

WOMEN HEALTH ISSUES IN INDIA

PCOS AS A CENTRAL DRIVER

Achanta Lakshmi pathi Recognition of Academic Excellence (RAE)



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Chief Coordinator

NATIONAL ICMR-PCOS TASK FORCE

President

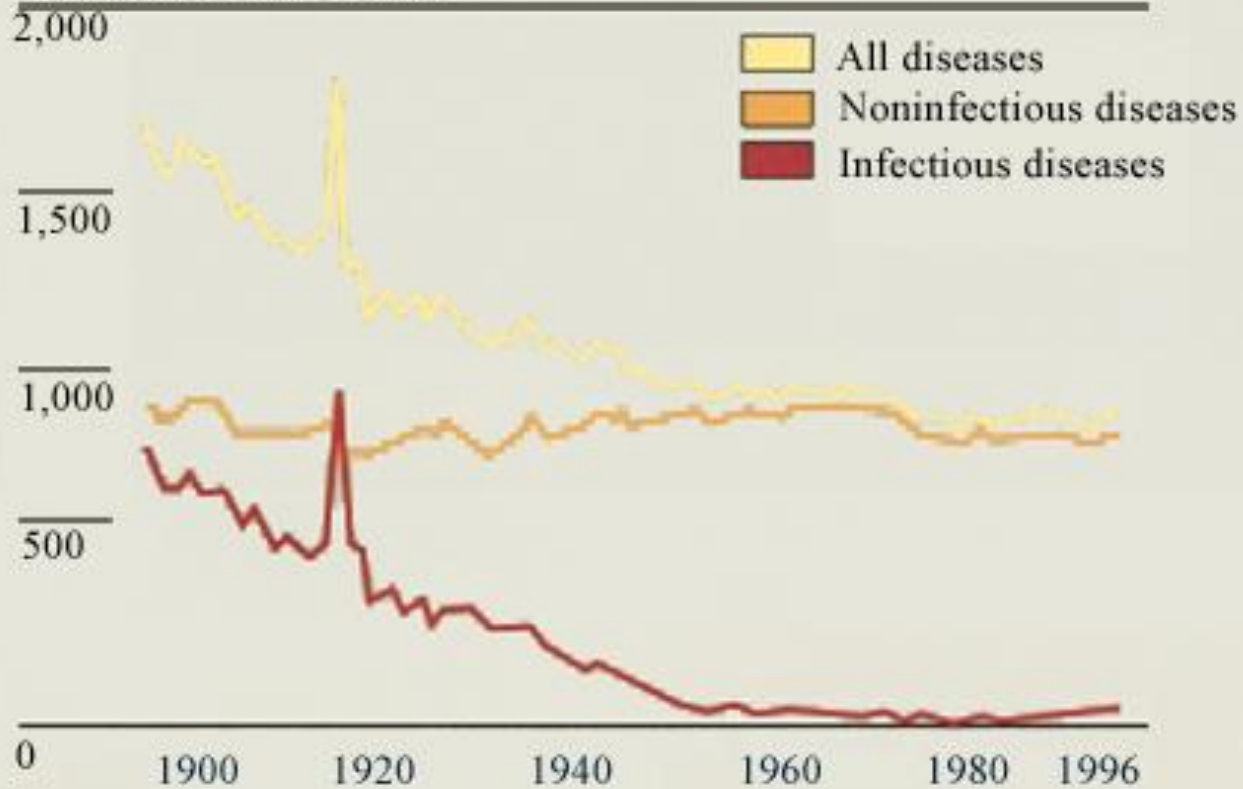
Metabolic Syndrome-Prediabetes-PCOS Society (M P PCOS)



THE EPIDEMIOLOGIC TRANSITION

Infectious Disease Mortality in the United States

Deaths per year per 100,000



Transition in India different- a Double Whammy

- obesity
- diabetes
- hypertension
- CHD
- stroke
- chronic lung disease
- motor vehicle and injuries
- Mental Health
- Substance abuse
- cancers

NCDs

Link to NCDs-India

73.4% of total deaths in 2017 (The Lancet, 2018)

NCDs kill 41 million people each year, equivalent to 74% of all deaths globally.

1 in every 4 individual has risk of dying from NCD (WHO, 2015)

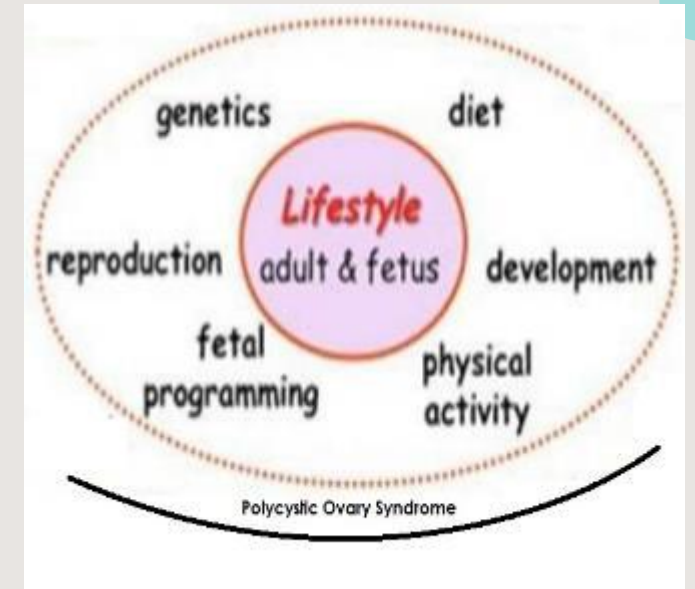
- 1. Diabetes; 2. CVDs; 3. Chronic respiratory diseases; 4. Obesity

28.1% of total deaths in 2016

S.No	Disease	Global Prevalence	
1	Diabetes Milletus	6.28% in 2017 (Khan et al , 2020)	7.3% diabetic . 10.3% Pre-Diabetic (InDiab, 2016)
2	HTN	31.1% of adults.	30.7% (Ramakrishnan et al,2019)
3	CAD	1,655 per 100000 individuals (1.72%) (Khan,2017)	1% to 10%.
4	Obesity	Increased from 3.2% in 1975 to 10.8% in 2014 (men) and from 6.4% to 14.9% (Women) [Di Cesare, 2019]	Increased from 2.2% (1990) to 5.1% (2015) [Luhar, et al, 2020]
5	Dyslipidemia	30.3% in Southeast Asia Region (WHO, 2008)	25% to 30% (urban) 15% to 20% (rural) [Gupta, 2017]
6	COPD	7.6% (Halbert et al, 2006)	from 3.3% to 4.2% in 2016. (The Lancet, 2018)
7	CKD	9.1% in 2017 (CKDC, 2020)	<1% to 13% (Lancet GH, 2017)

Women's Health Matters

- Women disproportionately affected by:
 - ✓ Hormonal disorders
 - ✓ Nutritional deficiencies
 - ✓ Reproductive health challenges



The exact cause or its trigger is not known till date

Intergenerational impact:

Maternal health → Child health → Future population health

Begining of my Endocrine Journey

Hyderabad ESICON 1999



Best Oral award

Chairs



Then Secretary

Today ES-After 25 years

WHERE IT ALL BEGAN...

My journey in women's health began:

**DM Endocrinology scholar (AIIMS ND)-
2000**

Guide and Mentor

Late Prof AC Ammini

DM Theses

a). Clinical Description of Adolescent PCOS

b). RCT



Comparison of Efficacy of Spironolactone with Metformin in the Management of Polycystic Ovary Syndrome: An Open-Labelled Study

M. ASHRAF GANIE, M. L. KHURANA, M. EUNICE, M. GULATI, S. N. DWIVEDI, AND A. C. AMMINI

Departments of Endocrinology and Metabolism (M.A.G., M.L.K., M.E., A.C.A.), Radiology (M.G.), and Biostatistics (S.N.D.), All India Institute of Medical Sciences, New Delhi 110029, India

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GENERAL MEDICINE | DERMATOLOGY

July 28, 2004

Prevalence and Treatment of Polycystic Ovary Syndrome

Robert W. Rebar, MD

Results from two recent studies shed additional light on polycystic ovary syndrome (PCOS). In both, PCOS is defined by oligoovulation, hyperandrogenemia or hirsutism, and exclusion . . .

Results from two recent studies shed additional light on polycystic ovary syndrome (PCOS). In both, PCOS is defined by oligoovulation, hyperandrogenemia or hirsutism, and exclusion of other endocrine disorders.

In the first study, investigators estimated the prevalence of PCOS among 400 consecutive premenopausal women (56% black, 42% white) who underwent pre-employment physical exams at a university in Alabama. Black women were more than twice as likely as white women to be obese (body-mass index, ≥ 30 kg/m²). Overall prevalences of menstrual dysfunction and hirsutism were 22.8% and 6.8%, respectively; 6.6% of the subjects fulfilled criteria for PCOS. The prevalence of hypothyroidism was 2.7%.

In the second study, 89 women (mean age, 22.6; mean BMI, 26.8) in India were randomized to receive 6 months of spironolactone (50 mg daily), which reduces androgen levels, or metformin (1000 mg daily), which improves insulin sensitivity, following diagnosis of PCOS. Menstrual regularity and hirsutism improved significantly in both groups, but the effect on hirsutism was more pronounced with spironolactone. Spironolactone was more effective in increasing the frequency of menstrual periods. Insulin sensitivity improved significantly with metformin and showed a trend toward improvement with spironolactone. Side effects were more common and were more troublesome with metformin.

COMMENT

The first study provides additional evidence that polycystic ovary syndrome is a common endocrinopathy among women of reproductive age. The second suggests that insulin resistance is not the major or sole cause of the disorder, because both agents were approximately equivalent for treating signs and symptoms of PCOS (although doses were lower than those commonly used in the U.S.). Spironolactone remains an effective approach to treating women with PCOS.

CITATION(S):

Azziz R et al. The prevalence and features of the polycystic ovary syndrome in an unselected population. *J Clin Endocrinol Metab* 2004 Jun; 89:2745-9.

Ganie MA et al. Comparison of efficacy of spironolactone with metformin in the management of polycystic ovary syndrome: An open-labeled study. *J Clin Endocrinol Metab* 2004 Jun; 89:2756-62.

NEJM
Journal Watch
Clinical insights. Expert perspectives.

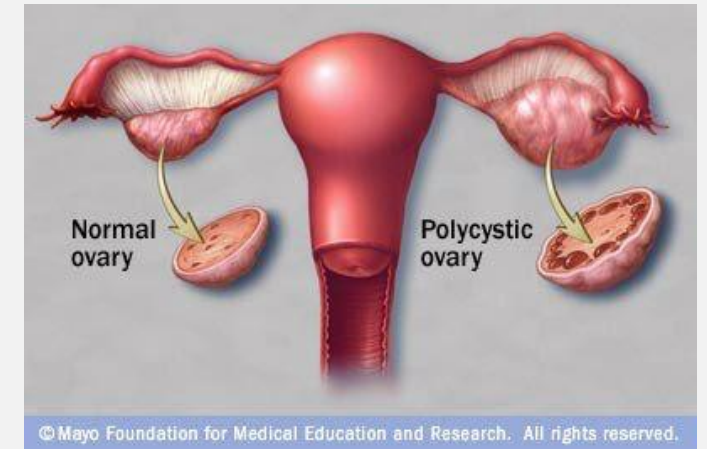
NEJM
Commentary

Best
Outgoing
DM
Scholar
2003



PCOS- HISTORICAL PERSPECTIVE

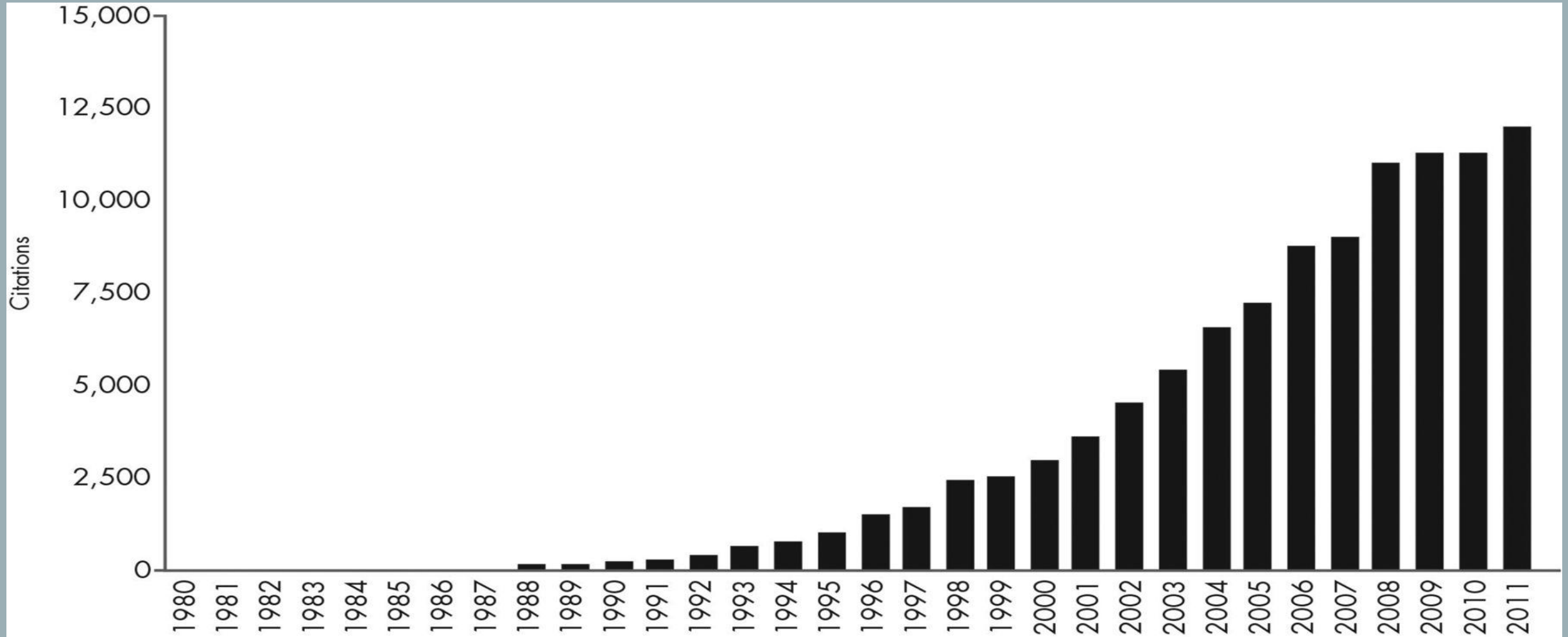
- ✓ The original description of enlarged, smooth polycystic ovaries (PCO) is credited to Chereau in 1844.
- ✓ In 1921, Achard and Thiers reported the coexistence of diabetes mellitus with clinical signs of androgen excess in a postmenopausal woman—the so-called “Achard-Thiers syndrome” or “diabetes of the bearded women”.



Stein IF, Leventhal ML. Amenorrhoea associated with bilateral polycystic ovaries. AJOG
1935

1990 – Burghen et al – Insulin connection

A new field—Most extensively studied



There are approximately 5,200,000 citations in a Web of Science (Thomson Reuters, New York, NY) Citation Report for 1980–2011 on the topics of PCOS or hyperandrogenism and hyperinsulinemia, insulin resistance, glucose intolerance, or **diabetes mellitus**. The annual citations have increased steadily from 1 in 1980 to approximately 12,000 in 2011 and

Diamanti-Kandarakis E, and Dunaif A *Endocrine Reviews* 2012;33:981-1030

Editorial

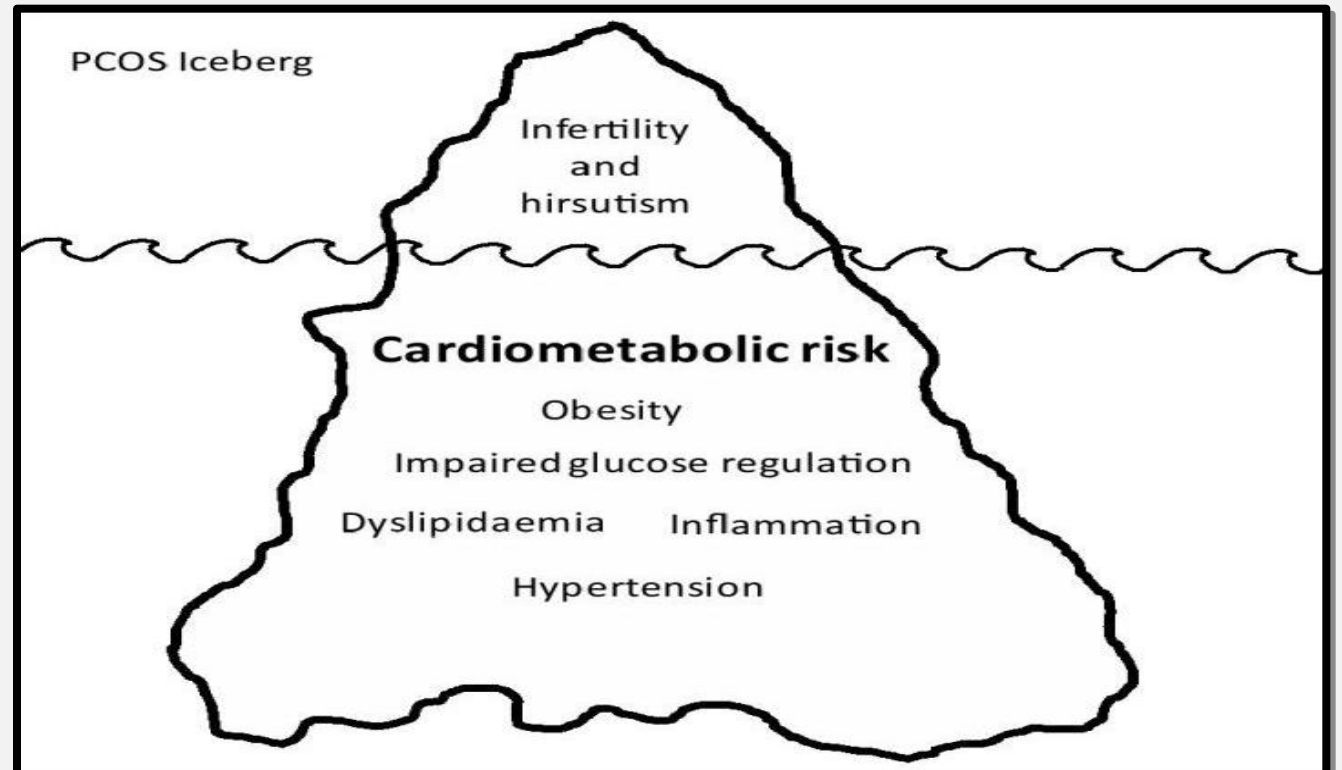
Polycystic ovary syndrome – A metabolic malady, the mother of all lifestyle disorders in women – Can Indian health budget tackle it in future?

