

Name: Dr. G. Thangavel

Designation: Assistant Professor, Department of Environmental Health Engineering, Faculty of Public Health, Sri Ramachandra Institute of Higher Education and Research (Deemed to be University), Porur, Chennai

Education and Training

Institution and location	Degree	Completion Date MM/YYYY	Field of study
The Tamil Nadu Dr. MGR Medical University, Chennai, India	BSMS	02/1996	Siddha Medicine
Christian Medical College, Vellore.	MSc	03/2000	Epidemiology
University of California, Berkeley	Research scholar	05/2010	Advanced epidemiology
Sri Ramachandra University, Chennai	Currently doing PhD (part time)		Ambient air pollution and low birth weight in greater Chennai

Personal Statement

My initial educational training was in Indigenous Medicine (Siddha Medicine) following which I acquired post graduate training in epidemiology. During my initial years of employment I gained extensive experience in the fields of fetal growth and birth defects epidemiology. I played key role in establishing birth defect registry to maintain longitudinal surveillance on the patterns and rates of incidence of birth defects in India. I have co-designed and conducted large scale field studies on pregnancy, child and adult health outcomes in relation to multiple risk factors.

My exposure to household air pollution issues came from my involvement in the process of updating the Global Household Air Pollution (HAP) Database between 2009 and 2012 for the development of WHO Guidelines for Household Air Pollution. I was responsible for leading the update of the database with additional fields to capture the more complex fields of exposure information becoming available in recent studies. I was also involved as a member of the technical HAP expert group at SRU that participated in the Global Burden of Disease (GBD) 2010 exercise.

More recently, I served as a lead co-investigator in the cohort studies involving pregnant mothers, infants and adults to examine the association between air pollution exposures and birth/early childhood and chronic respiratory outcomes. The study termed as the Tamil Nadu Health Effects of Air Pollution (TAPHE) study has provided exposure-response relationships specifically applicable in developing country settings that face dual burdens from ambient and household air pollution. I designed the study instruments pertaining to assessments of fetal growth, maternal health and birth outcomes and co-ordinated field assessments pertaining to both maternal and child outcomes. I was also responsible for design and maintenance of a relational database to organize the multiple fields of exposure, health and socio-demographic information collected on the cohort subjects. I played a lead role in developing and validating the analysis of the longitudinal prevalence data on acute respiratory infections in infants. My expertise in fetal growth assessments, field based maternal and child health assessments as well as database design and management together

with the experience of my involvement in HAP studies can adequately support the type the investigations proposed in the said application.

Areas of research expertise and interest

Environmental epidemiology in general, air pollution epidemiology in particular

Maternal and child health especially in the areas of fetal growth, birth weight, birth defects etc.

Research Support

Ongoing Research Support

1. PENN NMA# 41190/01 01/09/2019 to 31/10/2020

Funding source: Pennsylvania University

Encouraging use of liquefied petroleum gas, a clean cooking fuel to reduce household air pollution, among rural households in central Tamil Nadu

Role: Principal investigator, India

2. 68/11/2009_NCD-1 01/03/2018 to
28/02/2019

Funding source: ICMR

Impact of Meteorological changes and Air Pollution on Respiratory Health and Morbidity: A Retrospective Multicentric study”

Role: Principal investigator SRIHER

3. 1UM1HL134590-01 (Clasen, Checkley, Peel, MPI) 09/01/16 to
08/31/21

Funding source: National Institutes of Health, USA and Gates foundation

Household Air Pollution and Health: A Multi-Country LPG Intervention Trial

The major goal of this project is to conduct a multi-country randomized field intervention trial of LPG among pregnant women and their children.

Role: India Site Co-PI

2018 to 2021

4. **Funding agency: Ministry of environment, forest and climate change**

National Environmental Health Profile’ – 20 cities study.

The major goal of this project is to estimate the excess deaths and hospital admissions for various causes due to ambient air pollution in India’s 20 largest cities.

