operation. The senior drug controller of

### THE TRAP

- Sanjay Khatana was selling sex selection kits at ₹6000 each
- He used his website to attract potential customers
- Kits were sent to a couple by courier after an

cops, who accompanied them. "I posed as a private practitioner and told the accused that one of my clients has three daughters and now she wants a boy. The accused described the procedure of taking medicine and assured that the success rate of the kit is almost 100 per cent," said

### Haryana declares drought

Chandigarh: Haryana government on Tuesday formally declared 'drought-hit' with deficit of which Haryana was last drought-hit in 2007 state witnessed scarcity in the monsoon

striving to get several works done for his constituency and has succeeded in some. Parks' development and expansion of the bus name a few. Neeraj Jain, local

**CHANDIGARH:** Haryana chief minister Bhupinder Singh Hooda on Tuesday termed former Congress leader Birender Singh as a frustrated and selfish person. The CM dismissed the allegations made by Singh that he did not allow him to become a union minister. HTc

### BSP leader joins

**CHANDIGARH:** The Bahujan Samaj Party (BSP) leader Chander Pal joined the Congress in the presence of Rajya Sabha member Kumari Selja and Haryana Congress president Ashok Tanwar at New Delhi on

# Delhi resident arrested for selling 'baby gender-test' kit

HT Correspondent

**CHANDIGARH:** A Delhi-based person who had lured many couples desirous of a male child by offering a "baby gender-choose" kit was on Tuesday arrested by the police following a trap laid by the Haryana Food and Drug Administration (FDA) department. Commissioner of Food and Drug Administration Dr Rakesh Gupta said the accused, Sanjay Khatana of Delhi enticed couples wanting a male offspring by advertising the "baby gender kit" through a website. He used to sell the kit ₹6,000 each. Khatana runs an office on Bristol Lawrence Road in Delhi. Dr Gupta said a decoy customer, Gunjan Malhotra, along with deputy civil surgeon,



A 'baby gender choose' kit recovered by the Haryana food and drug administration department during a raid in Gurgaon on Tuesday.

ACCUSED LURED MANY... HT PHOTO... tained alkaline for conception of a male child with the help of

एकड़ तथा अन्य फसलों के लिए 3500 रुपए प्रति एकड़ की दर से मुआवजा दिया जाएगा। विस्तृत पेज-3

आंकड़ों के हवाले से कहा है कि भारत व जा के बीच द्विपक्षीय व्यापार वित्त वर्ष 2013-14 आखिर में 18.31 अरब डॉलर रहा था।

# लड़का होने की दवा एसपी बेचने वाला गिरफ्तार

## वेबसाइट के माध्यम से लोगों से करता था संपर्क गुड़गांव। फूड एंड ड्रग एडमिनिस्ट्रेशन तथा स्वास्थ्य विभाग की टीम ने छपा मारकर 'लड़का होने की दवा' की किट बेचने वाले व्यक्ति को रो हाथों पकड़कर पुलिस के हवाले कर दिया। दिल्ली निवासी संजय खटाना नामक यह आरोपी वेबसाइट के माध्यम से इस किट की बिक्री करता था। गर्भ धारण करने से पहले दवा की किट का प्रयोग करके इच्छानुसार संतान पाई जा सकती है। देश में ऐसी दवा का कारोबार करना गैर कानूनी है और दंडनीय अपराध है। आरोपी के खिलाफ गुड़गांव की पटौदी रोड चौकी में पीएनडीटी एक्ट की धारा-6ए, 3ए, 22(1), 22(2), 22(3) तथा 23 के तहत एफआईआर दर्ज की गई है और उसे पुलिस ने हिरासत