M. Ashraf Ganie, Sanjay Kalra¹

Department of Endocrinology, Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, ¹Department of Endocrinology, Bharti Hospital and BRIDE, Karnal, Haryana, India



DIABETES Capital

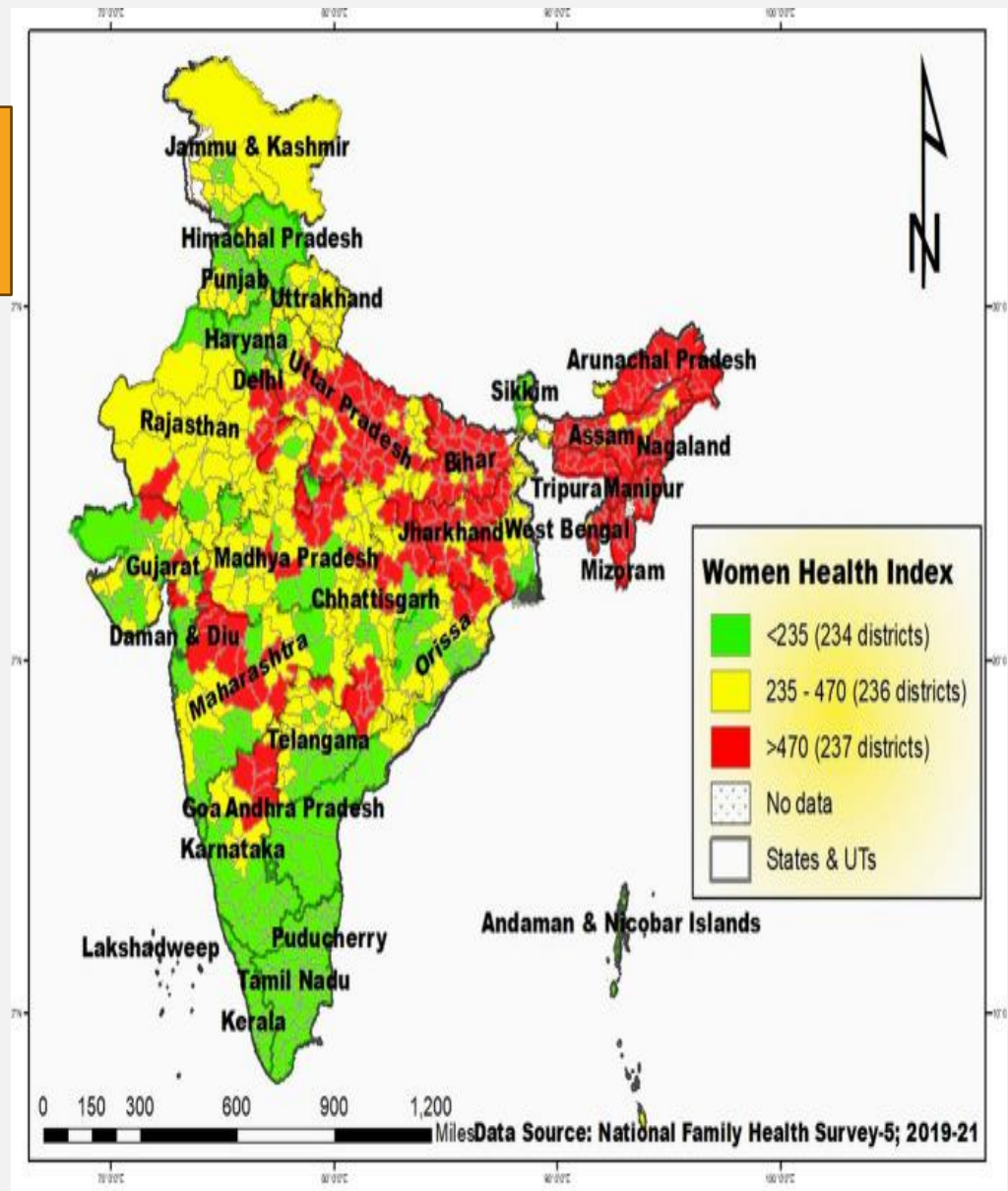


National Family Health Survey (NFHS 5)



15 years later

Sustainable Development Goal 3 (SDG3)



Swasth Nari, Sashakt Parivar Abhiyaan' and *8th Rashtriya Poshan Maah* >10 Lakh

Awareness about PCOS and Other NCD's-'Swasth Nari Sashakt Parivar' Abhiyaan



Sher-i-Kashmir Institute of Medical Sciences, Srinagar and MP-PCOS Society

In Collaboration with
Government Degree College, Sumbal
is organizing
PCOS AWARENESS MONTH
as part of

SWASTH NARI SASHAKT PARIVAR ABHIYAAN

SEPTEMBER 18, 2025
THURSDAY
11:00 AM - 1:00 PM
VENUE: GOVT. DEGREE COLLEGE, SUMBAL

PROF. M. ASHRAF GANIE
Dean SKIMS & RSGC
(Patron)

PROF. G. M. GULZAR
Dean Medical Faculty, SKIMS
(Co-Patron)

DR. RIAZ A. MISGAR
Organizing Chairman



My experience- blessed



Since year 2000

All India Institute of Medical Sciences
Delhi



Sheri-Kashmir Institute of Medical
Sciences Srinagar



ISSUES IN PCOS...-INDIA

- Burden of disease ?
- Relation to Diabetes and other NCD epidemic?
- Indian phenotype ?
- Consequences?
- What causes it?
- Prevention /Early detection/ Treatment ---different?

I.How common is PCOS ?

Data on PCOS from India- sketchy

Prevalence of Polycystic Ovarian Syndrome in India: A Systematic Review and Meta-Analysis

Mintu Dewri Bharali ¹, Radhika Rajendran ², Jayshree Goswami ³, Kusum Singal ⁴, Vinoth Rajendran ⁵

1. Department of Community Medicine, Guwahati Medical College and Hospital, Guwahati, IND 2. Department of Biotechnology, Indian Institute of Technology, Guwahati, Guwahati, IND 3. Department of Obstetrics and Gynecology, Gauhati Medical College and Hospital, Guwahati, IND 4. Center For Advanced Research Evidence-Based Child Health, Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh, IND 5. Department of Community Medicine/Family Medicine, All India Institute of Medical Sciences, Jodhpur, IND

Author, year	Region	group (years)	diagnose PCOS	Sample size	Prevalence (%)
Nidhi et al., 2011 [21]	Andhra Pradesh	15-18	Rotterdam's, NIH	460	9.13, 2.61
Vijaya and Bharatwaj, 2014 [22]	Pondicherry	19-25	Rotterdam's	238	11.76
Bhuvanashree et al., 2013 [23]	Andhra Pradesh	10-19	Rotterdam's	253	15.42
Joshi et al., 2014 [24]	Maharashtra	15-24	Rotterdam's, AES	600	22.50, 10.67
Deswal et al., 2019 [25]	Haryana	16-45	Rotterdam's	2253	4.17
Gupta et al., 2018 [26]	Madhya Pradesh	17-24	Rotterdam's	500	8.20
Nanjaiah 2018 [27]	Karnataka	18-30	Rotterdam's	396	4.55
Singh et al., 2018 [28]	Andhra Pradesh	15-19	Rotterdam's	117	11.97
Laddad et al., 2019 [29]	Maharashtra	10-19	Rotterdam's	150	17.33
Ganie et al., 2020 [30]	Kashmir	15-40	Rotterdam's, NIH, AES	964	13.59, 11.11, 13.17



Diabetes and Obesity International Journal

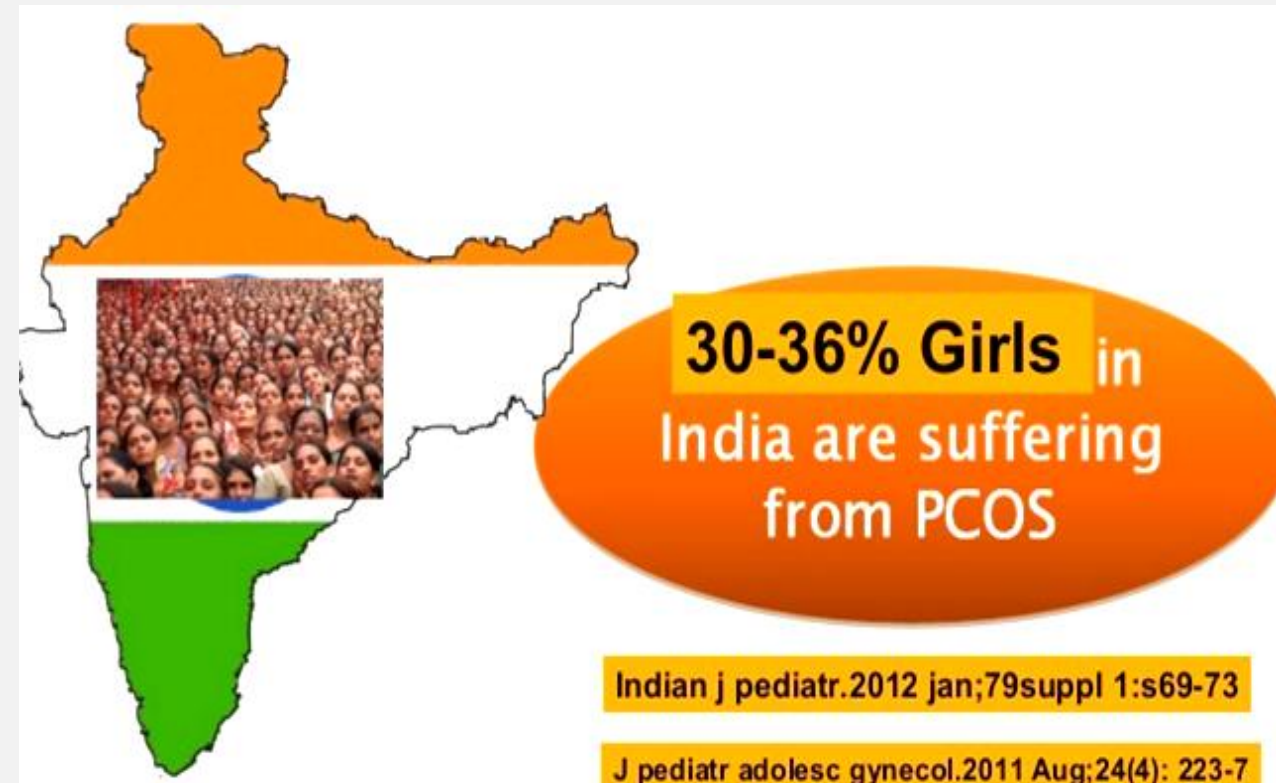
Polycystic Ovary Syndrome: A Multi-Specialty, Multi-System Galloping Epidemic

Sriwastva MK¹ and Ganie MA^{1*}

¹Department of Endocrinology & Metabolism, All India Institute of Medical Sciences, India

*Corresponding author: Mohd Ashraf Ganie Department of Endocrinology & Metabolism, All India Institute of Medical Sciences, New Delhi, India, 110029, Tel: 0112659-3968; Email: ashraf.endo@gmail.com

Editorial
Volume 1 Issue 3
Received Date: July 25, 2016
Published Date: August 1, 2016



Several meetings with Heads of DBT/ICMR/DST-----



Listened
Realized

Expert Group Meeting for Brainstorming on Polycystic Ovary Syndrome (PCOS)
ICMR-AIIMS Joint Collaborative Initiative
Venue: Conference Room 301 ICMR Hqs
11th September 2014 (8.30 AM-6.00 PM).

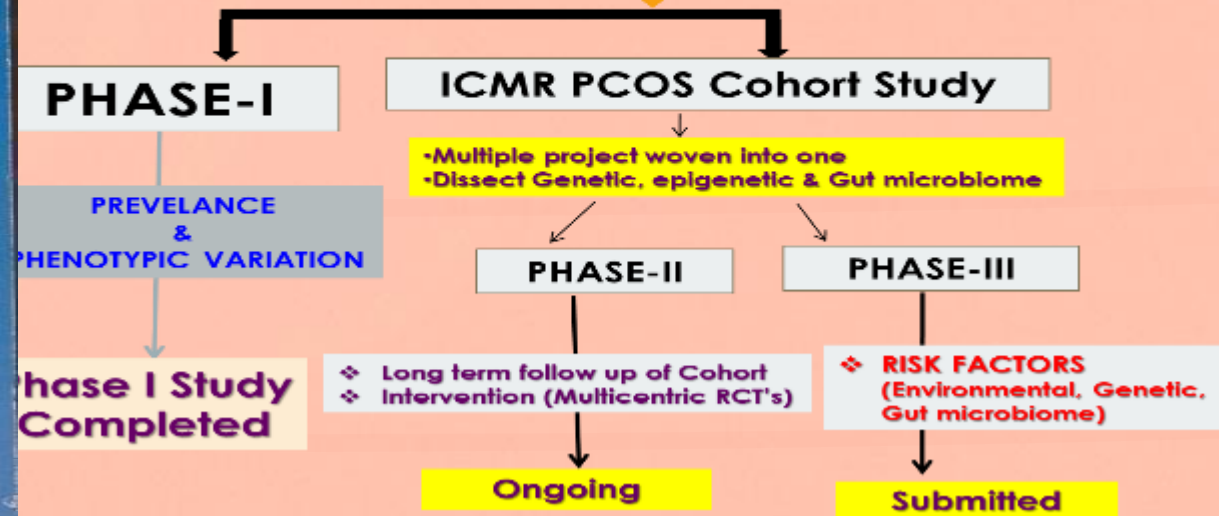
TIMINGS	Inaugural Session	SPEAKERS
8:30-9:00	Registration	
	Chair: Dr. V. M. Kotach, DG ICMR & Secretary DHR and Dr. M.C. Misra Director AIIMS, N. Delhi	
9:00-9:05	Welcome Address	Dr. Malabika Roy
9:05-9:15	Address by Chairman	Dr. V M Kotach, Secretary DHR and DG ICMR
9:15-9:25	Address by Director AIIMS	Dr. M C Misra, Director AIIMS
9:25-9:45	PCOS in India, a thrust area	Dr. Mohd Ashraf Ganie, Endo & Metab, AIIMS ND (Coordinator)
	Rapporteur: Dr. Anju Sinha Scientist 'D', Div of RCH	
	Session I: Co-Chair: Prof. R J Dash, former Head Endocrinology, PGIMER, Chandigarh	
9:45-10:15	Epidemiology of PCOS: global and Indian scenario	Prof. G R Sridhar, Director Endo Center Vizac Dr. Beena Joshi NIFRRH Mumbai
10:15-10:45	Risk factors across the lifespan and their relationship with future chronic diseases (DM, obesity, Metabolic syndrome, NASH, CAD) Prof. Rakesh Sahay, Department of Endocrinology, Nizam's Institute, Hyderabad	Prof. Showkat Ali Zargar, Director SKIMS, Srinagar Prof. S K Sharma Chairman Medicine, AIIMS, New Delhi

Expert group meeting for brainstorming on Polycystic Ovary Syndrome (PCOS)

Convened by
Indian Council of Medical Research (ICMR) & Endocrinology and Metabolism, All India Institute of Medical Sciences New Delhi.

Multicentric ICMR-PCOS Study

At inception then then DG-ICMR suggested to conduct the study in Phases.



ICMR-PCOS Task Force Study (Phase-I)

Sanctioned in Oct 2017

- Protocol Developed
- SOP/study tool formulation
- Instruction manual
- Staff recruitment
- Training/certification
- IM meetings to finalize the protocol

Evaluation of prevalence, regional phenotypic variation, co-morbidities, risk factors and the variations in response to different therapeutic modalities among Indian women with polycystic ovary syndrome (PCOS): A Multicenter study across India

MULTICENTRE PCOS-ICMR TASK FORCE STUDY



Chief Coordinator & Principal Investigator
Dr. Mohd Ashraf Ganie
Professor Department of Endocrinology,
Sheri-Kashmir Institute of Medical sciences Srinagar, J&K



Indian Council of Medical Research
V. Ramalingaswami Bhawan, Ansari Nagar, P. Box No. 4911
New Delhi – 110029

The protocol was frozen during investigators meeting-cum-training workshop in April 2018



Protocol Published
JMIR Res Protoc
2021;10(8):e23437



World Health
Organization



TRAINING CUM INVESTIGATOR MEET



Upcoming Event: Dissemination Meeting, 31st october, 2023, ICMR, New



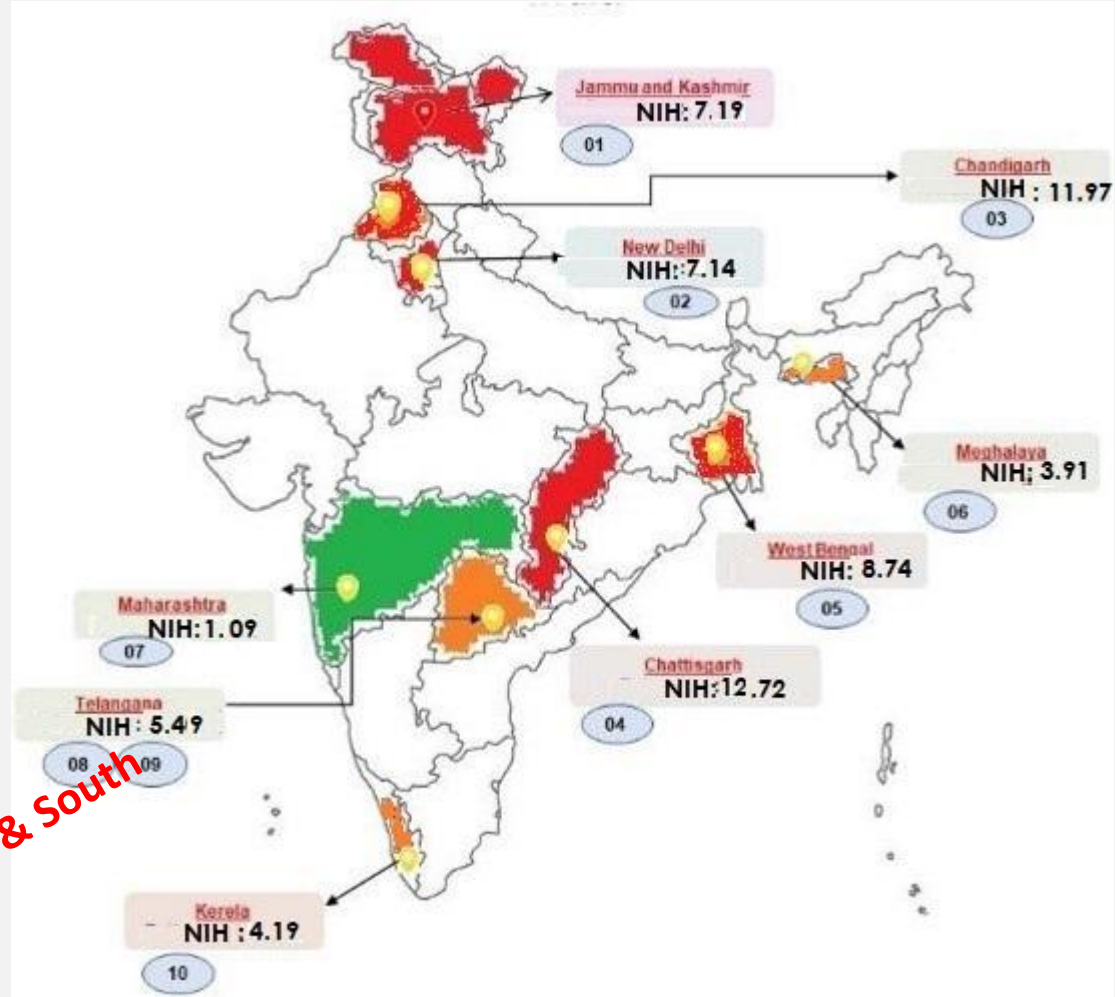
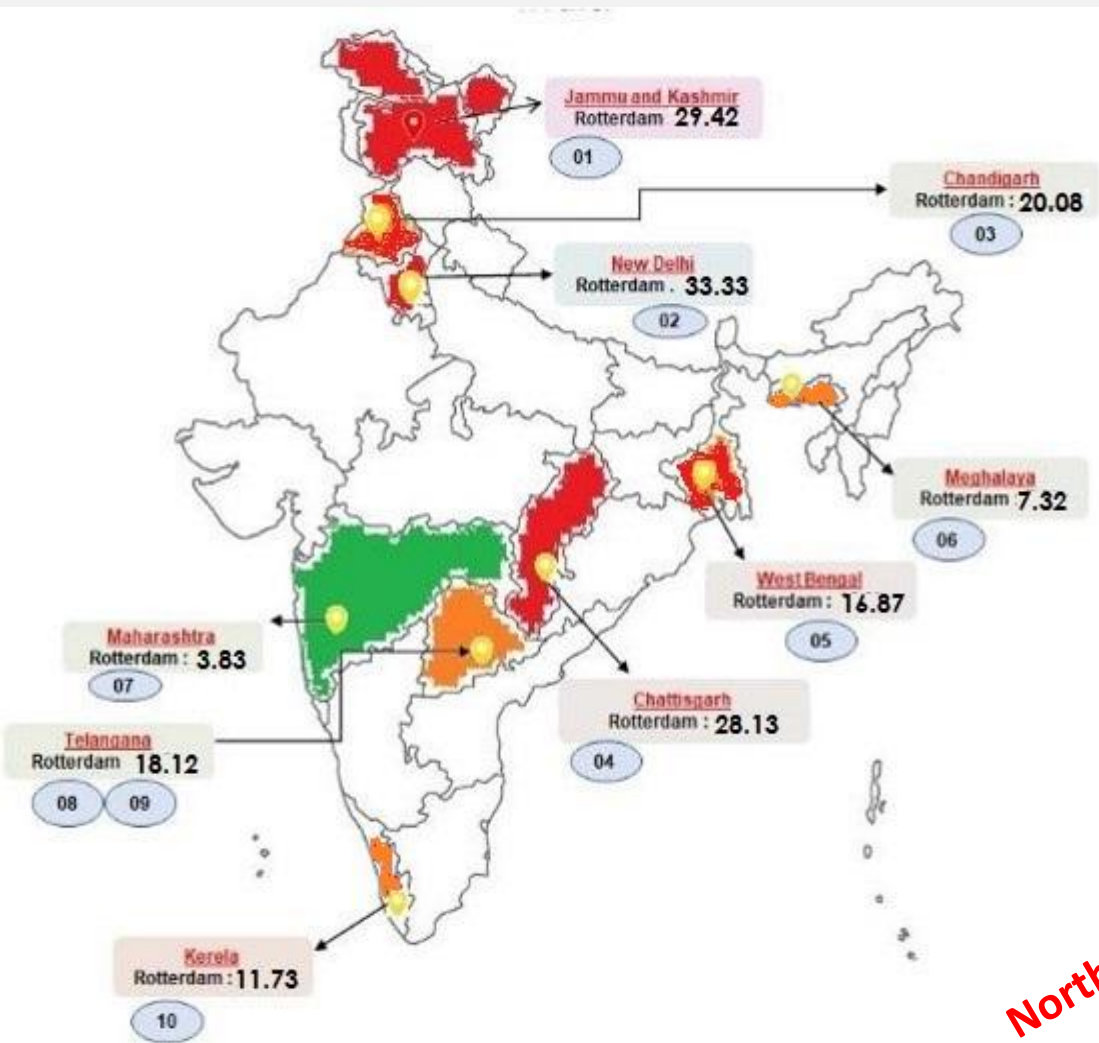
Dr. Rajiv Dahiya
Secretary to Government of India,
Director General, ICMR

He has been working faculty at various levels in the department of Endocrinology and metabolism, AIIMS New Delhi and Endocrinology at Sher- Kashmir Institute of Medical Sciences (SKIMS) for last 13 years. He is currently Professor of Endocrinology at SKIMS Srinagar.