Role: Co-Investigator

Recent Completed Research Support

1. 5/8/4-11/Env/CAR/07-NCD-I, Indian Council for Medical Research

Balakrishnan, Kalpana (PI)

03/01/10 to 09/01/15

Tamil Nadu Air Pollution and Health Effects Study

The goal of this project was to launch pregnant mother-child and adult cohorts to establish exposure-response relationships for (ambient and household) air pollution in relation to birth weight, acute respiratory illness, chronic respiratory symptoms and lung function. The project

also developed exposure models for application in on-going chronic disease cohorts and created bio-repositories for future exploration of gene-environment interactions.

Role: Co-Investigator

2. 5R21DE016877, NIH/NIDCR Munger, Ron (PI) 12/01/13-08/01/15

Orofacial Clefts: Nutritional and Environmental Risk Factors

The goal of this study was to develop and validate field protocols for assessment of nutritional and air pollution related bio-markers for a planned case-control study involving an examination of environmental and genetic risk factors for Oro-facial Clefts in Southern India

Role: Co-Investigator

Teaching experience

Period	Institution	Courses	Subjects
Dec 2015 – till date	SRMC&RI(Deemed to be University), Chennai	Undergraduate courses of Allied Health & Biomedical sciences	Basic quantitative research tools for clinical and public health research
2011 -2012	MMM College of Health Sciences, A unit of Madras Medical Mission, Chennai, India	MBA (Hospital Management), MSc (Medical Sociology) & BSc (Medical Sociology)	Basic & intermediate Biostatistics and epidemiology
June 2010 to Till date	SRMC&RI(Deemed to be University), Chennai	Masters in Public Health (MPH) & Associate Fellowship in Industrial Hygiene (AFIH)	Full time faculty - Epidemiology (Both Introductory and Applied)
June 2010 to Till date	The TN Dr. MGR Medical University, Chennai	Guest faculty in Evidence Based Medicine & Research Methodology and Biostatistics Training Programs	Bias in Research, Literature Review, Statistical significance etc.
June 2008 to Dec 2011	SRMC&RI(Deemed to be University), Chennai	MPharam, MSc (Nursing), MSc (Biotech), MSc (Genetics), MSc (Med informatics), MPT	Epidemiology & Research Methodology
June 2008 to April 2010	SRMC&RI(Deemed to be University), Chennai	MSc (Industrial Hygiene), PGCIH	Introduction to epidemiology, Occupational epidemiology, and Research Methodology
June 2006 – May 2007	St Isabel's Hospital, Chennai	DNB (OG)	Introduction to epidemiology, Research Methodology and basic biostatistics
June 2006 – April 2008	Mediscan systems (in affiliation with Bharathidasan University, Trichy)	PGDMU & PGDCG	Introduction to epidemiology, Research Methodology and basic biostatistics
June 2000 – May 2008	Mediscan systems, Chennai	Trainee doctors	Introduction to epidemiology and basic biostatistics

Positions and Honors

1996	Consultant Siddha physician, Arogya Health Care Pvt. Ltd, Chennai, India
1998 - 1999	Medical officer – Siddha, Bharathiammal Vaidya SevaKendram, Esayanoor, Vellore Dist, TamilNadu, India
2000 - 2008	Chief epidemiologist, Fetal Care Research Foundation & Mediscan, Chennai, India
2010 (Jan to May)	Research Scholar, School of Public Health, University of California, Berkeley, CA, USA
2008– August 2016	Lecturer, Department of Environmental Health Engineering, SRMC&RI(Deemed to be University), Chennai
Sep 2016 - to date	Assistant Professor, Department of Environmental Health Engineering, Faculty of public health, SRMC&RI(Deemed to be University), Chennai

Other Experience and Professional Memberships

1996 – Present	Member, Tamil Nadu Siddha Medical Council, Chennai
2002 – 2008	Member Secretary, Intuitional Ethics Committee, Fetal Care Research Foundation, Mediscan, Chennai
2009-2011	Member, HAP Expert Group, Global Burden of Disease 2010

Major Contributions to Science

Development of indigenous fetal growth standards for South Indian population

Determining fetal growth and expected date of delivery are two crucial aspects in the field of perinatal clinical decision making. Fetal growth is determined by many different parameters; most notable are genetic, ethnic and nutritional parameters. Hence, not having a population specific reference range for fetal growth and dating would lead to a wrong clinical decision making. To fill this lacuna, I assisted in developing the first fetal growth reference standards for South India. The methodology has been widely adopted in other studies in India.