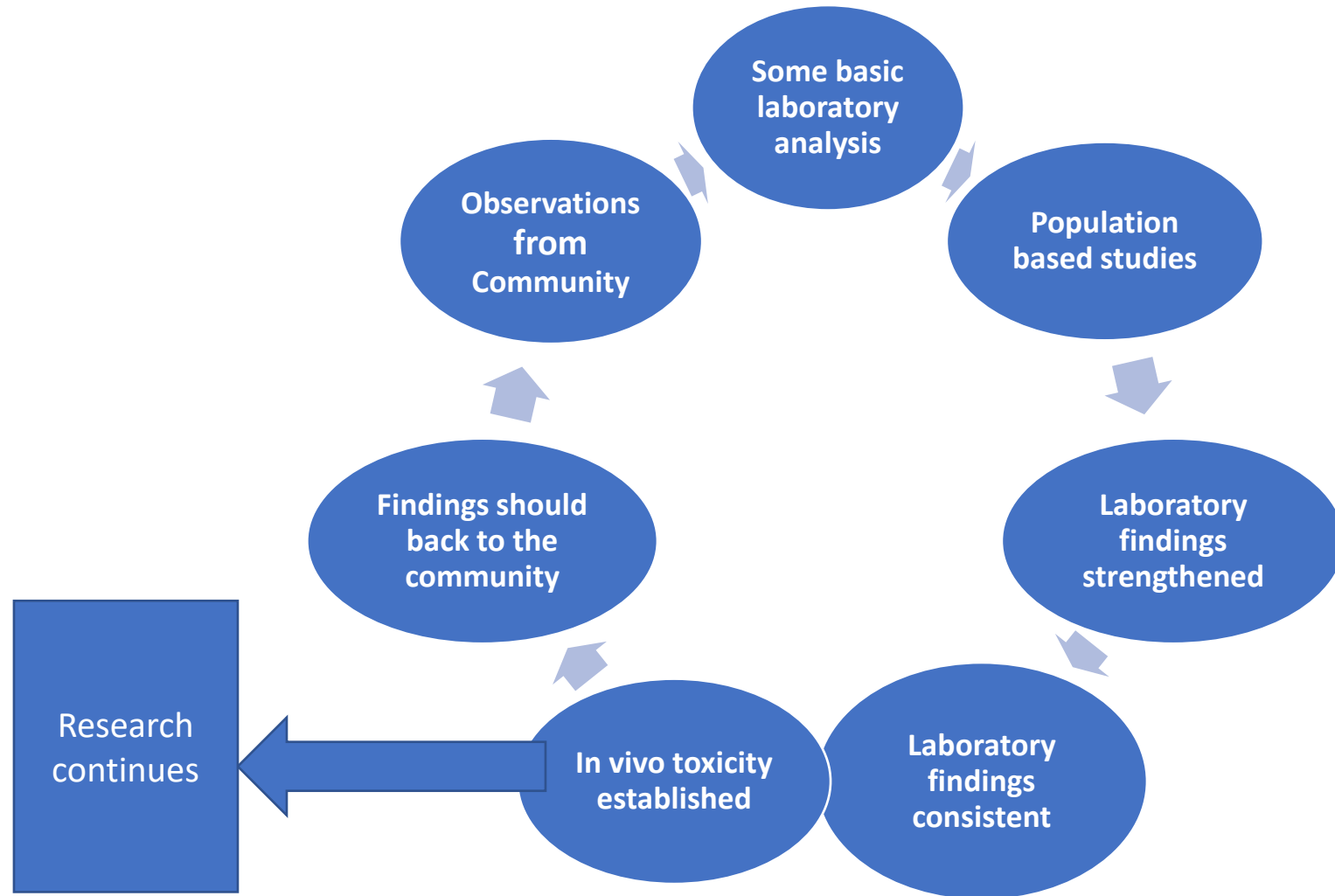
# एसपी कांस

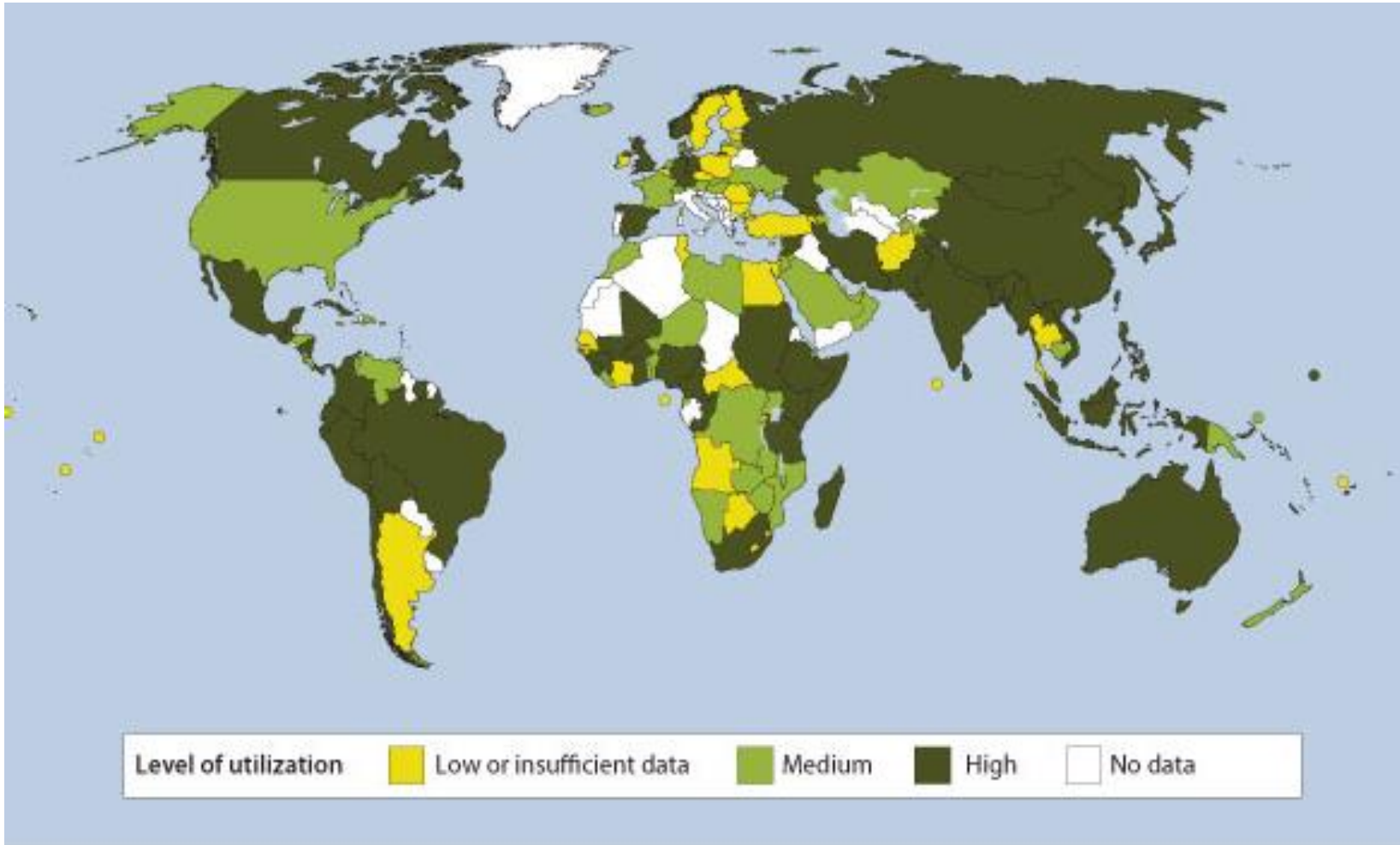
आज समाज नेटव... चंडीगढ़। पुलिस इस्पे... नेटे की हत्या के मामले... अवैध हिरासत में र... पंजाब-हरियाणा हाईव... अवैध हिरासत मामले में... अपनाया सख्त रुख... डिटेक्टिव, तीन इंसपेव... सस्पेंड करने के आदे... जांच कर 22 सितं... करने की भी कहा ग

## Some actions...

- Haryana took and is continuing to take punitive action on people who sell SSDs.
- Under the ambit of PCPNDT Act, First Information Reports (FIRs) are being lodged and raids are being conducted on those who are found to sell these spurious medicines or sell gender selection kits with the promise of facilitating the birth of a male child.
- A total of more than 800 such raids have been conducted successfully in Haryana, out of which 100 raids were conducted on people selling SSDs including 10 convictions.

# Research cycle





- 80% of the global population relies on traditional medicine for their primary health care needs (Parveen et al ,2015)
- The prevalence of its use is more than 50% in both developed and developing nations (Nyeko et al. 2016)

Traditional medicines widely used



# Use of traditional medicines in pregnancy

- Largely determined by the prevailing sociocultural, religious and spiritual values
- Use of herbal medications during pregnancy -reported to be higher in the developing world compared to the West (Louik et al 2010)
- Common indications -nausea/vomiting, pain in abdomen, preventing neonatal jaundice, cold, flu, urinary tract infections, to facilitate labour and to increase the intelligence of the newborn (Kennedy et al, 2013), beauty of skin of infants and to prevent abortion (Chen Y-C et al 2012)
- Sources of information- informal (family and friends, internet, magazines, media



# Are traditional and indigenous medicines always unsafe?

- Many medicines used in the Western system of medicines had their roots in the traditional system of medicine like Penicillin (from *Penicillium* fungi), Artemesin (from herb *Artemesia annua*), Digoxin (from *Digitalis purpurea*) are some such examples.
- One of the promising therapies for Methicillin Resistant *Staphylococcus aureus* infection is a ninth century treatment for eye infections found in Bald's Leechbook, written in Old English and presented as a recipe consisting of garlic and onions, wine, and bile from a cow's stomach brewed in a brass cauldron (***Shulman 2015***)



# Learnings

- Focus on what you want :: ***Do Introspection***
- Share your thoughts.. Publications, informal and formal interactions.. ***Express by writing***
- Interact with people from different fields.. ***Inter-sectoral collaboration***
- Partnership with Government: ***Participate in Government activities***