Randeep Gulati is an Indian pulmonologist and the current director of the All-India Institute of Medical Sciences, credited with the establishment of India's first Centre for pulmonary medicine and sleep disorders at AIIMS. He was honored by the Government of India in 2015 with Padma Shri, the fourth highest Indian civilian award.

Interactive to share data
Knowledge dissemination
Online data capturing-Phase II
Patient reports

National PREVALENCE OF PCOS AS PER ROTTERDAM-2003 & NIH-1990 CRITERIA



North and Central & South

- Prevalence 16% and above
- Prevalence 7 to 11%
- Prevalence 3 to 4%

- Prevalence 7% and above
- Prevalence 3 to 5%
- Prevalence 1 to 2%



Prevalence, Phenotypes, and Comorbidities of Polycystic Ovary Syndrome Among Indian Women

Mohd Ashraf Ganie, DM; Subhankar Chowdhury, DM; Neena Malhotra, MD; Rakesh Sahay, DM; Prasanta Kumar Bhattacharya, PhD; Sarita Agrawal, MD; P. K. Jabbar, DM; Vanita Suri, DM; Roya Rozati, MD; Vishrubhata Sreenivas, PhD; Mohammad Saleem Baba, DM; Imtiaz Ahmad Wani, PhD; Haroon Rasnid, PhD; Abhilash Nair, DM; Amlin Shukla, MD; Taruna Arora, PhD; Bharati Kulkarni, PhD, for the PCOS Study Group

Abstract

IMPORTANCE The prevalence of polycystic ovary syndrome (PCOS) varies across the globe. Indian studies on PCOS are limited by poor design, small sizes, regional representations, and varying methods.

OBJECTIVES To estimate the nationwide prevalence of PCOS in India, examine the phenotypic spectrum, and assess the magnitude of comorbidities associated with PCOS.

DESIGN, SETTING, AND PARTICIPANTS This cross-sectional study recruited 9824 women aged 18 to 40 years from November 1, 2018, to July 31, 2022, across 5 zones of the country. A prevalidated questionnaire dichotomized women into screen-positive and screen-negative groups. Relevant clinical, hormonal, and sonographic assessments categorized women as either women with criteria-based PCOS (ie, National Institutes of Health [NIH] 1990 criteria, Rotterdam 2003 criteria, or Androgen Excess and Polycystic Ovary Syndrome Society [AE-PCOS] criteria), women with partial phenotypes (hyperandrogenism, oligomenorrhea, or polycystic morphology labeled as pre-PCOS), or healthy women, in addition to quantitating various comorbidities.

MAIN OUTCOMES AND MEASURES The prevalence and phenotypes of PCOS among women of reproductive age and the burden of comorbidities associated with PCOS.

RESULTS A total of 8993 women (mean [SD] age, 29.5 [6.2] years) were enrolled in this study: 196 women were already diagnosed with PCOS, 2251 were categorized as screen positive, and 6546 were categorized as screen negative. The mean (SD) age of screen-positive women (28.1 [6.4] years) was lower than that of screen-negative women (29.7 [6.1] years) ($P < .001$), and the mean (SD) age at menarche was higher in the former group (13.2 [1.3] vs 13.1 [1.2] years; $P < .001$). The national prevalence of PCOS was 7.2% (95% CI, 4.8%-10.8%) by NIH 1990 criteria, 19.6% (95% CI, 12.7%-29.2%) by Rotterdam 2003 criteria, and 13.6% (95% CI, 8.4%-21.6%) by AE-PCOS criteria. Overall, PCOS phenotypes C (501 [40.8%]) and D (301 [24.6%]) were the most common, and 492 women (pre-PCOS subgroup) had oligomenorrhea ($n = 75$), hyperandrogenism ($n = 257$), or polycystic ovarian morphology ($n = 160$) only. Among women with PCOS ($n = 1224$), obesity was present in 529 (43.2%), dyslipidemia in 1126 (91.9%), nonalcoholic fatty liver disease in 403 (32.9%), metabolic syndrome in 305 (24.9%), impaired glucose tolerance in 111 (9.1%), diabetes in 41 (3.3%), and hypertension in 101 (8.3%). The pre-PCOS subgroup ($n = 492$) displayed similar metabolic aberrations (dyslipidemia: 390 [79.3%]; metabolic syndrome: 78 [15.9%]; nonalcoholic fatty liver disease: 163 [33.1%]; impaired glucose tolerance: 62 [12.6%]; diabetes: 7 [1.4%]; and hypertension: 26 [5.3%]).

(continued)

Key Points

Question What is the prevalence, variation of phenotypes, and comorbidities associated with polycystic ovary syndrome (PCOS) in India?

Findings In this cross-sectional study of 9824 women aged 18 to 40 years, the weighted national prevalences of PCOS by the National Institutes of Health 1990 and Rotterdam 2003 criteria were 7.2% and 19.6%, respectively, and PCOS phenotype C was the most prevalent (40.8%). Among women with PCOS, 43.2% had obesity, 91.9% had dyslipidemia, 32.9% had nonalcoholic fatty liver disease, 24.9% had metabolic syndrome, 3.4% had diabetes, and 8.3% had hypertension.

Meaning These findings suggest that there is a high prevalence of PCOS among women in India, with the majority of these women having 1 or more metabolic diseases.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

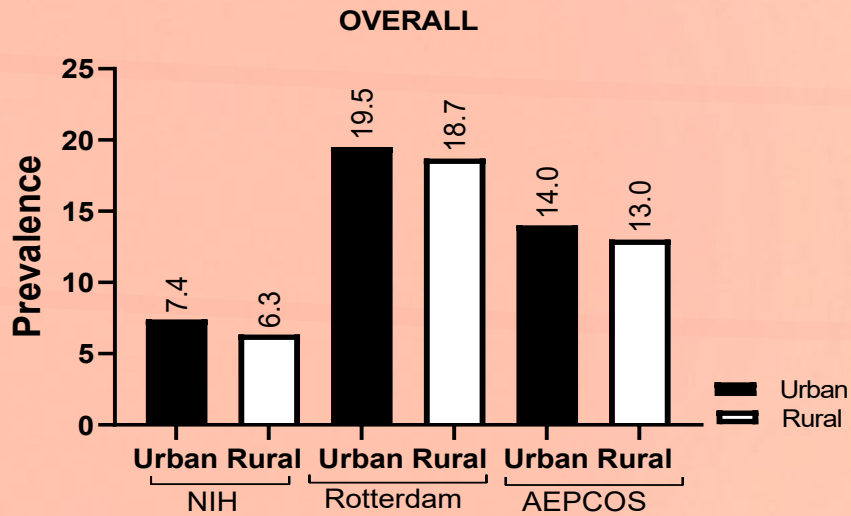
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JAMA Network Open. 2024;7(10):e2440583. doi:10.1001/jamanetworkopen.2024.40583

October 23, 2024 1/5

Overall prevalence as per criteria followed

NIH Criteria	6.87%
Rotterdam Criteria	19.17%



Prevalence • Different in various race and ethnicity
 Caucasian-11.9%
 Chinese-11.2%
 Australian= 17.8 Middle-east-19.9%
India : 19.17% as per Rotterdam criteria;
6.87% by NIH-criteria

Lists some studies conducted on the prevalence of PCOS (By Rot. 2003 Criteria) in different countries and populations

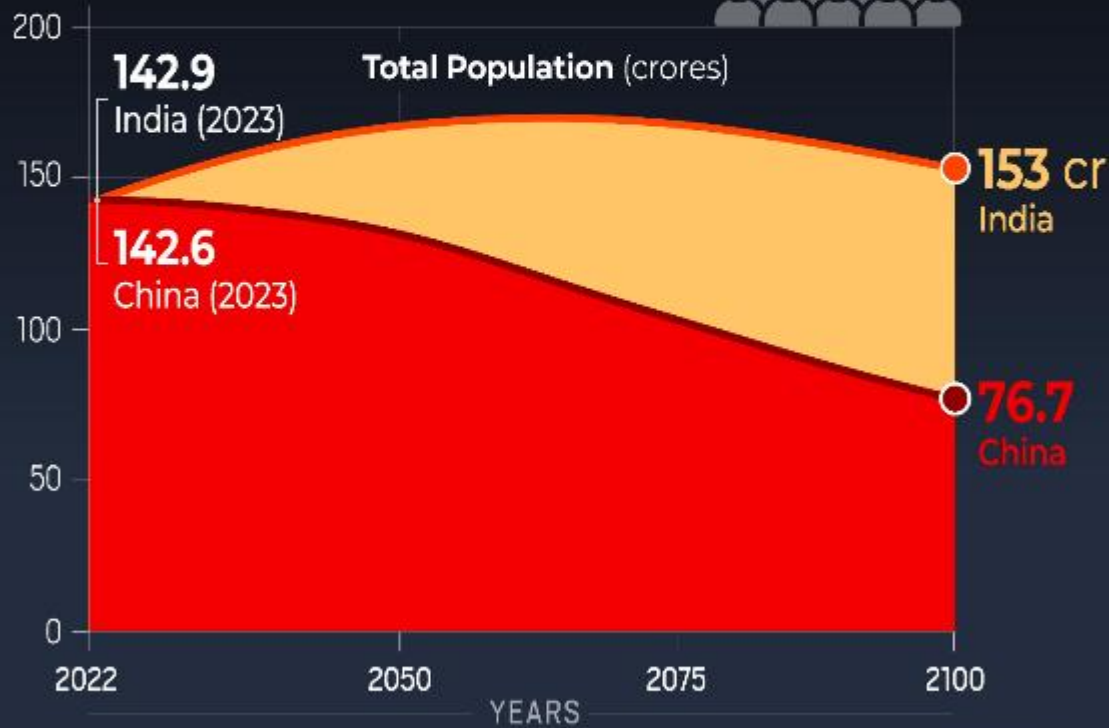
Author, year	Country	Study Population selection	Study Cohort	Age Group (years)	n	A (%)	B (%)	C (%)	D (%)	PCOS Prevalence	CI (95%)
Li R, 2013 16	China	The community-based study, Cross-sectional	Han Chinese women from different communities (19-45 years)	19-45	Total N: 15,924 PCOS: 886	28.7	19	37.3	15	5.60%	25.709 to 31.770
Ma, 2010 15	China	Cross-sectional	Community and Hospital Group	19-45	Total N: 2,111 PCOS: 129	31	16.3	27.1	25.6	6.10%	23.163 to 39.748
March, 2010 21	Australia	Cross-sectional	A retrospective birth cohort study	27-34	Total N: 728 PCOS: 129.5	21.2	27.5	18.9	32.5	17.80%	14.269 to 28.972
Tehrani, 2011 17	Iran	Community-based cross-sectional	Urban areas of four randomly selected provinces	18-45	Total N: 929 PCOS: 136	8.8	39.7	31.6	19.9	14.60%	4.643 to 14.906
Yildiz, 2012 20	Turkey	Cross-sectional Study	Women working in a Govt-based Institute	18-45	Total N: 392 PCOS: 78	25.6	5.1	46.2	23.1	19.90%	16.419 to 36.786
Rashidi 2014 19	Iran	Community-based study	Khuzestani women	18-45	Total: 625, PCOS: 87	12.6	24.1	48.2	14.9	13.60%	6.484 to 21.498
Gabrielli L, 2012 23	Brazil	Unselected	A cross-sectional, two-phase study	18-45	Total-894, PCOS-73	0	94.5	1.36	4.1	8.50%	0.000 to 4.928
Lauritsen, 2014 22	Denmark	Employees of Copenhagen University Hospital	A prospective, cross-sectional study	20-40	Total -447, PCOS-86	4.65	4.65	72.09	18.6	16.60%	1.282 to 11.483

ICMR-PCOS study, India Screened Population 14061 women recruited 10,109 women aged 18-40 years - **Largest/Well designed**

India Surpasses China's Population



China's population may decline considerably henceforth



Note: Medium variant of population projections as on July 1

Source: Population Division of the U.N. | Graphic: Samrat Sharma, Sarfaraz



- ✓ USA = 4 million
- ✓ 8 Billion \$ 2022
- ✓ China = 24 million
- ✓ >44.4 million women have PCOS or at risk of PCOS or its complication
- ✓ Cost = 88 billion (Health budget 861 billion INR)

India - PCOS Capital

2. What is Indian phenotype ?

Polycystic ovary syndrome adult phenotypes, in order of decreasing clinical severity

Phenotype 1 (classic PCOS)	Rotterdam criteria, 2003 [1]	AES criteria, 2006 [2]	NIH criteria, 1992 [3]	Classic PCOS [4]
Clinical and/or biochemical evidence of hyperandrogenism				
Evidence of oligo-anovulation				
Ultrasonographic evidence of a polycystic ovary				
Phenotype 2 (hyperandrogenic anovulation)				
Clinical and/or biochemical evidence of hyperandrogenism				
Evidence of oligo-anovulation				
Phenotype 3 (ovulatory PCOS)				
Clinical and/or biochemical evidence of hyperandrogenism				
Ultrasonographic evidence of a polycystic ovary				
Phenotype 4 (non-hyperandrogenic PCOS)				
Evidence of oligo-anovulation				
Ultrasonographic evidence of a polycystic ovary				

Specification of phenotype was proposed in a workshop convened by the National Institutes of Health (NIH) in 2012.^[5] The four phenotypes are listed here in order of decreasing diagnostic specificity. The specificity of the two least severe phenotypes is successively less. Each set of diagnostic criteria requires exclusion of other causes of hyperandrogenism and anovulation.

PCOS: polycystic ovary syndrome; AES: Androgen Excess Society; NIH: National Institutes of Health.

Present Description

PCOS

Findings

Physical

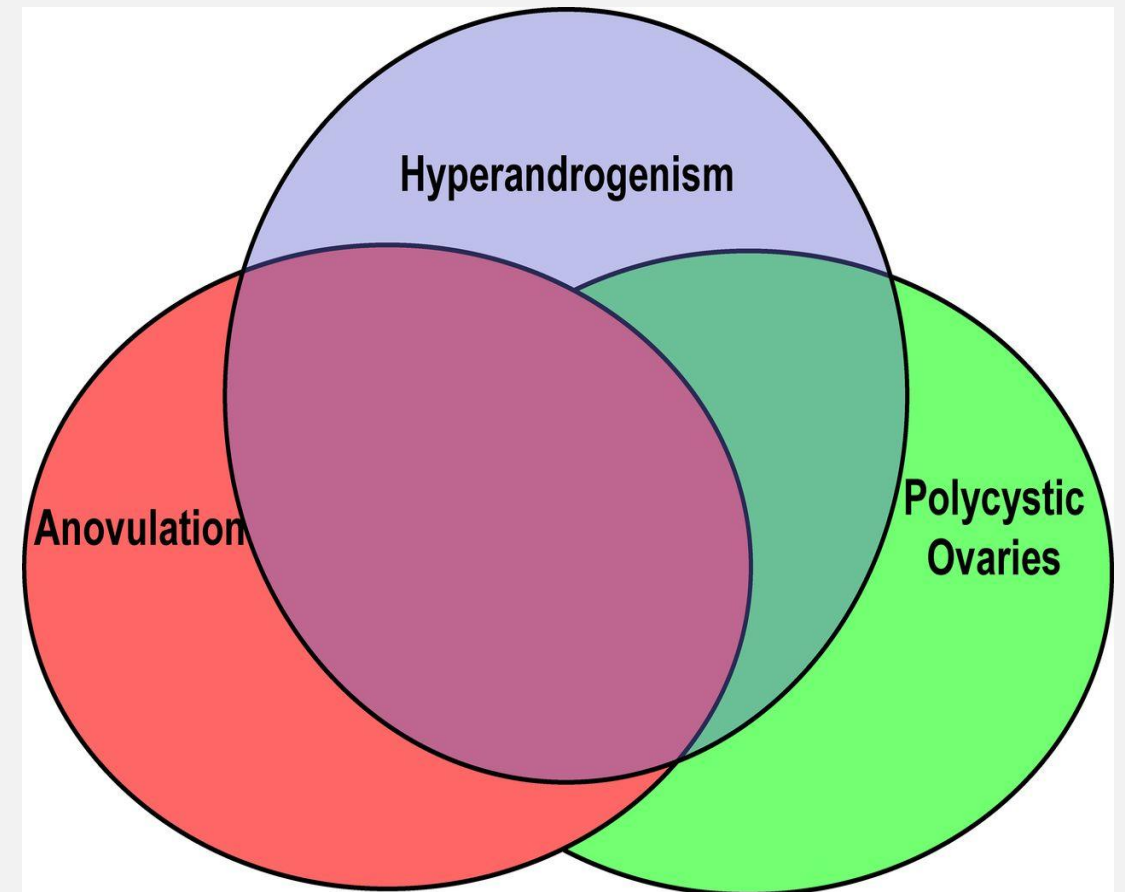
- ◆ Obesity
- ◆ Hirsutism
- ◆ Acanthosis
- ◆ Abnormal menses
- ◆ Acne

Biochemical

- ◆ ↑ Androgen
 - Testosterone
 - DHEAS
 - Androstenedione
 - 17OH progesterone
- ◆ ↓ SHBG
- ◆ ↑ LH
- ◆ Insulin/Glucose
- ◆ ↑ PAI-1
- ◆ ↑ Lipids

Ultrasound

- ◆ Necklace sign
- ◆ ↑ Ovarian volume
- ◆ Antral follicle count
- ◆ Doppler blood flow changes



ORIGINAL ARTICLE

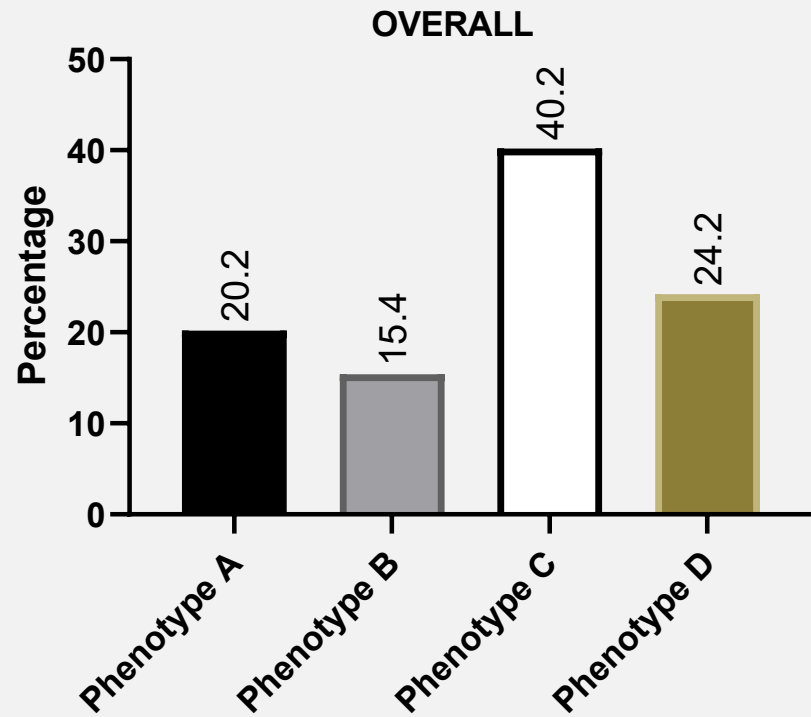
Observation of phenotypic variation among Indian women with polycystic ovary syndrome (PCOS) from Delhi and Srinagar