Developing Birth Defects Registry in India

Birth defects surveillance programs have a long history in developed countries. The rapid epidemiological transition in India and other developing countries requires active surveillance for all diseases. While there is a history of surveillance for infectious and chronic diseases, there has been limited precedence for a birth defects registry in India. To understand the patterns of birth defects, especially in relation to contributions to infant mortality and fill a critical gap in the information base, I developed a novel hospital based surveillance system for birth defects. Numerous reports were generated using the information in the registry and it continues to be a resource for many surveillance efforts in Southern India.

Update of the Global Household Air Pollution Database

The Global Household Air Pollution Database was first designed in 2003 by investigators at University of California, Berkeley to consistently abstract information from limited pool of HAP exposure assessment studies. However, since the last decade a growing number of studies across all world regions have started to provide detailed information from large-scale population based studies. The older database therefore had to be updated with both recent studies and additional data fields to capture the full breadth of details provided by recent studies. The update also fulfilled the need to consolidate exposure information from available HAP studies and inform the development of The World Health Organisation Air Quality Guidelines for Household Fuel Combustion. In 2011, I led the update of the database and assisted in abstracting information from over 50 new studies. The database is now hosted by WHO and being used for routine updates.

SCIENTIFIC PUBLICATIONS

Journal articles

1. Goodman D, Crocker ME, Pervaiz F, McCollum ED, Steenland K, Simkovich SM, Miele CH, Hammitt LL, Herrera P, Zar HJ, Campbell H, Lanata CF, McCracken JP, Thompson LM, Rosa G, Kirby MA, Garg S, **Thangavel G**, Thanasekaraan V, Balakrishnan K, King C, Clasen T, Checkley W; HAPIN Investigators. [Challenges in the diagnosis of paediatric pneumonia in intervention field trials: recommendations from a pneumonia field trial working group](#). *Lancet Respir Med*. 2019 Oct 4. pii: S2213-2600(19)30249-8. doi: 10.1016/S2213-2600(19)30249-8.
2. Quinn AK, Williams K, Thompson LM, Rosa G, Díaz-Artiga A, **Thangavel G**, Balakrishnan K, Miranda JJ, Rosenthal JP, Clasen TF, Harvey SA. [Compensating control participants when the intervention is of significant value: experience in Guatemala, India, Peru and Rwanda](#). *BMJ Glob Health*. 2019 Aug 21;4(4):e001567. doi: 10.1136/bmjgh-2019-001567.
3. Shupler M, Balakrishnan K, Ghosh S, **Thangavel G**, Stroud-Drinkwater S, Adair-Rohani H, Lewis J, Mehta S, Brauer M. [Global household air pollution database: Kitchen concentrations and personal exposures of particulate matter and carbon monoxide](#). *Data Brief*. 2018 Oct 27;21:1292-1295. doi: 10.1016/j.dib.2018.10.120.
4. Balakrishnan K, Ghosh S, **Thangavel G**, Sambandam S, Mukhopadhyay K, Puttaswamy N, Sadasivam A, Ramaswamy P, Johnson P, Kuppaswamy R, Natesan D, Maheshwari U, Natarajan A, Rajendran G, Ramasami R, Madhav S, Manivannan S, Nargunanadan S, Natarajan S, Saidam S, Chakraborty M, Balakrishnan L, Thanasekaraan V. [Exposures to fine particulate matter \(PM_{2.5}\) and birthweight in a rural-urban, mother-child cohort in Tamil Nadu, India](#). *Environ Res*. 2018 Feb;161:524-531. doi: 10.1016/j.envres.2017.11.050.
5. Sitalakshmi R, Saikumar P, Jeyachandran P, Manoharan, **Thangavel**, Thomas J. Civil construction work: The unseen contributor to the occupational and global disease burden. *Ind J Occup Env Med* 2016;20(2):103-108.
6. Balakrishnan K, Sambandam S, Ramaswamy P, Ghosh S, Venkatesan V, **Thangavel G**, Mukhopadhyay K, Johnson P, Paul S, Puttaswamy N, Dhaliwal RS, Shukla DK; SRU-CAR Team. [Establishing integrated rural-urban cohorts to assess air pollution-related health effects in pregnant women, children and adults in Southern India: an overview of objectives, design and methods in the Tamil Nadu Air Pollution and Health Effects \(TAPHE\) study](#). *BMJ Open*. 2015 Jun 10;5(6):e008090. doi: 10.1136/bmjopen-2015-008090.
7. Tamilselvan K, Ravinder S, **Thangavel G**, Subhashini AS, Padmavathi R. A study of variation in the levels of seminal plasma superoxide dismutase and glutathione peroxidase in normospermic and oligozoospermic men. *Int J Biomed Res* 2015; 6: 263-267.
8. Tamilselvan K, Ravinder S, **Thangavel G**, Subhashini AS, Padmavathi R. The effect of seminal oxidative stress on male infertility. *Int J Basic Med Sci* 2014; 5: 91-96.
9. Senthil A, **Anandh B**, **Jayachandran P**, **Thangavel G**, **Josephin D**, **Yamini R**, **Kalpna B**. Perception and prevalence of work-related health hazards among health care workers in public health facilities in southern India. [Int J Occup Environ Health](#). 2015 Jan-Mar;21(1):74-81. doi: 10.1179/2049396714Y.0000000096.
10. Smith KR, Bruce N, Balakrishnan K, Adair-Rohani H, Balmes J, Chafe Z, Dherani M, Hosgood H D, Mehta S, Pope D, Rehfuess E, **and others** in the HAP CRA Risk Expert Group. Millions Dead: How Do We Know and What Does It Mean? Methods Used in the Comparative