Mohd Ashraf Ganie¹, Raman Kumar Marwaha¹, Atul Dhingra¹, Sobia Nisar², Kaliavani Mani³, Shariq Masoodi⁴, Semanti Chakraborty¹, and Aafia Rashid⁴

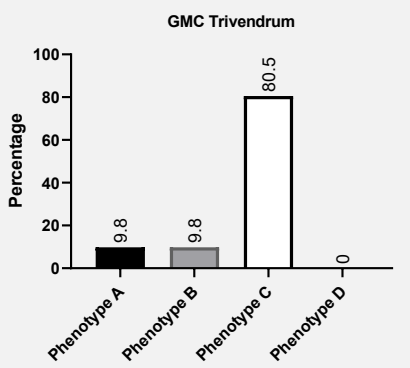
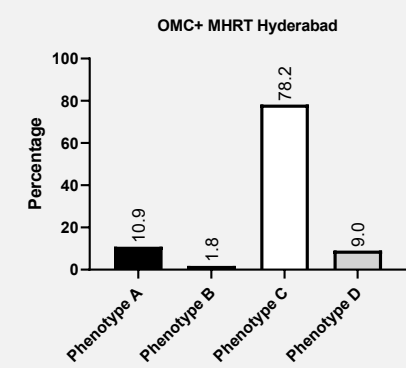
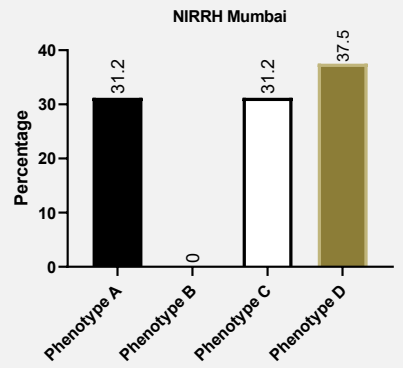
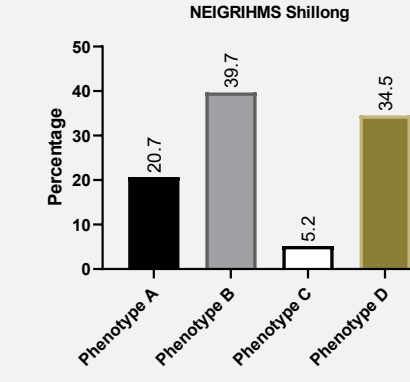
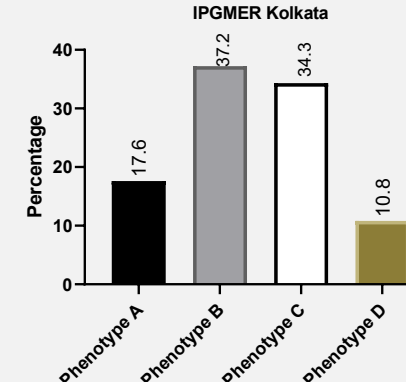
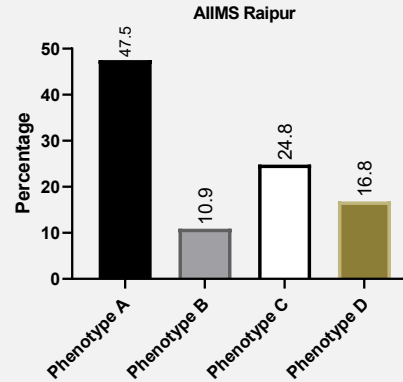
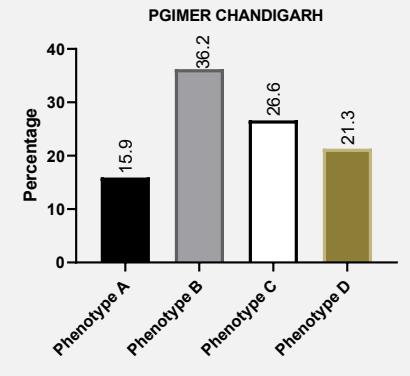
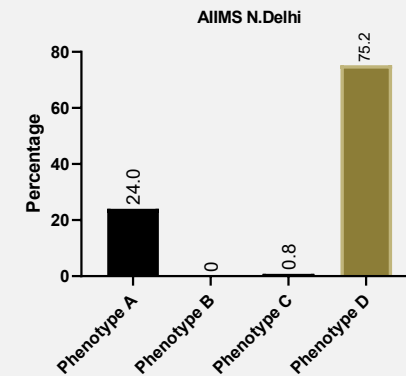
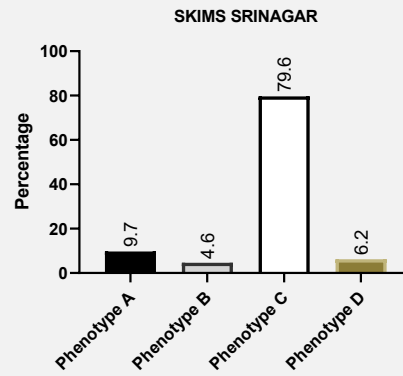
two tertiary care institutions located in Delhi and Srinagar. A total of 299 (210 PCOS diagnosed by Rotterdam 2003 criteria and 89 healthy) women underwent estimation of T4, TSH, LH, FSH, total testosterone, prolactin, cortisol, 17OHP, and lipid profile, in addition to post OGTT, C-peptide, insulin, and glucose measurements. Among women with PCOS, mean age, age of menarche, height, systolic, diastolic blood pressure, and serum LH were comparable. PCOS women from Delhi had significantly higher BMI (26.99 ± 5.38 versus 24.77 ± 4.32 kg/m²; $P=0.01$), glucose intolerance (36 versus 10%), insulin resistance as measured by HOMA-IR (4.20 ± 3.39 versus 3.01 ± 2.6 ; $P=0.006$) and QUICKI (0.140 ± 0.013 versus 0.147 ± 0.015 ; $P=0.03$) while PCOS from Srinagar had higher FG score (12.12 ± 3.91 versus 10.32 ± 2.22 ; $P=0.01$) and serum total testosterone levels (0.65 ± 0.69 versus 0.86 ± 0.41 ng/ml; $P=0.01$). Two clear phenotypes, i.e. obese hyperinsulinaemic dysglycemic women from Delhi and lean hyperandrogenic women from Srinagar are emerging. This is the first report on North Indian women with PCOS showing phenotypic differences in clinical, biochemical and hormonal parameters despite being in the same region.



Site-wise /Overall Percentage of PCOS women falling under different PCOS Phenotypes



PCOS Network
N=10,000



Ph A : OA+HA+PCOM ; Ph B: OA+HA ; Ph C: HA+PCOM; Ph D: OA+PCOM

Present Description

PCOS

Findings

Physical

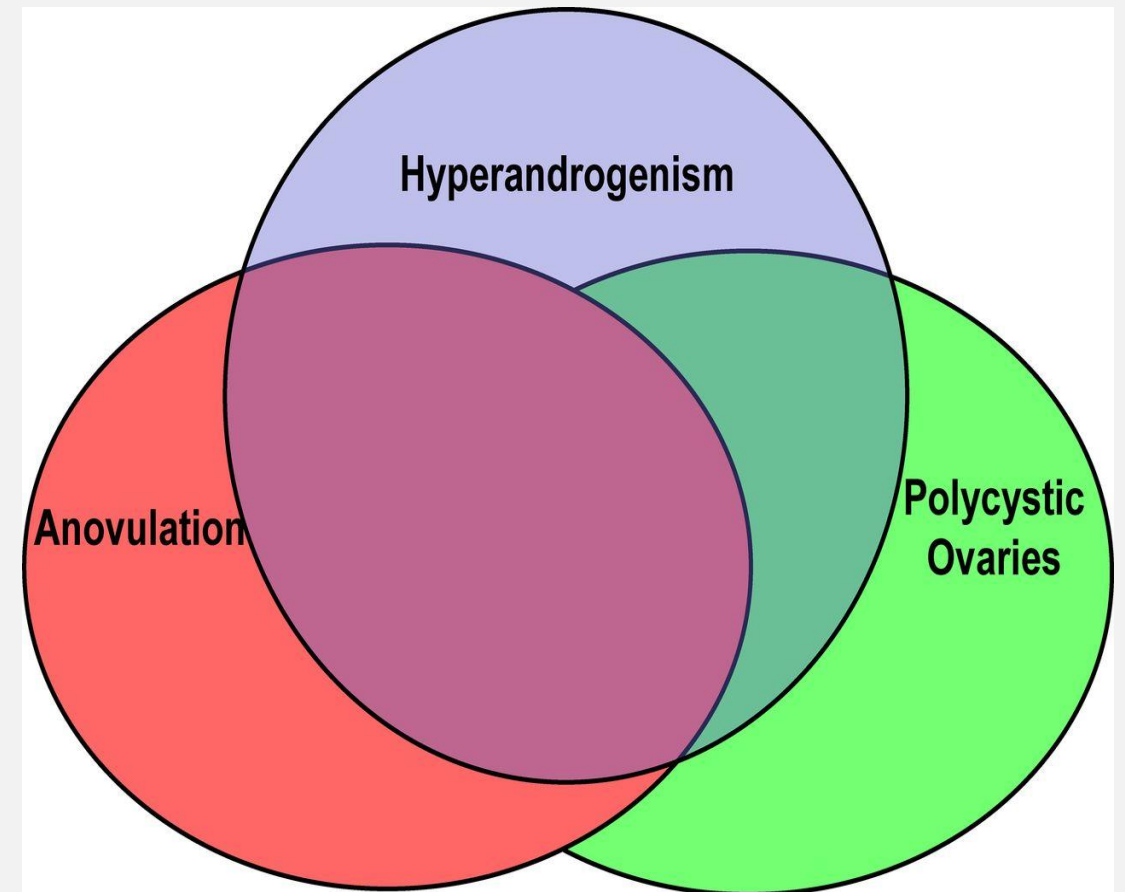
- ◆ Obesity
- ◆ Hirsutism
- ◆ Acanthosis
- ◆ Abnormal menses
- ◆ Acne

Biochemical

- ◆ ↑ Androgen
 - Testosterone
 - DHEAS
 - Androstenedione
 - 17OH progesterone
- ◆ ↓ SHBG
- ◆ ↑ LH
- ◆ Insulin/Glucose
- ◆ ↑ PAI-1
- ◆ ↑ Lipids

Ultrasound

- ◆ Necklace sign
- ◆ ↑ Ovarian volume
- ◆ Antral follicle count
- ◆ Doppler blood flow changes



Polycystic ovary syndrome adult phenotypes, in order of decreasing clinical severity

Phenotype 1 (classic PCOS)	Rotterdam criteria, 2003 [1]	AES criteria, 2006 [2]	NIH criteria, 1992 [3]	Classic PCOS [4]
Clinical and/or biochemical evidence of hyperandrogenism				
Evidence of oligo-anovulation				
Ultrasonographic evidence of a polycystic ovary				
Phenotype 2 (hyperandrogenic anovulation)				
Clinical and/or biochemical evidence of hyperandrogenism				
Evidence of oligo-anovulation				
Phenotype 3 (ovulatory PCOS)				
Clinical and/or biochemical evidence of hyperandrogenism				
Ultrasonographic evidence of a polycystic ovary				
Phenotype 4 (non-hyperandrogenic PCOS)				
Evidence of oligo-anovulation				
Ultrasonographic evidence of a polycystic ovary				

Specification of phenotype was proposed in a workshop convened by the National Institutes of Health (NIH) in 2012.^[5] The four phenotypes are listed here in order of decreasing diagnostic specificity. The specificity of the two least severe phenotypes is successively less. Each set of diagnostic criteria requires exclusion of other causes of hyperandrogenism and anovulation.

PCOS: polycystic ovary syndrome; AES: Androgen Excess Society; NIH: National Institutes of Health.

ORIGINAL ARTICLE

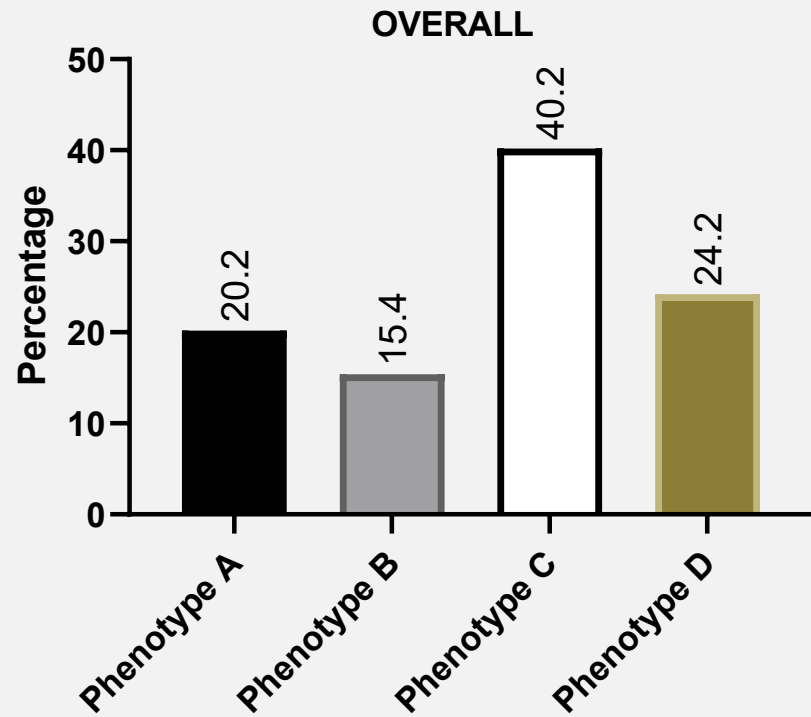
Observation of phenotypic variation among Indian women with polycystic ovary syndrome (PCOS) from Delhi and Srinagar

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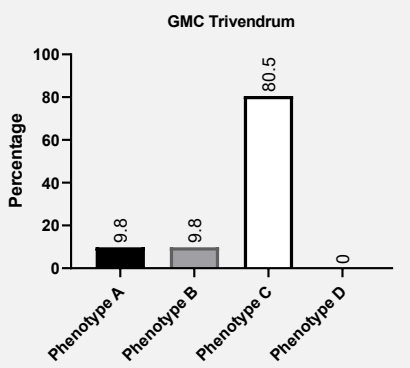
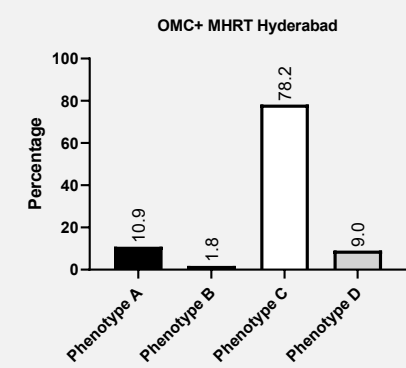
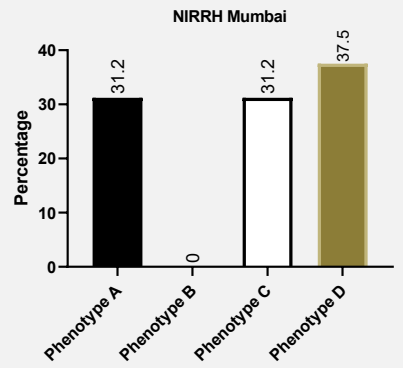
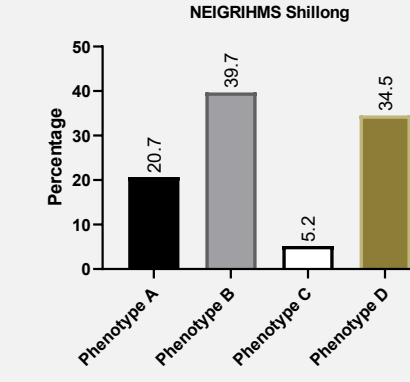
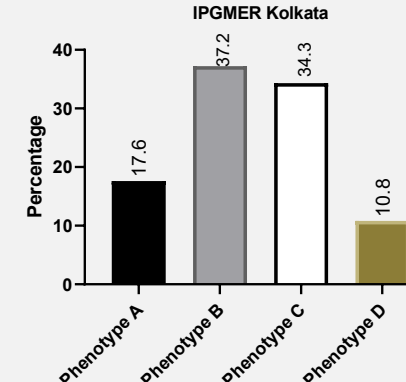
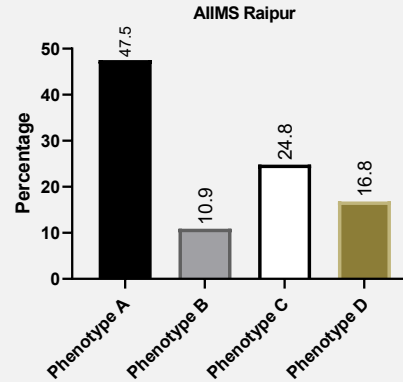
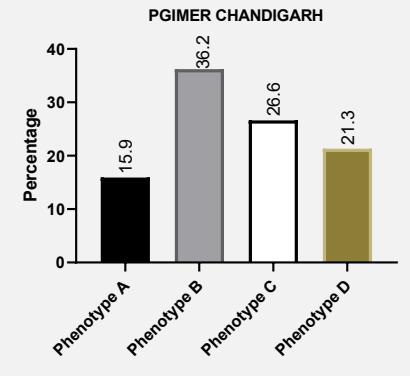
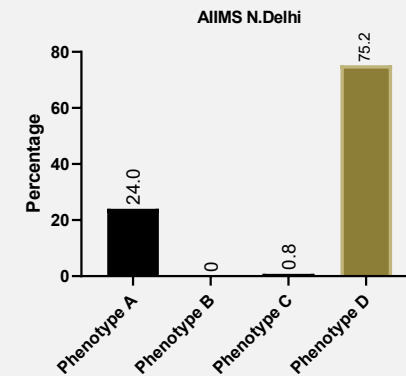
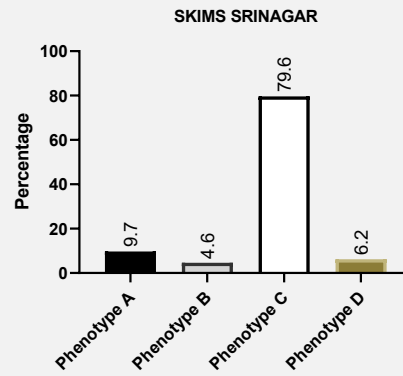
two tertiary care institutions located in Delhi and Srinagar. A total of 299 (210 PCOS diagnosed by Rotterdam 2003 criteria and 89 healthy) women underwent estimation of T4, TSH, LH, FSH, total testosterone, prolactin, cortisol, 17OHP, and lipid profile, in addition to post OGTT, C-peptide, insulin, and glucose measurements. Among women with PCOS, mean age, age of menarche, height, systolic, diastolic blood pressure, and serum LH were comparable. PCOS women from Delhi had significantly higher BMI (26.99 ± 5.38 versus 24.77 ± 4.32 kg/m²; $P = 0.01$), glucose intolerance (36 versus 10%), insulin resistance as measured by HOMA-IR (4.20 ± 3.39 versus 3.01 ± 2.6 ; $P = 0.006$) and QUICKI (0.140 ± 0.013 versus 0.147 ± 0.015 ; $P = 0.03$) while PCOS from Srinagar had higher FG score (12.12 ± 3.91 versus 10.32 ± 2.22 ; $P = 0.01$) and serum total testosterone levels (0.65 ± 0.69 versus 0.86 ± 0.41 ng/ml; $P = 0.01$). Two clear phenotypes, i.e. obese hyperinsulinaemic dysglycemic women from Delhi and lean hyperandrogenic women from Srinagar are emerging. This is the first report on North Indian women with PCOS showing phenotypic differences in clinical, biochemical and hormonal parameters despite being in the same region.



Site-wise /Overall Percentage of PCOS women falling under different PCOS Phenotypes



PCOS Network
N=10,000



Ph A : OA+HA+PCOM ; Ph B: OA+HA ; Ph C: HA+PCOM; Ph D: OA+PCOM

Newer phenotypes, Pre-PCOS women highlight the need to reassess diagnostic criteria

› Clin Endocrinol (Oxf). 2023 Sep 1. doi: 10.1111/cen.14964. Online ahead of print.

Pre-polycystic ovary syndrome and polymenorrhoea as new facets of polycystic ovary syndrome (PCOS): Evidences from a single centre data set

Mohd Ashraf Ganie^{1 2}, Aafia Rashid², Mohammad Salem Baba¹, Mohd Afzal Zargar³, Imtiyaz Ahmad Wani², Sobia Nisar⁴, Ishfaq Ahmad Wani², Syed Douhath², Mukesh Sriwastawa⁵, Mohd Ishaq Geer⁶, Mir Mohd Asrar², Rintu Kutum^{7 8}, Saqib Hassan⁹, Shahid Khan¹⁰, Wajid Rafi¹¹, Dil Afroz Bhat¹², Wasia Showkat², Tajali Sahar², Naseer Ahmad Choh¹³, Rabia Khurshid¹⁴, Syed Mudassar¹², Zafar Amin Shah¹⁵, Iram Shabir¹⁶, Sanjeed Ahmad Sofi¹³, Nandita Gupta¹¹, Imran Hafeez¹⁷, Vishnubatra Sreenivas¹⁸

737 were classified as Pre-PCOS, including

- HA (n = 538),
- OA (n = 121),
- or PCOM (n = 78).
- Common clinical features included oligomenorrhoea (75.5%),
- hirsutism (82.9%),
- obesity (27.2%),
- hypertension (1.6%),
- metabolic syndrome (19.6%),
- and diabetes mellitus (5.6%).

**Clin Endocrinol (Oxf). 2023 Sep 1. doi:
10.1111/cen.14964.**

**New phenotypes
Not fitting any criteria
Not controls
Mono-symptomatic**

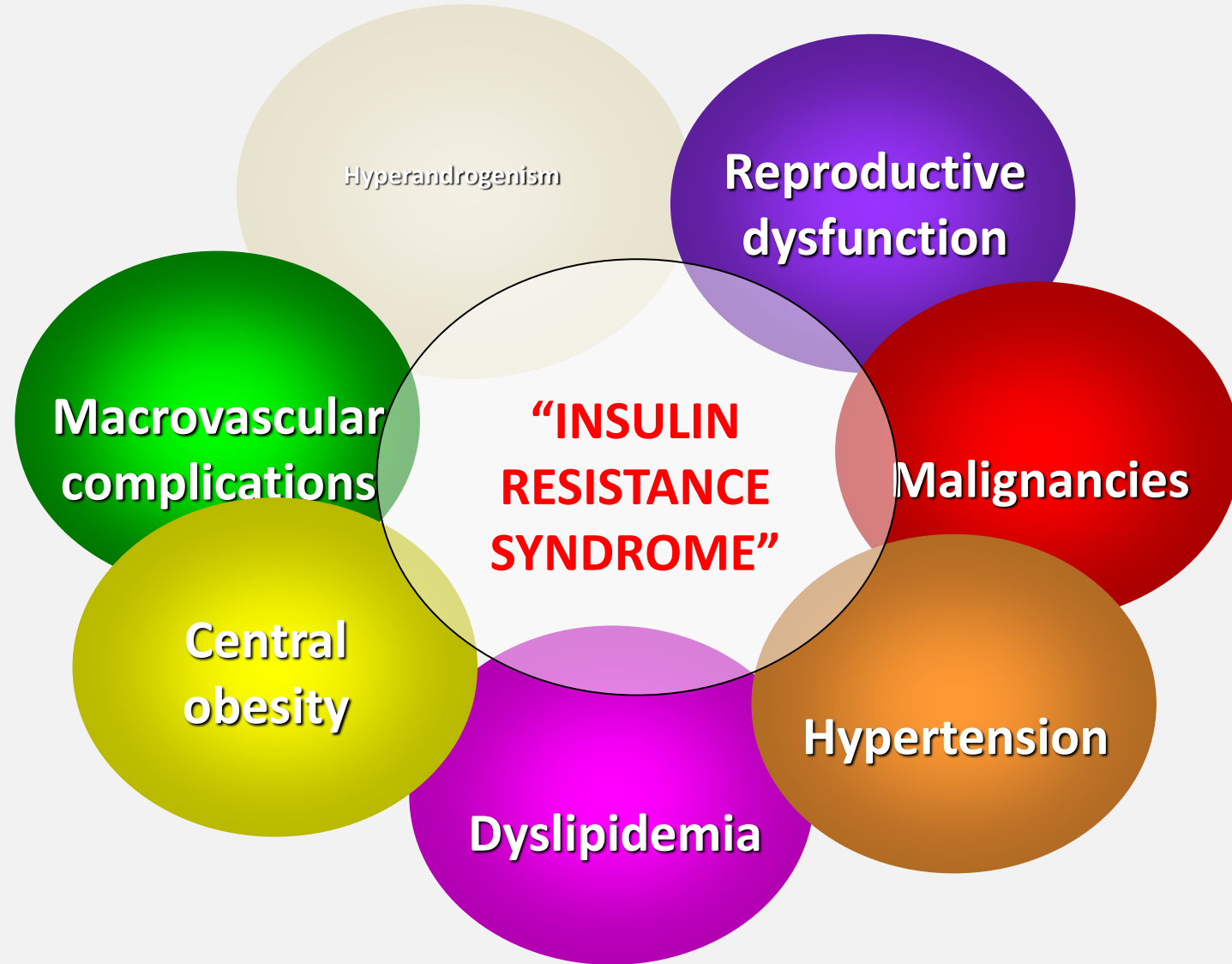
Comorbidities among study population

Characteristic	Control (n=1175) %	Partial Phenotype (n= 758) %	Classic PCOS (n=858) %	OR (95%CI)	
				Partial Phenotype	Classic PCOS
BMI categories (WHO guideline)	29.84%	25.73%	32.17%	0.81 (0.65-0.99)	1.14(0.93-1.38)
Overweight (25-29.9 Kg/m²)	10.40%	10.42%	11.07%	0.94 (0.69-1.27)	1.12 (0.84-1.5)
Obese (≥30 Kg/m²)					
BMI categories (Asian guideline)	20.38%	19.53%	20.16%	0.85 (0.66-1.09)	1.06 (0.84-1.36)
Overweight (23 – 24.9Kg/m²)	40.24%	36.15%	43.24%	0.8 (0.65-0.98)	1.16 (0.95-1.41)
Obese (≥25 Kg/m²)					
Central obesity (WC>80 cms)	48.2%	44.9%	50.2%	0.87 (0.73-1.05)	1.08 (0.91-1.29)
NAFLD	26.6%	33.3%	35.0%	1.38 (1.13-1.68)	1.49 (1.23-1.80)
Hypertension (JNC-8 guideline)					
Prehypertension	48.2%	46.6%	46.9%	0.94 (0.78-1.14)	1.02 (0.85-1.22)
Stage I	4.8%	5.3%	8.3%	1.07 (0.7-1.64)	1.8 (1.24-2.62)
Metabolic syndrome (NCEP-ATPIII guideline)	14.8%	15.9%	24.9%	1.1 (0.84-1.41)	1.92 (1.53-2.40)
Diabetes mellitus	1.53%	1.47%	3.44%	0.96 (0.45-2.1)	2.29 (1.25-4.19)
IFG	12.85%	14.51%	12.4%	1.2 (0.88-1.51)	0.96 (0.73-1.25)
IGT	7.44%	12.7%	11.5%	1.8 (1.3-2.5)	1.6 (1.19-2.2)
Hypercholesterolemia (TC≥ 200mg/dl)	12.4%	16.4%	18.9%	1.39 (1.07-1.80)	1.65 (1.29-2.11)
Elevated LDL (LDL≥ 130mg/dl)	10.8%	14.8%	16.5%	1.44 (1.09-1.89)	1.63 (1.26-2.12)
Hhypertriglyceridemia (TG≥150mg/dl)	17.9%	21.7%	24.2%	1.27 (1.01-1.60)	1.46 (1.18-1.82)

3. What are its health consequences among Indians?

METABOLIC ABNORMALITIES

- Obesity
- Hypertension
- Sleep Apnea
- NAFLD
- Cardiovascular risk
- Psychiatric comorbidities
- Hyperinsulinemia
- Glucose intolerance /DM
- Dyslipidemia
- Hyperuricemia
- Sub-inflammation
- Hyperhomocystinemia
- Procoagulant-PAI-1, ICAM
- Mitogenesis



❖ Commonest endocrinopathy

Generic condition

PCOS: changing women's health paradigm



(young age)

(older age)

- menstrual disorders
- hirsutism
- contraception
- sexual health
- infertility



- pregnancy complications
- quality of life
- type 2 diabetes
- cardiovascular disease
- cancer risk?

Multi-disciplinary approaches



Gender differences in insulin and C-peptide concentrations at birth using cord blood collection

Mohammad Shafi Kuchay¹, Rattan P. Kudyar², Anil Gupta²,
Kamal Kishor Pandita², Mohammad Ashraf Ganie³



Female newborn babies have higher cord plasma insulin and C-peptide concentrations than male newborns, despite being smaller, suggesting intrinsic insulin resistance in girls.

- 60% OBESE -central
- Classic PCOS – 33-47% (2-3 x)
- MS high in family members

•MS in PCOS by IDF, WHO, ATP III and criteria were 50.0%, 47.3% and 23.68% respectively. (23.55±4.2)

Rise of hsCRP and homocysteine which increases risk of CVD.

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**GYNECOLOGICAL
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ORIGINAL ARTICLE

High-sensitivity C-reactive protein (hs-CRP) levels and its relationship with components of polycystic ovary syndrome in Indian adolescent women with polycystic ovary syndrome (PCOS)

Mohd Ashraf Ganie¹, Saqib Hassan², Sobia Nisar³, Nasir Shamas², Aafia Rashid², Ishfaq Ahmed², Syed Douhat², Syed Mudassar⁴, Vicar M. Jan⁵, and Fouzia Rashid⁶

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ORIGINAL ARTICLE | VOLUME 113, ISSUE 6, P1299-1307.E2, JUNE 2020

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Left ventricular myocardial mass index and its correlates as an early marker of cardiovascular risk among nonobese normotensive Indian women with polycystic ovary syndrome: lessons from a cross-sectional study

Aafia Rashid, M.Sc., M.Phil. • Akbar Masood, M.Sc., Ph.D. • Ishfaq A. Wani, M.Sc. • ...
Tabasum Parvez, M.B.B.S., M.D. • Mohd Afzal Zagar, M.Sc., Ph.D. •
Mohd Ashraf Ganie, M.B.B.S., M.D., D.M. • Show all authors

Pattern of urinary albumin excretion in normotensive young and adolescent Indian women with polycystic ovary syndrome

Mohd Ashraf Ganie, Khalid Jamal Farooqui, Mohd Ashraf Bhat, Mohammad Mussafar Mir², Zaffar Amin Shah, Syed Douhath¹, Syed Hussain Mir¹, Fouzia Rashid¹, Shazia Naqshi¹, Mohd Ibrahim Masoodi³, S. A. Zargar⁴, Abdul Hamid Zargar¹

Departments of Endocrinology, Nephrology, and Immunology and Molecular Medicine, Sheri-Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, ²Department of Clinical Biochemistry, University of Kashmir, Srinagar, Jammu and Kashmir, India, ³Department of Ophthalmology, and ⁴Clinical Biochemistry, Al-Jouf, Aljouf University, KSA, ⁵Sheri Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, India

ABSTRACT

Objective: Polycystic ovarian syndrome (PCOS) is a clinically heterogeneous endocrine disorder affecting up to 4-8% of women of reproductive age. The aim of this study was to evaluate the presence of microalbuminuria in women with PCOS and study its correlation with the various metabolic, clinical, and hormonal parameters. **Materials and Methods:** A cross-sectional study involving 68 PCOS women was carried out in a tertiary care center hospital. The diagnosis of PCOS was made according to the Rotterdam

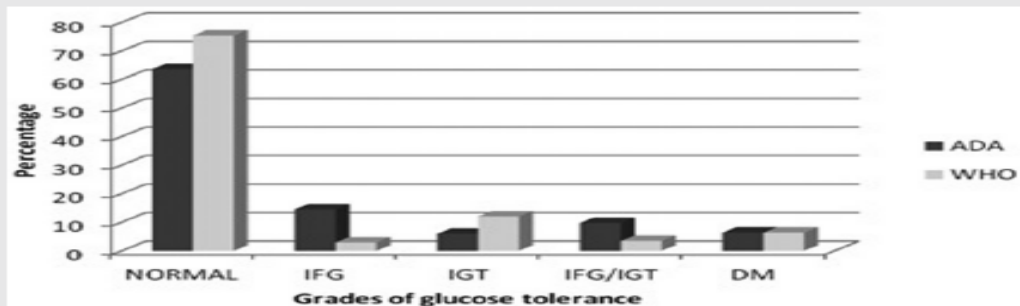


Oral glucose tolerance test significantly impacts the prevalence of abnormal glucose tolerance among Indian women with polycystic ovary syndrome: lessons from a database of two tertiary care centers on the Indian subcontinent

Mohd Ashraf Ganie, M.D., D.M.,^a Atul Dhingra, M.D.,^a Sobia Nisar, M.D.,^b Vishnubhatla Sreenivas, Zaffar Amin Shah, M.Sc., Ph.D.,^d Aafia Rashid, M.Sc., Ph.D.,^e Shariq Masoodi, D.M.,^f and Nandita Gupta, M.Sc., Ph.D.^a



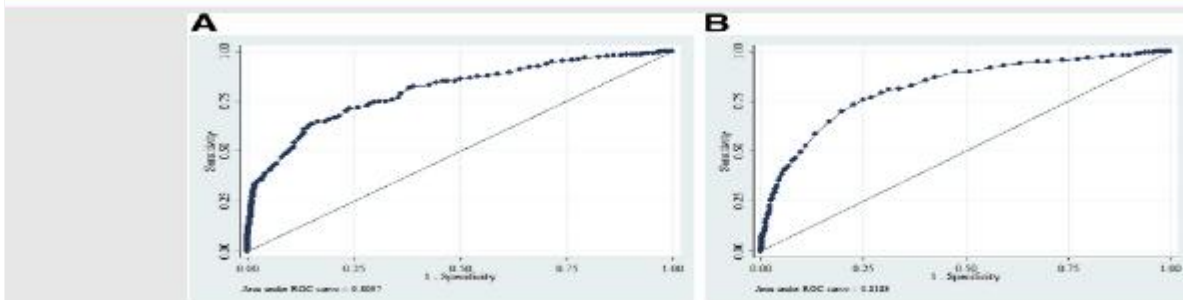
N=2014, Mean AGE 23.53 years IGT=30.1% DM=6.3%



Prevalence of AGT categories as per WHO 2006 (29) and ADA 2014 (28) criteria among women with PCOS.

Ganie. Glucose tolerance in Indian women with PCOS. Fertil Steril 2016.

FIGURE 2



ROC curve for the utility of 2-hour post-OGTT glucose estimation in the diagnosis of AGT among women with PCOS. (A) Fasting plasma glucose; (B) post-OGTT 2-hour plasma glucose.

Ganie. Glucose tolerance in Indian women with PCOS. Fertil Steril 2016.

Reproductive Biology and Endocrinology



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Research

Prevalence of ultrasonography proved polycystic ovaries in North Indian women with type 2 diabetes mellitus

Abdul H Zargar*, Vipin K Gupta, Arshad I Wani, Shariq R Masoodi, Mir I Bashir, Bashir A Laway, Mohammad A Ganie and Mohammad Salahuddin



Prevalence of glucose intolerance among adolescent and young women with polycystic ovary syndrome in India

Ganie M, Ashraf*, M.L. Khurana*, M. Esmie*, N. Gupta*, S.N. Dwivedi**, M.S. Gulati***, A.U. Ammalni*

ABSTRACT

The study was aimed to measure the prevalence of glucose intolerance and insulin sensitivity in adolescents and young women with polycystic ovary syndrome (PCOS). One hundred forty-eight young women who attended one tertiary care center for treatment and/or observation for PCOS were included for the study. National Institute of Child Health and Human Development 2006 consensus criteria were used for diagnosis of PCOS. Oral glucose tolerance test (OGTT) was done to study the glucose intolerance and insulin sensitivity parameters. Analysis of plasma glucose was done before and 30 and 120 minutes after 75 gms of oral glucose challenge. Insulin sensitivity was calculated based on fasting, 30 min peak and all points. The degree of glucose intolerance and insulin resistance was associated with severity of hyperandrogenism, body mass index (BMI), and family history of diabetes mellitus.

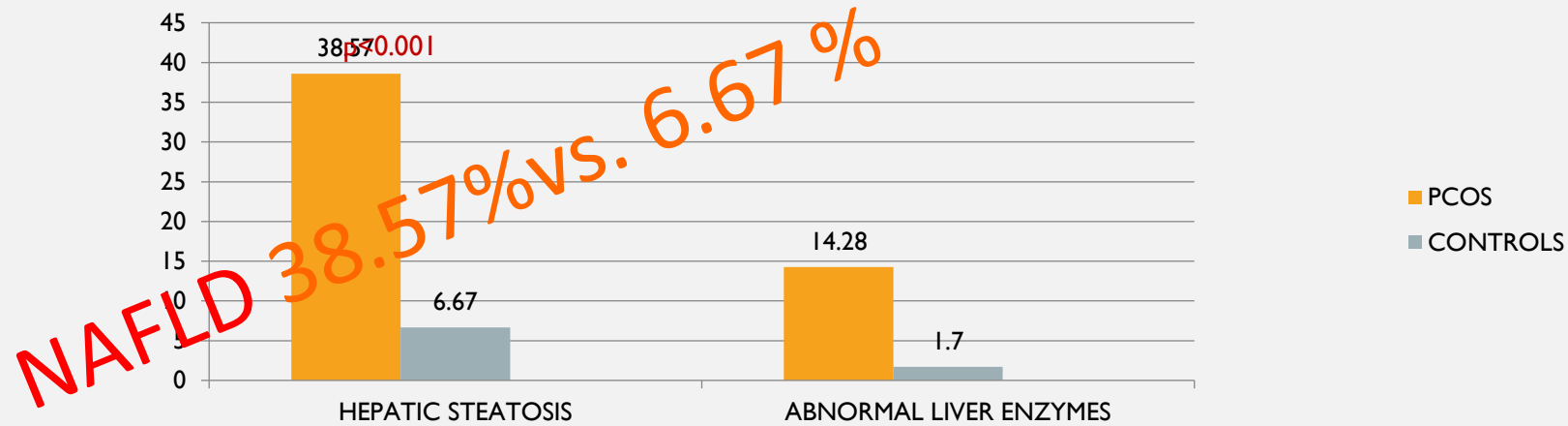
Results indicate higher incidence of glucose intolerance even at younger ages in PCOS females. Thirty six percent of PCOS women had impaired glucose tolerance (9.12%). One hundred forty eight young women who attended one tertiary care center for treatment and/or observation for PCOS were included for the study. National Institute of Child Health and Human Development 2006 consensus criteria were used for diagnosis of PCOS. Oral glucose tolerance test (OGTT) was done to study the glucose intolerance and insulin sensitivity parameters. Analysis of plasma glucose was done before and 30 and 120 minutes after 75 gms of oral glucose challenge. Insulin sensitivity was calculated based on fasting, 30 min peak and all points. The degree of glucose intolerance and insulin resistance was associated with severity of hyperandrogenism, body mass index (BMI), and family history of diabetes mellitus.