Risk Assessment of Household Air Pollution. Annual Review of Public Health 2014; 35: 185-206. DOI : 10.1146/annurev-publhealth-032013-182356.

11. Srikanth P, Sivasubramanian S, Sudharsanam S, **Thangavel G**, Jagannathan K. Assessment of Aerobic Bacterial Contamination of Computer Keyboards in a Tropical Setting. **JAPI** 2012; 60: 18-20.
12. Sudharsanam S, Swaminathan S, Ramalingam A, **Thangavel G**, Annamalai R, Steinberg R, Balakrishnan K, Srikanth P. Characterization of indoor bioaerosols from a hospital ward in a tropical setting. **African Health Sciences** 2012; 12(2): 217 – 225. <http://dx.doi.org/10.4314/ahs.v12i2.22>.
13. Balakrishnan K, Ramaswamy P, Sambandam S, **Thangavel G**, Ghosh S, Johnson P, Mukhopadhyay K, Venugopal V, Thanasekaraan V. Air pollution from household solid fuel combustion in India: an overview of exposure and health related information to inform health research priorities. **Glob Health Action** 2011;4. doi: 10.3402/gha.v4i0.5638. Epub 2011 Oct 4.
14. Deepalakshmi K, Priscilla J, Padmavathi R, **Thangavel G**, Subashini AS. A preliminary study of assessment of left ventricular function in morbid obesity. Bulletin of Association of Physiologist of Tamilnadu 2009; 3: 21 – 23.
15. Suresh S, Indrani S, **Thangavel G**, Sujatha J. Perinatal outcome after multifetal pregnancy reduction. **Ind J pediatrics**, 2008 Sep ; 75 (9) : 907-909 [DOI: 10.1007/s12098-008-0184-5].
16. **Thangavel G**, Sujatha J, Durga S, Suresh S, Indrani S. Short-limb skeletal dysplasias and consanguinity - a hospital-based case control study. **Perinatology** 2006;8:190-193.
17. Sujatha J, **Thangavel G**, Aarti R, Indrani S, Suresh S. Patterns and trends of genetic counseling: experience from urban referral prenatal diagnostic centre in South India. **Perinatology** 2006;8:54-59.
18. Suresh S, **Thangavel G**, Sujatha J, Indrani S. Methodological issues in setting up a surveillance system for birth defects in India. **Natl Med J India**. 2005;18:259-62.
19. **Thangavel G**. Fetal biometry some insights. **Ind J Med Ultrasound** 2005; 3: 9-11.
20. **Thangavel G**. Suresh S. Mathematical modeling of fetal growth, Part 2: Regression analysis. **Ind J Med Ultrasound** 2003; 1: 59-67.
21. Suresh S. **Thangavel G**. Mathematical modeling of fetal growth, Part 1: data collection and descriptive statistics. **Ind J Med Ultrasound** 2003; 1: 35-43
22. Ashok M, **Thangavel G**, Indrani S, Suresh S. Atrioventricular Septal Defect - Associated Anomalies and Aneuploidy in Prenatal Life. **Ind Pediatr** 2003;40:659-664
23. Parange NA, **Thangavel G**. Ultrasonography in Prenatal Diagnosis of Congenital Malformations: Experiences from a Single Center in Rural Maharashtra. **Ind J Med Ultrasound** 2002;2:4 –13.
24. Thangavel G. Effective literature search using PubMed. **Ind J Med Ultrasound** 2002; 2: 4 –13.