Fibroscan as a non-invasive predictor of hepatic steatosis: A cross-sectional study of an over looked disease among patients with the polycystic ovary syndrome (PCOS)

Chakarborty S, Ganie MA, Masoodi I, Shalimar IJMR 2019



Seventy women with PCOS and sixty healthy women (controls)



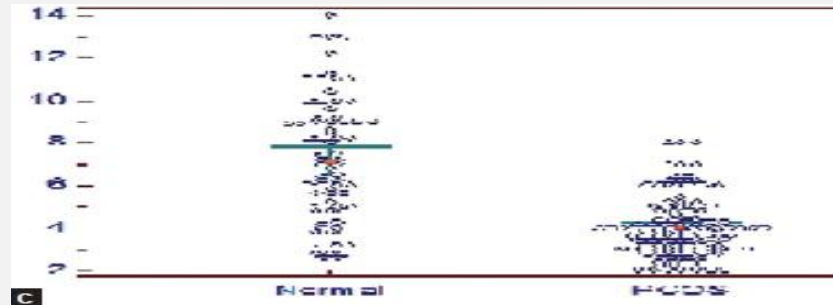
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Original Article

Comparative evaluation of sonographic ovarian morphology of Indian women with polycystic ovary syndrome versus those of normal women

Sanjeed Ahmed, Shivani Pahwa², Chandan Jyoti Das², Farooq A Mir, Sobia Nisar³, Majid Jehangir⁴, Shameem Parveen⁵, Aafia Rashid⁶, Mohd Ashraf Ganie¹

Department of Radiodiagnosis, Sheri-Kashmir Institute of Medical Sciences, Srinagar, ¹Departments of Endocrinology, Metabolism and Diabetes, and ²Radiodiagnosis, ³Department of Geriatric Medicine, All India Institute of Medical Sciences, Ansari Nagar, New Delhi, ⁴Department of Radiodiagnosis, Government Medical College, ⁵Departments of Obstetrics and Gynecology, and ⁶Endocrinology, Sheri-Kashmir Institute of Medical Sciences, Srinagar, Jammu and Kashmir, India



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Efficacy of serum anti-mullerian hormone (AMH) levels for prediction of polycystic ovary syndrome (PCOS) and its association with clinical, biochemical and hormonal parameters

Original Research Article | Published: 06 September 2022 | 38, 457–465 (2023)

Sajad Sumji, Abid Bhat, Aafia Rashid, Rohina Bashir, Imtiyaz A Wani, Vishnu Vasudevan, Tajali Sehar & Mohd. Ashraf Ganie

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In Conversation with
RJ Sahil Muzaffar

20th January, 2022 (Thursday)
Timing: 5:30 PM TO 6:30 PM
Live On (Radio Chinar 90.4 MHz)



Prevalence of metabolic syndrome in the family members of women with polycystic ovary syndrome from North India

Iram Shabir, Mohd Ashraf Ganie¹, Mohd Afzal Zargar², Dilafroz Bhat³, Mohd Muzzafar Mir³, Aleem Jan⁴, Zaffar Amin Shah⁵, Vicar Jan⁶, Riyaz Rasool⁷, Andleeb Naqati²

PhD Scholar, ¹Department of Endocrinology, All India Institute of Medical Sciences, New Delhi, ²Department of Biochemistry, University of Kashmir, Srinagar, Jammu and Kashmir, ³Departments of Clinical Biochemistry, ⁴Hematology, ⁵Immunology and Molecular Medicine, ⁶Cardiology, ⁷Radiodiagnosis, Sheri Kashmir Institute of Medical Sciences, Srinagar, Jammu and Kashmir, India

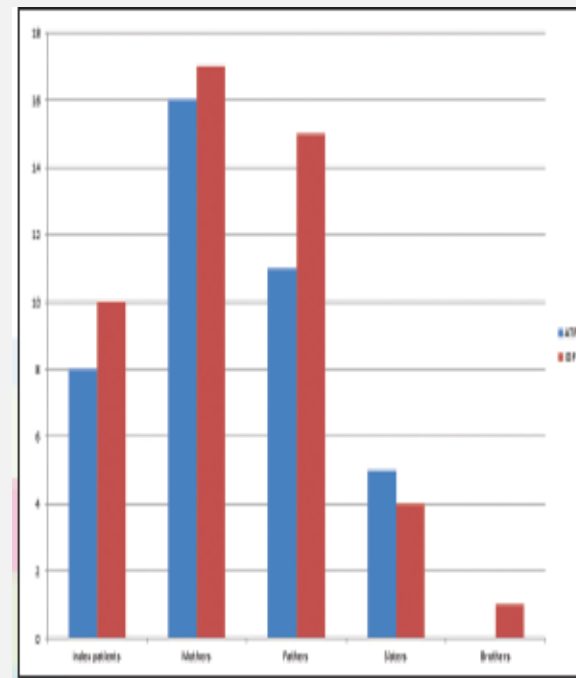


Figure 1: Bar diagram showing prevalence of metabolic syndrome in subjects by ATP III and IDF definitions



metabolic syndrome by two different criteria in the first-degree relatives of patients with PCOS. Results: The average age of 37 index patients was 23 ± 3.6 years, with the mean age of menarche as 13.3 ± 1.2 years. The mean age and age of menarche in mothers ($n = 22$) was 48.8 ± 5.1 and 13 ± 1.3 years, respectively, whereas as it was 23.5 ± 4.7 and 13.3 ± 1.2 years in sisters ($n = 22$), respectively. Metabolic syndrome (MS) defined by International Diabetes Federation (IDF) criteria was present in 10 index patients, 1 brother, 4

ORIGINAL ARTICLE

Morning plasma cortisol is low among obese women with polycystic ovary syndrome

Iram Shabir¹, Mohd Ashraf Ganie¹, Edavan P. Praveen¹, Madan L. Khurana¹, Jomimol John¹, Nandita Gupta¹, Guresh Kumar², and Ariachery C. Ammini¹

¹Department of Endocrinology & Metabolism and ²Department of Biostatistics, All India Institute of Medical Sciences, New Delhi, India

Abstract

Polycystic ovary syndrome (PCOS) is the most common cause for androgen excess in women. It is associated with wide variety of metabolic disorders. The present study assessed morning plasma cortisol in women with PCOS. One hundred and ninety seven cases and 55 controls were enrolled for this study. The mean age of patients and controls were 23 ± 5.6 years and 25 ± 4.3 years. One hundred twelve (56%) women with PCOS had BMI >25 . Serum cortisol levels were significantly higher in lean PCOS women compared to controls (13.4 ± 5.1 versus

Keywords

Body mass index, cortisol, hirsutism, hyperandrogenism, insulin, insulin resistance, polycystic ovary syndrome

History

Received 15 May 2013

N=197 cases and 55 controls

The mean age of patients and controls were 23 ± 5.6 years and 25 ± 4.3 years.

One hundred twelve (56%) women with PCOS had BMI >25 .

Serum cortisol levels were significantly higher in lean PCOS women compared to controls (13.4 ± 5.1 vs 11.3 ± 4.5 , $P < 0.01$) and over weight PCOS women group (13.4 ± 5.1 vs 9.3 ± 3.2 , $P < 0.01$).

Morning plasma cortisol correlated negatively with BMI in PCOS women with normal glucose tolerance.

? Significance

Prevalence of Psychiatric Disorders in Patients with a Diagnosis of Polycystic Ovary Syndrome in Kashmir

Arshad Hussain, Rajesh Kumar Chandel, Mohd Ashraf Ganie¹, Mansoor Ahmad Dar, Yasir Hassan Rather, Zaid Ahmad Wani, Javid Ahmad Shiekh², Majid Shafi Shah



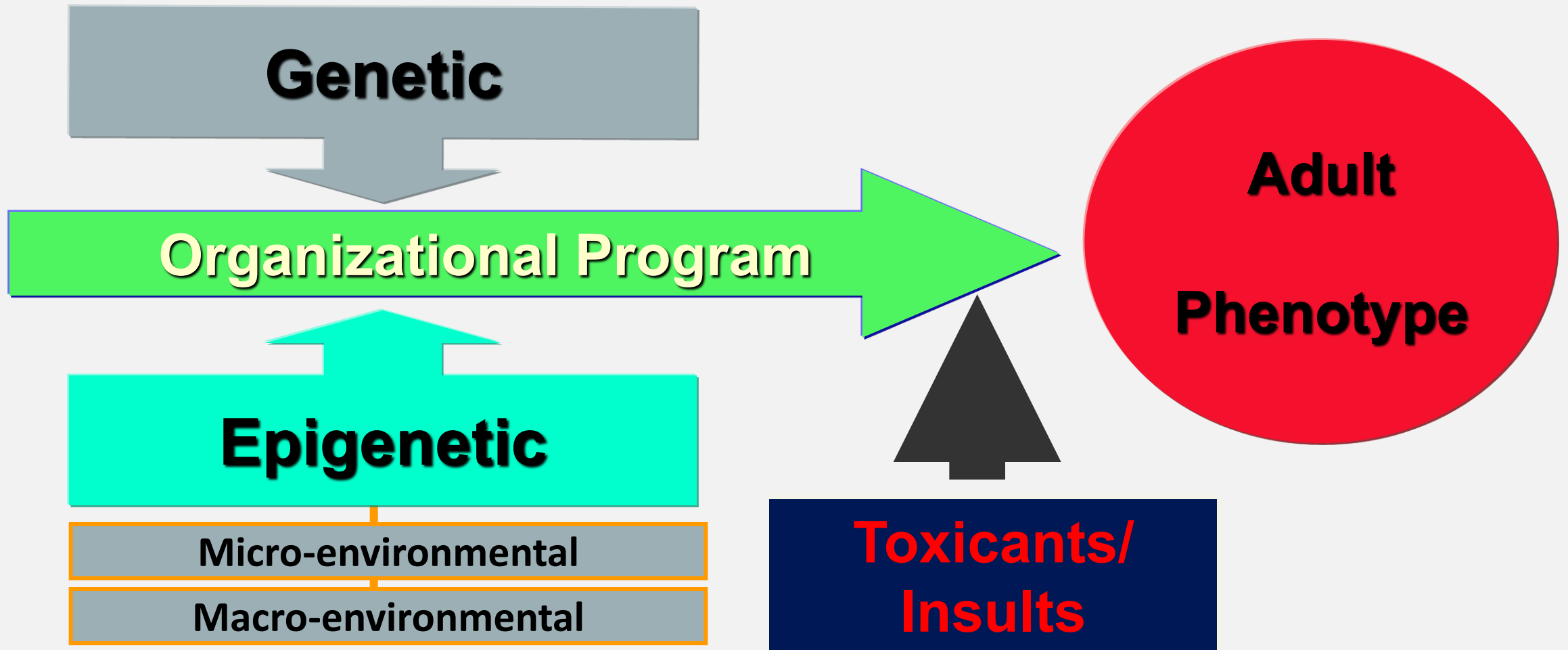
N= 110 PCOS N=40 Controls Comorbidities= 52.7% vs. 10%

Psychiatric diagnosis	Group		Total (%)
	PCOS n (%)	Control n (%)	
No diagnosis	52 (47.3)	36 (90.0)	88 (58.7)
BPAD	3 (2.72)	0 (0.00)	3 (2)
Suicidality	9 (8.18)	0 (0.00)	9 (6)
Dysthymia	2 (1.81)	0 (0.00)	2 (1.33)
Generalized anxiety disorder	17 (15.45)	0 (0.00)	17 (11.33)
Major depressive disorder	26 (23.64)	3 (7.5)	29 (19.33)
Agoraphobia	1 (0.9)	0 (0.00)	1 (0.7)
Obsessive compulsive disorder	7 (6.36)	1 (2.5)	8 (2)
Panic disorder	17 (15.45)	2 (5)	19 (5.33)
PTSD	1 (0.9)	0 (0.00)	1 (0.7)

4. What are the risk factors?

What causes it?

Elements of the Primary Organizational Palette



GENETICS and PCOS

- Small studies
- Associations are weak
- A meta-analysis of small case-control studies) suggested that a variant in IRS-1 was associated with PCOS.
- GWAS of PCOS in Han Chinese with PCOS- strong evidence for association 2p16.3 (OR, 0.71), 2p21 (OR, 0.67), and 9q33.3 (OR, 1.34).
- Similar genes in Chinese and European PCOS populations suggests that PCOS is an ancient trait present in ancestral populations before their migration out of Africa approximately 40,000 to 60,000 yr ago

WES/GWAS in India needed

Family history of menstrual irregularity or diabetes mellitus enhances the susceptibility of polycystic ovary syndrome among subjects harboring rs7903146 genetic variant of TCF7L1

Research article | Published: 17 May 2022 | 21, 769–776 (2022)

Rabiya Rashid, Idrees A. Shah, Mir M. Asrar, Meena Godha, Bashir A. Ganai & Mohd Ashraf Ganie ✉

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ORIGINAL ARTICLE

Association of -675 4G/5G PAI-1 and -2518A/G MCP-1 genetic polymorphisms with polycystic ovary syndrome in Kashmiri women: A case control study

Yousuf, Syed Douhath¹; Ganie, Mohammad Ashraf²; Mudassar, Syed¹; Shafi, Humaira^{3#}; Ibrahim, Saima^{3#}; Jeelani, Humira⁴; Rashid, Gowhar⁵; Zargar, Mohammad A.⁵; Rashid, Fouzla³

[Author Information](#) ⓘ

Journal of Family Medicine and Primary Care 11(8):p 4743–4752, August 2022. | DOI: 10.4103/jfmpc.jfmpc_1916_21 ©

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Effect Modification of LHCGR Gene Variant (rs2293275) on Clinico–Biochemical Profile, and Levels of Luteinizing Hormone in Polycystic Ovary Syndrome Patients

Original Article | Published: 12 January 2023 | 61, 1418–1432 (2023)

Mudassir Jan Makhdoomⁱ, Idrees A. Shah, Rabiya Rashid, Aafia Rashid, Saurabh Singh, Zaffar Amin Shah & Mohd Ashraf Ganie ✉

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Article | [Open access](#) | Published: 21 June 2021

Impact of rs2414096 polymorphism of CYP19 gene on susceptibility of polycystic ovary syndrome and hyperandrogenism in Kashmiri women

Sairish Ashraf, Shayaq Ul Abeer Rasool, Mudasar Nabi, Mohd Ashraf Ganie, Shariq R. Masoodi & Shajrul Amin ✉

Genetic susceptibility- DM/ Inflammation / HPA axis

GUT MICRO BIOTA

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Open Access Article

***Bifidobacterium* Is Enriched in Gut Microbiome of Kashmiri Women with Polycystic Ovary Syndrome**

by Saqib Hassan ^{1,2,†} , Marika A. Kaakinen ^{1,3,†} , Harmen Draisma ^{1,3} ,
 Liudmila Zudina ³ , Mohd A. Ganie ⁴ , Aafia Rashid ⁴ , Zhanna Balkhiyarova ^{1,3} ,
 George S. Kiran ⁵ , Paris Vogazianos ⁶ , Christos Shammis ⁷ , Joseph Selvin ² ,
 Athos Antoniadis ⁶ , Ayse Demirkan ^{3,8} and Inga Prokopenko ^{1,3,9,*}

- 1 Section of Genetics and Genomics, Department of Metabolism, Digestion and Reproduction, Imperial College London, London SW7 2AZ, UK
- 2 Department of Microbiology, School of Life Sciences, Pondicherry University, Puducherry 605014, India
- 3 Section of Statistical Multi-Omics, Department of Clinical and Experimental Medicine, University of Surrey, Guildford GU2 7XH, UK
- 4 Department of Endocrinology, Sheri-Kashmir Institute of Medical Sciences (SKIMS), Srinagar 190011, India
- 5 Department of Food Science and Technology, School of Life Sciences, Pondicherry University, Puducherry 605014, India
- 6 Stremble Ventures Ltd., Limassol 4710, Cyprus
- 7 ...





Well designed study with diet correlation required



Original Article

Assessment of PON1 activity and circulating TF levels in relation to BMI, testosterone, HOMA-IR, HDL-C, LDL-C, CHO, SOD activity and TAC in women with PCOS: An observational study

Humira Jeelani ^{a b}, Mohd Ashraf Ganie ^c, Akbar Masood ^b, Shajrul Amin ^{a b}, Iram Ashaq Kawa ^{a b}, Qudsia Fatima ^{a b}, Saika Manzoor ^{a b}, Tabasum Parvez ^d, Niyaz Ahmad Naikoo ^e, Fouzia Rashid ^{a b}  

ORIGINAL RESEARCH article

Front. Endocrinol., 08 November 2019

Sec. Reproduction

Volume 10 - 2019 | <https://doi.org/10.3389/fendo.2019.00699>

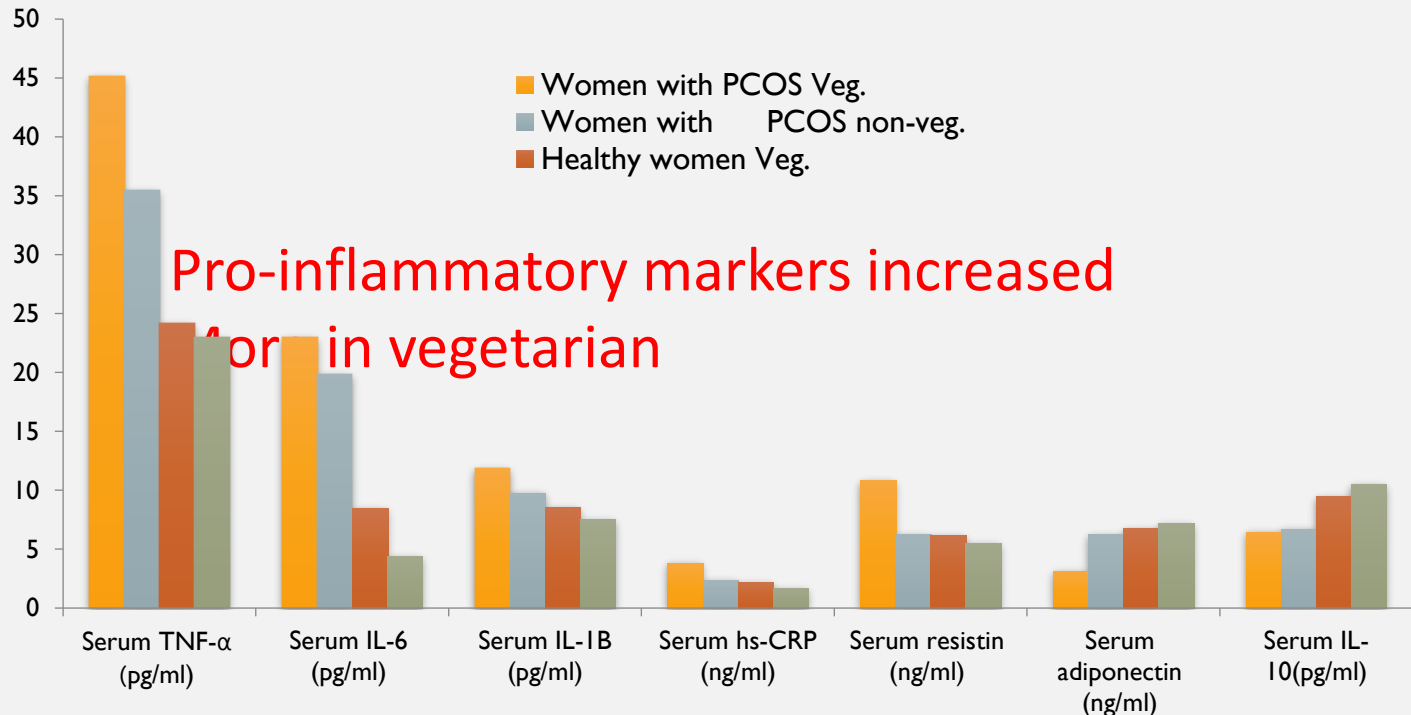
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[Reproduction and the Inflammatory Response](#)

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Comparative Evaluation of Biomarkers of Inflammation Among Indian Women With Polycystic Ovary Syndrome (PCOS) Consuming Vegetarian vs. Non-vegetarian Diet

 Mohd Ashraf Ganie^{1*}  Tajali Sahar¹  Aafia Rashid¹  Ishfaq A. Wani¹  Sobia Nisar²  Thozhukat Sathyapalan³  Sreenivas Vishnubhatla⁴  Lakshmy Ramakrishnan⁵  Tabasum Parveez⁷



CLINICAL STUDY

High prevalence of polycystic ovary syndrome characteristics in girls with euthyroid chronic lymphocytic thyroiditis: a case–control study

Mohd Ashraf Ganie¹, Raman Kumar Marwaha, Rashmi Aggarwal and Satveer Singh

Azziz
Baumgartner
award



Conclusion: Higher prevalence of PCOS characteristics in euthyroid CLT girls when compared to controls suggest possible role of autoimmune phenomenon in the etiopathogenesis of PCOS.

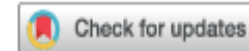
GYNECOLOGICAL ENDOCRINOLOGY

<https://doi.org/10.1080/09513590.2018.1469613>



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ORIGINAL ARTICLE



Evaluation of serum anti-nuclear antibody among women with PCOS: a hospital based single center cross sectional study

Aafia Rashid^a, Javaid Ahmad Bhat^a, Mohd Ashraf Ganie^a, Imtiyaz Ahmad Wani^a, Moomin Hussain Bhat^a, Zaffar Amin Shah^b, Shariq R. Masoodi^a and R. K. Marwaha^c



Overt Hypothyroidism is known induce a endocrine picture of PCOS

**Fertility
and Sterility.**



Association of subclinical hypothyroidism and phenotype, insulin resistance, and lipid parameters in young women with polycystic ovary syndrome

Mohd Ashraf Ganie, D.M.,^a Bashir Ahmad Laway, D.M.,^a Tariq Ahmed Wani, M.Sc.,^b Mohd Afzal Zargar, Ph.D.,^c Sobia Nisar, M.D.,^d Feroze Ahamed, M.D.,^e M. L. Khurana, Ph.D.,^c and Sanjeed Ahmed, M.D.^f

^a Department of Endocrinology Sher-i-Kashmir Institute of Medical Sciences, Soura Srinagar; ^b Biostatistics, Sher-i-Kashmir Institute of Medical Sciences, Soura Srinagar; ^c Department of Clinical Biochemistry, University of Kashmir, Srinagar, Kashmir; ^d Department of Internal Medicine, Government Medical College, Srinagar; ^e Department of Endocrinology, Metabolism, and Diabetes, All India Institute of Medical Sciences, Ansari Nagar, New Delhi; and ^f Department of Radiodiagnosis, Sher-i-Kashmir Institute of Medical Sciences, Soura Srinagar, India

Subclinical hypothyroidism is not associated with alteration in phenotypic expression and insulin resistance IN PCOS.

Original Article

Association of polycystic ovary syndrome and Graves' disease: Is autoimmunity the link between the two diseases

Sobia Nisar, Parvez A. Shah, M. Shafi Kuchay¹, Manzoor A. Bhat¹, Aafia Rashid¹, Sanjeed Ahmed², Mohd Ashraf Ganie¹

Department of Medicine, Government Medical College Srinagar, Jammu and Kashmir, India, Departments of ¹Endocrinology, ²Radiodiagnosis, Sher-i-Kashmir Institute of Medical Sciences, Soura

The association of Graves' disease & thyroiditis is unlikely to be because of a chance alone and may point to a common aetiopathogenic linkage leaving a scope for molecular characterization.





Idiopathic Hyperprolactinemia Presenting as Polycystic Ovary Syndrome in Identical Twin Sisters: A Case Report and Literature Review

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1. Endocrinology and Metabolism, All India Institute of Medical Sciences, New Delhi, IND

✉ **Corresponding author:** Alpesh Goyal, alpeshgoyal89@gmail.com

Disclosures can be found in Additional Information at the end of the article



Abstract

This case report describes 15-year-old identical twin sisters, who presented to us with features of polycystic ovary syndrome (PCOS). A biochemical workup revealed hyperinsulinemia and androgen excess with elevated prolactin levels. The possible etiologies for hyperprolactinemia were excluded with a detailed evaluation and it was labeled as idiopathic. Considering the fact that androgen excess could be caused by either insulin resistance or hyperprolactinemia, we decided to treat one sister with insulin sensitizer metformin and other with dopamine agonist cabergoline. While cabergoline treatment resulted in normalization of prolactin levels and androgen excess, no significant biochemical or clinical improvement occurred with metformin treatment. Hyperprolactinemia was therefore considered to be the cause of androgen excess in both and cabergoline therapy initiated in the other sister as well. Through the report, we conclude that diagnosis of PCOS should be made only after exclusion of alternative causes like

Impact of hypovitaminosis D on clinical, hormonal and insulin sensitivity parameters in normal body mass index polycystic ovary syndrome women

Mohd Ashraf Ganie, Raman Kumar Marwaha, Sobia Nisar, Khalid Jamal Farooqi, Rafi Ahmed Jan, Saleem Ahmed Wani, Tariq Gojwari & Zaffar Amin Shah

Clinical/hormonal parameters	PCOS (n = 122) (Mean ± SD)	Control (n = 46) (Mean ± SD)	p value ^a
Age (year)	23.35 ± 5.38	24.26 ± 5.25	NS
Age of menarche (year)	13.02 ± 1.34	12.52 ± 0.91	NS
No. of cycles per year	6.90 ± 3.32	11.82 ± 1.13	0.01
Ferriman–Gallwey score	12.22 ± 3.61	4.86 ± 1.39	0.01
Height (cm)	156.63 ± 5.30	156.60 ± 4.84	NS
Weight (kg)	54.61 ± 6.91	54.82 ± 6.50	NS
Waist circumference (cm)	81.71 ± 9.72	79.82 ± 5.11	NS
Hip circumference (cm)	91.38 ± 6.45	89.73 ± 6.52	NS
W/H ratio	0.89 ± 0.07	0.89 ± 0.05	NS
BMI (kg/m ²)	22.26 ± 2.17	22.37 ± 2.96	NS
Systolic BP (mmHg)	119.62 ± 10.10	114.78 ± 5.05	0.02
Diastolic BP (mmHg)	78.61 ± 6.39	78.04 ± 4.01	NS
LH (IU/L)	8.45 ± 4.19	5.66 ± 2.08	0.01
FSH (IU/L)	5.99 ± 4.69	4.69 ± 1.71	NS
Total testosterone (ng/dl)	71.35 ± 42.93	35.67 ± 12.96	0.01

Biochemical/hormonal and insulin sensitivity parameters	Group I (n = 27) (Mean ± SD)	Group II (n = 27) (Mean ± SD)	p value
Serum LH (IU/L)	7.94 ± 4.66	7.77 ± 4.12	NS
Serum FSH (IU/L)	5.40 ± 1.83	5.75 ± 1.74	NS
Serum total testosterone (ng/dl)	69.68 ± 37.40	58.76 ± 58.35	NS
Blood glucose–fasting (mg/dl)	90.29 ± 18.69	87.81 ± 17.61	NS
Blood glucose–1 h post-OGTT (mg/dl)	129.75 ± 34.45	146.66 ± 47.17	NS
Blood glucose–2 h post-OGTT (mg/dl)	119.55 ± 47.27	133.29 ± 50.52	NS
Serum total cholesterol (mg/dl)	158.34 ± 33.45	165.77 ± 23.55	NS
Serum total triglyceride (mg/dl)	128.50 ± 70.68	142.25 ± 71.44	NS
Plasma insulin–fasting (μIU/ml)	13.38 ± 11.70	14.65 ± 10.30	NS
Fasting glucose/insulin QUICKI	10.37 ± 9.91	7.96 ± 4.39	NS
HOMA-IR	0.14 ± 0.01	0.14 ± 0.01	NS
	2.97 ± 2.38	3.21 ± 2.36	NS

^abGroup I = vitamin D deficient group (<5 ng/ml) and Group II = vitamin D sufficient (>15 ng/ml).

No relation

Bone Mineral Density is Unaltered in Women with Polycystic Ovary Syndrome

Authors

Mohd Ashraf Ganie¹, Semanti Chakraborty¹, Ashish Sehgal², M. Sreejith¹, Devasenathipathy Kandasamy¹, Manisha Jana¹, Aafia Rashid²

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- All India Institute of Medical Sciences New Delhi, Endocrinology and Metabolism Ansari Nagar, New Delhi, India
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Key words

polycystic ovary syndrome, bone mineral density, dual energy X-ray absorptiometry, adolescent women, body mass index

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accepted 05.09.2018

Bibliography

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Horm Metab Res 2018; 50: 754–760

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ISSN 0018-5043

Correspondence

ABSTRACT

Context The effects of endocrine aberrations associated with polycystic ovary syndrome (PCOS) on bone mineral density (BMD) in young women is a matter of debate.

Objectives To compare BMD in young women with PCOS to age and body mass index (BMI) matched controls and to elucidate its correlation to BMI, insulin resistance and serum testosterone.

Design and Methods We recruited 60 women with PCOS aged 14–24 years, diagnosed based on Rotterdam 2003 criteria, and 58 age matched controls. BMD was measured by dual energy X-ray absorptiometry. In addition, these subjects underwent biochemical and hormonal analysis including oral glucose tolerance test, calculation of Homeostatic Model Assessment–Insulin Resistance Index, measurement of serum thyroxine, thyrotropin, prolactin, total testosterone, dehydroepiandrosterone sulfate, follicular phase luteinizing hormone and follicle stimulating hormone.

Results There was no difference of BMD between women with PCOS and control women (1.103±0.08 vs 1.126±0.083 g/cm²; p=0.127). In subgroup analysis based on BMI, BMD in obese

Centralized PCOS LAB and storage laboratory



E. How does management differ among Indians

MNT-Weight loss

Caloric restriction for obese /overweight –
Insufficient in lean women
No diet superior

(ES level ++)

PCOS

Diet & Weight Loss

PCOS

Dietary Recommendations

Hypocaloric diets ↓ insulin resistance

- 10-20% protein, ~50% carbohydrates
- < 30% total fat, < 10% saturated fat

ADA nutritional recommendations: Diabetes Care 208:14, 1997

- ◆ Further improvement with 5-10kg weight reduction
- ◆ Two fold ↑ glucose disposal rate with 16% ↓ weight

Niskanen L, et al: J Obes Relat Metab Disord 20:154, 1996

- ◆ Focus on lowering dietary fat as a means for promoting negative energy balance has led to an underestimation of the potential role of dietary composition in promoting reductions in energy intake and weight loss

Roberts SB, et al: J Am Coll Nutr 21:1406, 2002

- ◆ Diets based on low-GI foods produced greater weight loss than did equivalent diets based on high-GI foods.

Brand-Miller JC, et al: Am J Clin Nutr 76:281, 2002

- ◆ Low GI diet more effect than low fat in obese children

Spleth LE, et al: Arch Ped Adol, 154:947, 2000



PCOS UPDATE AT SKIMS

Demonstration of Yoga For PCOS



Physical Activity Pyramid



HORMONAL CONTRACEPTIVES

- 1st line recommended
- Contain both estrogen and progestin
 - **Estrogen:** Ethinyl estradiol
 - **Progestin:** More variable component
- Very little comparative data with respect to different formulations
- Little data in adolescents



Included 28 publications reporting on 24 studies.

Risk of **myocardial infarction** or **ischemic stroke** was 1.6-fold increased in women using COCs .

The risk was highest for pills with > 50 microgram estrogen.

- **(ES level +++)**
- OCPs normalize androgen levels within a few weeks
- 4–9 months -improvement in hirsutism and 3–5 months for acne
- Acne will be cleared in 60% of patients in 6 months
- In 12 months, 95% should be free of acne. Homburg R et al.Hum Reprod 2004
- Combination of CPA (2 mg/day) and EE (35 µg/day) - hirsutism and acne.
- Non androgenic progestins like desogestrel and levonorgestrel and antiandrogens like cyproterone acetate, drospirinone in combination with ethinyl oestradiol are used.
- No superiority

Insulin-sensitising drugs versus the combined oral contraceptive pill for hirsutism, acne and risk of diabetes, cardiovascular disease, and endometrial cancer in polycystic ovary syndrome (Review)

Costello MF, Shrestha B, Eden J, Johnson N, Moran LJ

2011
Published



Up to 12-months treatment with the OCP is associated with an improvement in menstrual pattern and serum androgen levels compared with metformin; but metformin treatment results in a reduction in fasting insulin and lower triglyceride levels than with the OCP.

There is insufficient evidence in favour of either metformin or the OCP in treating hirsutism or acne (pimples); nor in preventing the development of diabetes, heart disease, or endometrial cancer. The limited data available does not support the preferential use of either insulin-sensitising drugs or OCP (alone or in combination) for the long-term medical management of PCOS.

1. SKIMS Srinagar

N=180

2. AIIMS, New Delhi

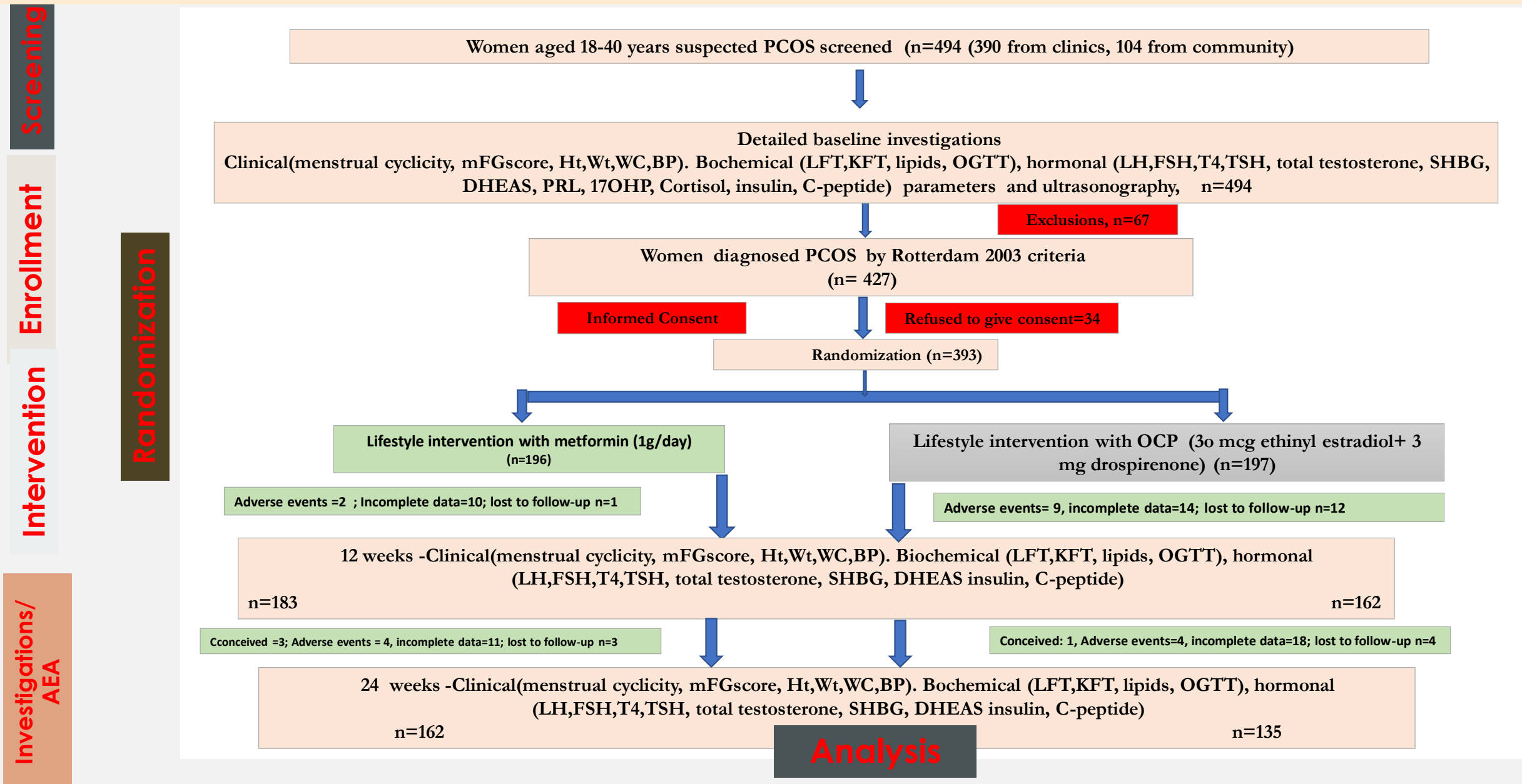
N=180



- ✓ Metformin and OCPs improved the efficacy in terms of increased frequency of menstrual cyclicity, regulating plasma glucose and plasma insulin, c-peptide and SHBG levels.
- ✓ A significant improvement in the indicators of glucose homeostasis like QUICKI, HOMA IR, FGIR, Matsuda, and stumvoll with metformin.
- ✓ OCPs are better in efficacy but may have deleterious effects on IR
- ✓ Metformin had higher milder adverse effects while OCPs has less but severe adverse events.

Inflammatory /Procoagulant markers /Worsen with OCP- **Unpublished**

The results of RCT (metformin (1g/day) Vs. OCP (30 µg Ethinyl estradiol plus 2mg drospirenone) of the study at SKIMS Srinagar and AIIMS



52 [Oral contraceptive use increases risk of inflammatory and coagulatory disorders in women with Polycystic Ovarian Syndrome: An observational study.](#)
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33 [Analysis of Intrinsic and Extrinsic Coagulation Pathway Factors in OCP Tre PCOS Women.](#) Page 4
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PMID: 34220002 [Free PMC article.](#)

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PMID: 34155264 [Free PMC article.](#)

54 [Effect of six-month use of oral contraceptive pills on plasminogen activator inhibitor-1 & factor VIII among women with polycystic ovary syndrome: An observational pilot study.](#)
Cite Yousuf SD, **Ganie MA**, Jeelani S, Mudassar S, Shah ZA, Zargar MA, Amin S, Wani IA, Rashid F.
Share Indian J Med Res. 2018 Dec;148(Suppl):S151-S155. doi: 10.4103/ijmr.IJMR_1899_17.
PMID: 30964093 [Free PMC article.](#)

48 [Comparative Evaluation of Biomarkers of Inflammation Among Indian Women With Polycystic Ovary Syndrome \(PCOS\) Consuming Vegetarian vs. Non-vegetarian Diet.](#)
Cite **Ganie MA**, Sahar T, Rashid A, Wani IA, Nisar S, Sathyapalan T, Vishnubhatla S, Ramakrishnan L, Parvez T, Geer I.
Share Front Endocrinol (Lausanne). 2019 Nov 8;10:699. doi: 10.3389/fendo.2019.00699. eCollection 2019.
PMID: 31781077 [Free PMC article.](#)

50 [Assessment of PON1 activity and circulating TF levels in relation to BMI, testosterone, HOMA-IR, HDL-C, LDL-C, CHO, SOD activity and TAC in women with PCOS: An observational study.](#)
Cite Jeelani H, **Ganie MA**, Masood A, Amin S, Kawa IA, Fatima Q, Manzoor S, Parvez T, Naikoo NA, Rashid F.
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17 [Oral contraceptive pill \(OCP\) treatment alters the gene expression of intercellular adhesion molecule-1 \(ICAM-1\), tumor necrosis factor- \$\alpha\$ \(TNF- \$\alpha\$ \), monocyte chemoattractant protein-1 \(MCP-1\) and plasminogen activator inhibitor-1 \(PAI-1\) in polycystic ovary syndrome \(PCOS\) women compared to drug-naïve PCOS women.](#) Page 2
Cite Yousuf SD, **Ganie MA**, Urwat U, Andrabi SM, Zargar MA, Dar MA, Manzoor-Ul-Rehman M, Mudassar S, Rashid F.
Share BMC Womens Health. 2023 Feb 15;23(1):68. doi: 10.1186/s12905-023-02187-5.
PMID: 36793022 [Free PMC article.](#)

OCP Use – worsens already existing inflammatory and procoagulant state

Insulin sensitizers in PCOS

REVIEW

Metformin: an old medication of new fashion: evolving new molecular mechanisms and clinical implications in polycystic ovary syndrome

Evanthia Diamanti-Kandarakis, Charikleia D Christakou, Eleni Kandaraki¹ and Frangiskos N Economou
 Endocrine Section, First Department of Medicine, University of Athens Medical School, Mikras Asias 75, Goudi 115-27, Athens, Greece and
¹Department of Medicine, Hull Royal Infirmary, Anlaby Road, Hull, HU3 2JZ England, UK
 (Correspondence should be addressed to E Diamanti-Kandarakis; Email: akandara@otenet.gr)

ovary syndrome (PCOS; in parameters assessed as primary outcome measures).