Other Publications

1. Balakrishnan K, Arasi DS, Ayyappan R, Jayachandran P, Yamini R, **Thangavel G**, Venkatesan D, Sambandam S. Basic occupational health services (BOHS) for health care workers in public health systems in Tamilnadu, India: Scoping a framework for risk management. International forum on occupational health and safety: policies, profiles and services. [OH&S Forum 2011. Published by Finnish Institute of Occupational Health. Helsinki, Finland.](#)
2. **Thangavel G**. An overview of caesarian deliveries. (Tamil) <http://poongaa.com/content/view/1561/1/> (30/04/2007)
3. **Thangavel G**. Chennai Birth Defects Registry - The sixth annual report. **BDR News** 2007; Volume 7: Issue 2
4. **Thangavel G**. Chennai Birth Defects Registry - The fifth annual report. **BDR News** 2006; Volume 6: Issue 2

5. **Thangavel G.** Chennai Birth Defects Registry - The fourth annual report. **BDR News** 2005; Volume 5: Issue 2
6. **Thangavel G.** Chennai Birth Defects Registry - The third annual report. **BDR News** 2004; Volume 4: Issue 2
7. **Thangavel G.** Manam Thirakiren. A critical look at Siddha medicine. **Aviztham** (Siddha Monthly Magazine) May 2004.
8. **Thangavel G.** The fear due to SARS. An editorial article. **Dinamani** (Tamil Daily) 23/05/2003.
9. **Thangavel G.** Chennai Birth Defects Registry - The second annual report. **BDR News** 2003; Volume 3: Issue 2.
10. **Thangavel G.** Chennai Birth Defects Registry - The first annual report. **BDR News** 2002; Volume 2: Issue 2.
11. **Thangavel G.** Chennai Birth Defects Registry – A preliminary report. **BDR News** 2001; Volume 1: Issue 2.

Chapter in a book

- Balakrishnan K, Sankar S, Ghosh S, Thangavel G, Mukhopadhyay K, Ramaswamy P, Johnson P, Thanasekaran V. Household Air Pollution Related to Solid Cookfuel Use: The Exposure and Health Situation in Developing Countries. Indoor Air Pollution, 2nd Edition, Handbook Environmental Chemistry, Springer Verlag, Berlin. P. Pluschke and H. Schleichinger (eds.), 2014 doi: 10.1007 /698_2014_260
- Suresh S, Thangavel G. Birth defects surveillance in India – A methodological approach. In: Gogate S, editor, Preventive genetics, 1st ed. JAYPEE brothers medical publishers (P) Ltd, New Delhi, 2006, pp 47-56.

Other materials

1. Kalpana Balakrishnan, Gurusamy Thangavel, Santu Ghosh, Sankar Sambandam, Krishnendu Mukhopadhyay, Heather Adair-Rohani, Nigel Bruce, Kirk R. Smith. **The Global Household Air Pollution Database 2011 (Version 3.0)** [http://www.who.int/indoorair/health_impacts/databases_iap/en/Accessed on 29/02/2016](http://www.who.int/indoorair/health_impacts/databases_iap/en/Accessed_on_29/02/2016)
2. Suresh S, Thangavel G, Vijayalakshmi R, Devaki G. Doppler in obstetrics. Mediscan Prenatal Diagnosis and Fetal Therapy Center and Fetal Care Research Foundation, Chennai 2006.
3. Suresh S, Thangavel G. Evidence based ultrasound in clinical decision making. Mediscan Systems & Fetal Care Research Foundation, Chennai 2004.
4. Suresh S, Thangavel G. Fetal biometry reference ranges – Mediscan. Mediscan Prenatal Diagnosis and Fetal Therapy Center, Chennai 2002.

5. Muthuraman N, Suresh S, Suresh I, Vijayalakshmi R, Thangavel G. Ultrasound nomograms: Abdomen, Pelvis and Small parts. Fetal Care Research Foundation, Chennai 2000.

Conference paper presentations / Invited speaker

1. Regular invited faculty in teaching literature review, bias in epidemiological studies and report writing in the research methodology and evidence based medicine workshops conducted by both the departments of Siddha and Epidemiology of The T Dr. MGR Medical University for faculty and post graduates students of both AYUSH institutions and biomedical institutions respectively since 2010.
2. **Literature review.** Workshop for AYUSH PG students at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 29th August 2012 & 24th September 2012.
3. **Bias in clinical research.** Workshop on Research Methodology & Biostatistics organized by The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 15th June 2012.
4. **Tests of significance.** Workshop on Research Methodology & Biostatistics organized by The National Institute of Siddha, Tambaram, Chennai. 18th April 2012.
5. **Literature review.** Workshop for AYUSH PG students at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 7th February 2012.
6. **Parametric tests.** Workshop on Essentials of Biostatistics organized by The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 14th December 2011.
7. **Systemic review on Prognosis.** Workshop on Evidence Based Medicine organized by The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 14th November 2011.
8. **What tests to do & When.** Workshop on Research Methodology & Biostatistics at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 23rd September 2011.
9. **Tests of significance.** Workshop for AYUSH PG students at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 13th September 2011.
10. **Literature review.** Workshop for AYUSH PG students at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 8th August 2011.
11. **Tests of Significance and Bias.** Workshop for AYUSH PG students at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 14th June 2012 & 5th July 2011.
12. **Bias.** Workshop on Evidence Based Medicine organized by The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 22nd March 2011.

13. **Hypothesis and Significance Testing.** Workshop for AYUSH PG students at The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. June, July, August 2010.
14. **Bias in epidemiological research.** Workshop on Evidence Based Medicine organized by The Tamilnadu Dr. MGR Medical University, Guindy, Chennai. 29th July 2009.
15. **Health Findings of Eco-health project on Stone Quarry Community in Budelkhand Region.** CME on Environmental and Occupational Health. Budelkhand University, Jhansi, Uttar Pradesh. 10th August 2008.
16. **Gestational age and Crown Rump Length.** Association of Physiologists of Tamilnadu Conference [APTCON]. SRU, July 2008.
17. **Downs syndrome risk prediction – an evidence based approach.** 9th national conference of Indian Society for Prenatal Diagnosis and Therapy (ISPAT). Chennai, India, November 2007.
18. **Conducting randomized double blind controlled clinical trails in Siddha system of medicine.** 1st CME programme – “Saisiddh 2007” at Sri Sairam Siddha medical college & Research centre, Chennai, India November 2007
19. **Utility of SPSS in Medical research.** Invited speaker at Utility of SPSS package for research analysis, Workshop conducted by Ramanujam Computing Centre, Anna University, Chennai, India December 2006.
20. **Clinical research in Siddha system of medicine.** Invited speaker at 4th National Siddha Conference, conducted by Tamilnadu Siddha graduates association, Chennai, India November 2006.
21. **Best poster (1st prize): Gestational age independent method for fetal size (growth) assessment.** Poster presented at 10th south Asian regional conference on Clinical UltraSonography in Practice (CUSP), Chennai, India, September 2006.
22. **Fetal nasal bone length nomogram.** Poster presented at 10th south Asian regional conference on Clinical UltraSonography in Practice (CUSP), Chennai, India, September 2006.
23. **Clinical research in Siddha system of medicine.** Invited speaker at International conference on globalisation of traditional, complementary and alternative systems of medicine, conducted by Agricultural University, Coimbatore, Tamilnadu, March 2006.
24. **Birth defects surveillance: An experience from India.** Poster presented at 2nd International Conference on Birth Defects and Disabilities in the Developing World, Beijing, China, September 2005.
25. Triple screening test – three years experience – poster presented at 8th south Asian regional conference on Clinical UltraSonography in Practice (CUSP), Chennai, India, September 2002