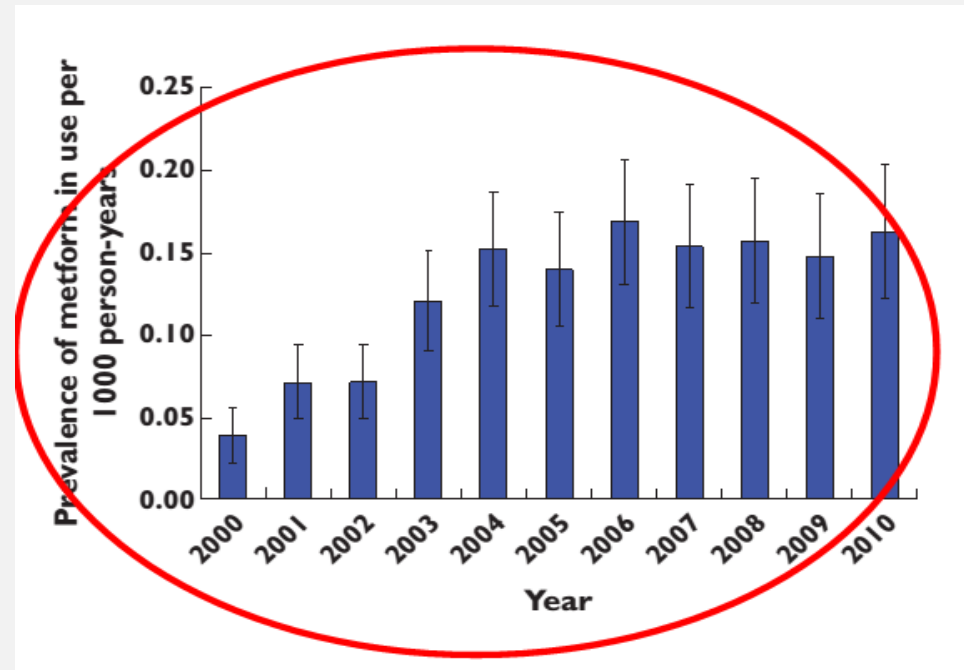
	Study (Ref.)	Study population-PCOS definition	Primary outcome measures
Reproductive features	Meta-analysis (74) 13 RCTs	543 PCOS (NIH)	Metf versus plac Metf+CC versus CC mono ↑ Ovulation rate Metf+CC versus CC ↑ Pregnancy rate
	Meta-analysis (75) 12 RCTs, 2 cohorts, 16 uncontrolled descriptive studies	PCOS	Metf versus plac Metf+CC versus CC mono ↑ Ovulation rate Metf+CC versus CC mono ↑ Pregnancy rate
	Meta-analysis (84) 27 RCTs	PCOS (Rotterdam)	Metf versus CC and Metf+CC versus CC ↔ Live birth rate in therapy-naive Metf+CC versus CC ↑ Live birth rate in CC resistant
	RCT double-blind (79)	100 PCOS (NIH)	Metf+plac versus CC+plac: ↔ ovulation rate ↑ Pregnancy rate ↓ Abortion rate
	RCT (82)	626 PCOS (NIH)	Trend ↑ for live birth rate CC+plac and CC+metf versus metf+plac ↑ Live birth rate
	RCT double-blind (83)	225 PCOS (NIH)	Metf+CC versus CC+plac ↑ Pregnancy rate in older and visc obese
Metabolic features ± menstrual frequency	RCT double-blind (34)	56 PCOS (NIH)	Metf versus plac in obese ↓ BMI, SBP, FG, HOMA, Testo ↑ HDL
	RCT double-blind (35)	40 PCOS (NIH)	Metf versus plac ↔ Fat distribution
	RCT (137)	76 PCOS (Rotterdam)	Metf+diet versus plac+diet ↑ Menstrual frequency ↓ Glucose-stimulated insulin levels
	RCT double-blind (139)	143 PCOS (Rotterdam)	Metf+diet versus plac+diet ↔ BMI, menstrual frequency, QUICKI ↓ WC, FAI

FAI, free androgen index; FG, fasting glucose; Plac, placebo; Testo, testosterone; Visc, viscera; WC, waist circumference; ↑, increase; ↓, decrease; ↔, no difference.

UK IMS DISEASE ANALYZER-

2674 METFORMIN PRESCRIPTIONS WERE ISSUED TO 337 PATIENTS (80% FEMALE) BETWEEN 2000 AND 2010-

0.03 PER 1000 PERSON-YEARS TO 0.16 PER 1000 PERSON-YEARS



Diagnosis	Number of patients		Total
	Boys	Girls	
Diabetes only	48	66	114
Obesity only	4	18	22
PCOS and obesity	NA	120	120
Diabetes and obesity	3	8	11
Diabetes, PCOS and obesity	NA	23	23

NA, not applicable.

- Metformin prescribing increased in children and adolescents between 2000 and 2010, in particular in girls aged 16–18 years.
- PCOS and obesity were the main, but unlicensed, indications for metformin prescribing amongst female adolescents.

Comparison of Efficacy of Spironolactone with Metformin in the Management of Polycystic Ovary Syndrome: An Open-Labelled Study

M. ASHRAF GANIE, M. L. KHURANA, M. EUNICE, M. GULATI, S. N. DWIVEDI, AND A. C. AMMINI
 Departments of Endocrinology and Metabolism (M.A.G., M.L.K., M.E., A.C.A.), Radiology (M.G.), and Biostatistics (S.N.D.), All India Institute of Medical Sciences, New Delhi 110029, India

TABLE 1. Clinical parameters of the subjects before and during treatment

	Metformin group (n = 35)			Spironolactone group (n = 34)		
	0 months	3 months	6 months	0 months	3 months	6 months
Age (yr)	22.9 ± 5.3			23.3 ± 5.2		
BMI (kg/m ² ; normal range, 20–25)	26.5 ± 5.6 (17–34) ^a	25.7 ± 4.5	25.6 ± 4.7	25.9 ± 5.0 (18–35) ^a	25.7 ± 4.8	25.5 ± 4.6
WHR (normal range < 0.80)	0.9 ± 0.1	0.85 ± 0.1	0.85 ± 0.1	0.86 ± 0.1	0.85 ± 0.1	0.86 ± 0.1
Age of menarche (yr)	12.9 ± 1.3			13.0 ± 1.2		
No. of menstrual cycles/yr (normal range ≥ 8)	5.7 ± 2.3	7.4 ± 2.6 ^b	9.1 ± 2.0 ^b	6.6 ± 2.1	9.0 ± 1.9 ^b	10.2 ± 1.9 ^b
Hirsutism score (normal range ≤ 8)	12.5 ± 4.9	11.4 ± 4.1 ^b	10.0 ± 3.3 ^b	12.9 ± 3.2	10.1 ± 3.1	8.7 ± 1.9
Hirsutism duration (yr)	4.0 ± 2.5			4.4 ± 2.7		
BP systolic (mm Hg; normal range ≤ 120)	122.9 ± 14.9	118.3 ± 18.8	122.2 ± 14.9	122.7 ± 8.50	123.1 ± 6.4	122.9 ± 14.7
BP diastolic (mm Hg; normal range ≤ 90)	81.1 ± 5.0	81.2 ± 6.4	79.6 ± 14.3	82.9 ± 4.8	80.3 ± 6.8	81.4 ± 5.6

Results are given as mean ± SD.

^a BMI range.

^b *P* < 0.05 for comparison within the group.

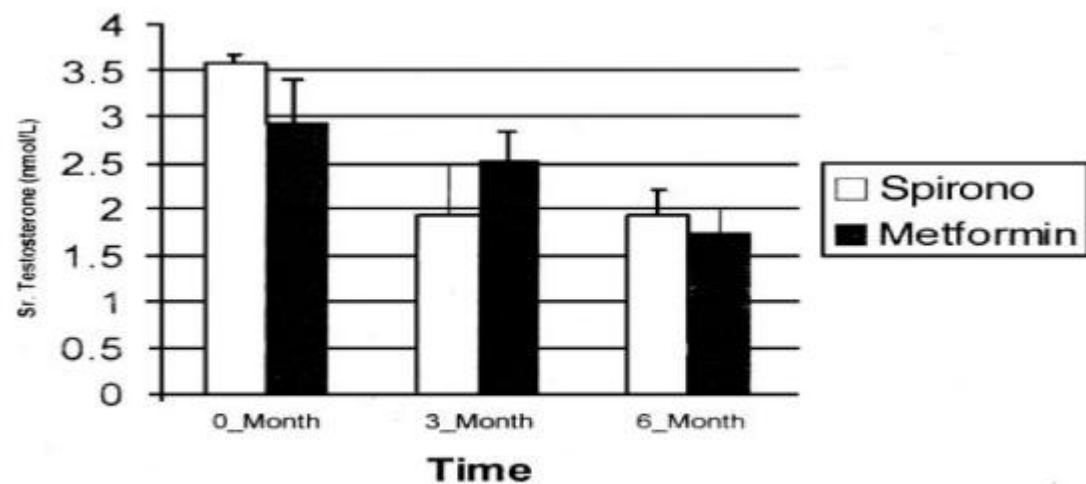
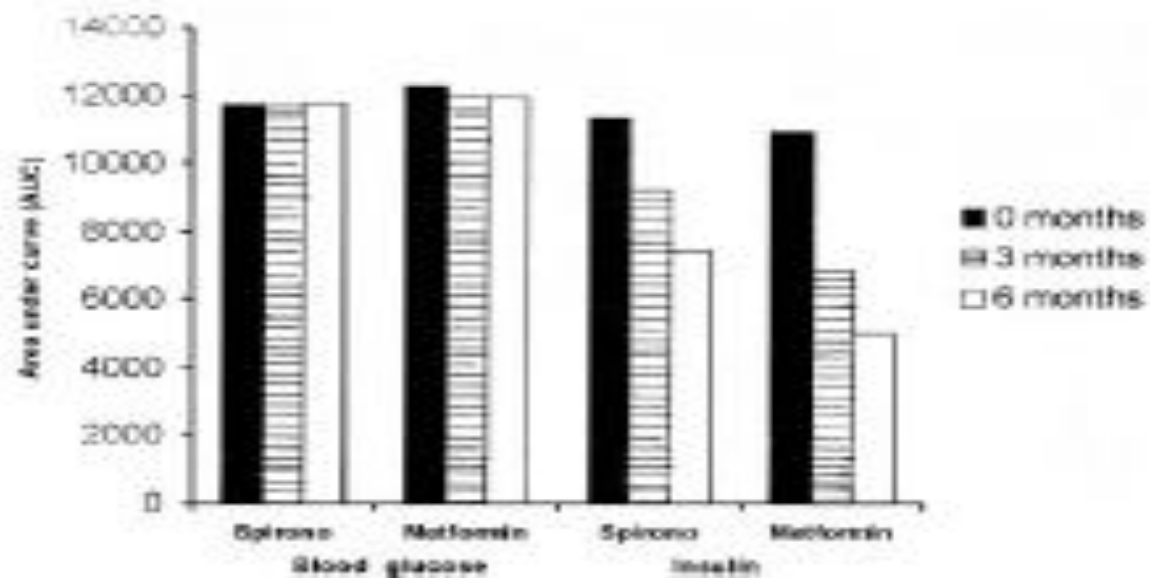


FIG. 2. Comparing the effect of spironolactone and metformin on serum testosterone levels before and after treatment (conversion factor, nmol/liter = ng/dl × 0.03467).



Improved efficacy of low dose spironolactone and metformin combination than either drug alone in the management of women with polycystic ovary syndrome (PCOS): a six month, open label randomized study

Mohd Ashraf Ganie, M.D; D.M, Associate Professor, Madan Lal Khurana, PhD, Scientist IV
Sobia Nisar**, MD, Senior Resident,
Parvaiz Ahmed Shah**, M.D, D.M, Professor,
Zaffar Amin Shah*, PhD, Additional Professor,
Bindu Kulshrestha****, MD; DM, Assistant Professor,
Nandita Gupta, PhD, Professor, Mohd Afzal Zargar #, PhD, Professor,
Tariq Ahmed Wani ***, M Sc, Biostatistician,
Syed Mudasir @, PhD, Additional Professor,
Farooq Ahmed \$, M.D, Senior Resident, Shenaz Taing ~, MD, Associate Professor

1. N=204 WOMEN RANDOMIZED TO Metformin 1gm/day vs spironolactone 50 mg/day or the combination
2. 24 WEEKS FOLLOW UP –CLINICAL/BIOCHEMICAL/INSULIN SENSITIVITY/SAFETY PROFILE



Current Pharmaceutical Design

Editor-in-Chief >>

ISSN (Print): 1381-6128
ISSN (Online): 1873-4286

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Meta-Analysis

Do Pleiotropic Effects of Spironolactone in Women with PCOS Make it More than an Anti-androgen? Evidence from a Systematic Review and Meta-analysis

Author(s): Rohina Bashir, Mir Mahmood Asrar, Idrees Ayoub Shah, Imtiyaz Ahmad Wani and Mohd. Ashraf Ganie*

Volume 29, Issue 19, 2023

Published on: 27 June, 2023

Page: [1486 - 1496]

Pages: 11

DOI: [10.2174/1381612829666230331093912](https://doi.org/10.2174/1381612829666230331093912)

Price: \$65

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PDF



THIAZOLIDINEDIONES

- AN RCT of rosiglitazone in obese adolescents with PCOS - insulin sensitivity and biomarkers for cardiovascular risk than treatment with EE/D.
- However, EE/D was more effective in restoring cyclical menses and reduction in HA
(Tfayli et al, J Clin Endocrinol Metab 2011)



Gynecological Endocrinology >

Volume 36, 2020 - Issue 4

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POLYCYSTIC OVARIAN SYNDROME

Coadministration of metformin or spironolactone enhances efficacy of rosiglitazone in management of PCOS

Mohd Ashraf Ganie, Aafia Rashid, Mona Sood , Nighat Yaseen Sofi, Ishfaq A. Wani, Sobia Nisar, ...show all

Pages 308-312 | Received 14 Jun 2019, Accepted 28 Sep 2019, Published online: 08 Nov 2019

BRIEF COMMUNICATION

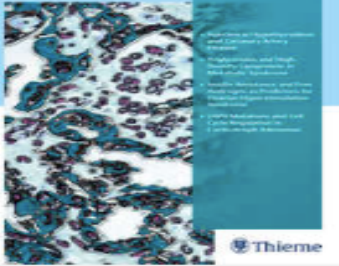
Fetal bone mineralization defects following maternal inadvertent exposure to thiazolidinediones in pregnancy

Mohd Ashraf Ganie ✉, Aishwarya Krishnamurthy, Mohammad Salem, Aafia Rashid, Imtiaz Ahmad Wani, Tariq Gojwari

First published: 26 January 2020 | <https://doi.org/10.1002/ijgo.13103> | Citations: 2



4 Cases of TZD adverse outcomes



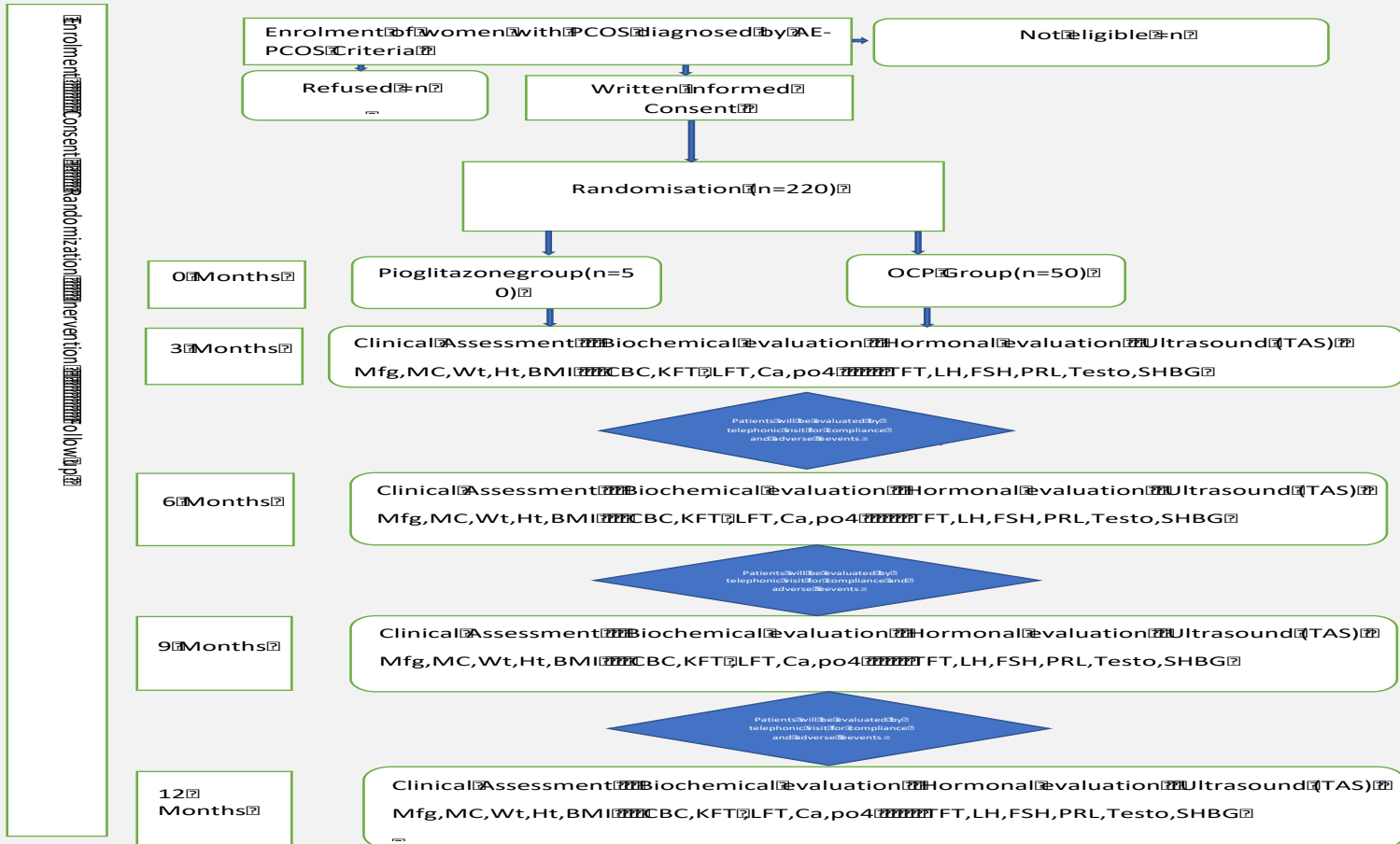
Endocrine Care

© Georg Thieme Verlag KG Stuttgart · New York

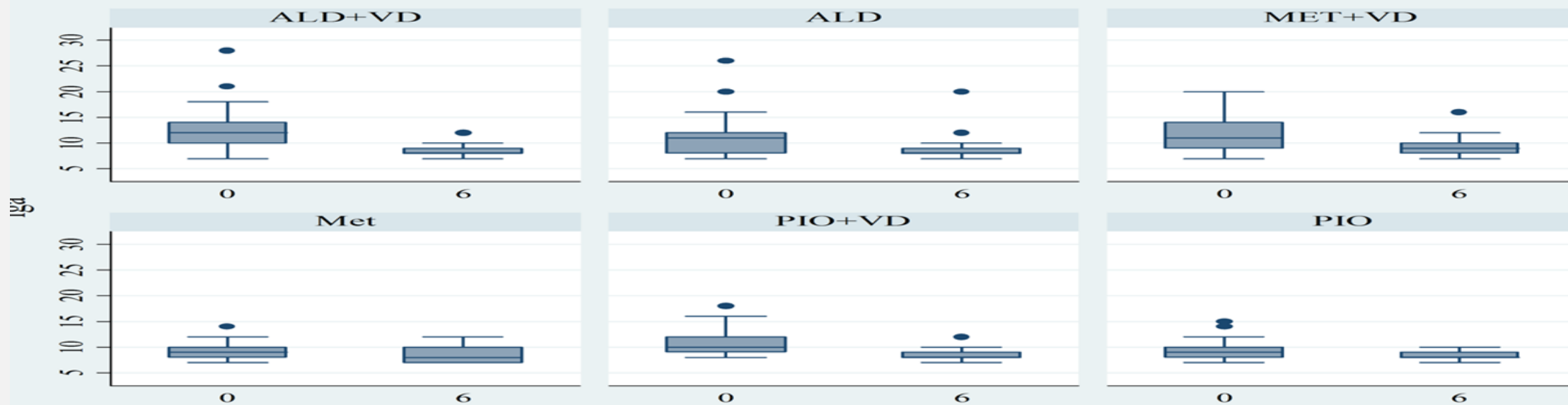
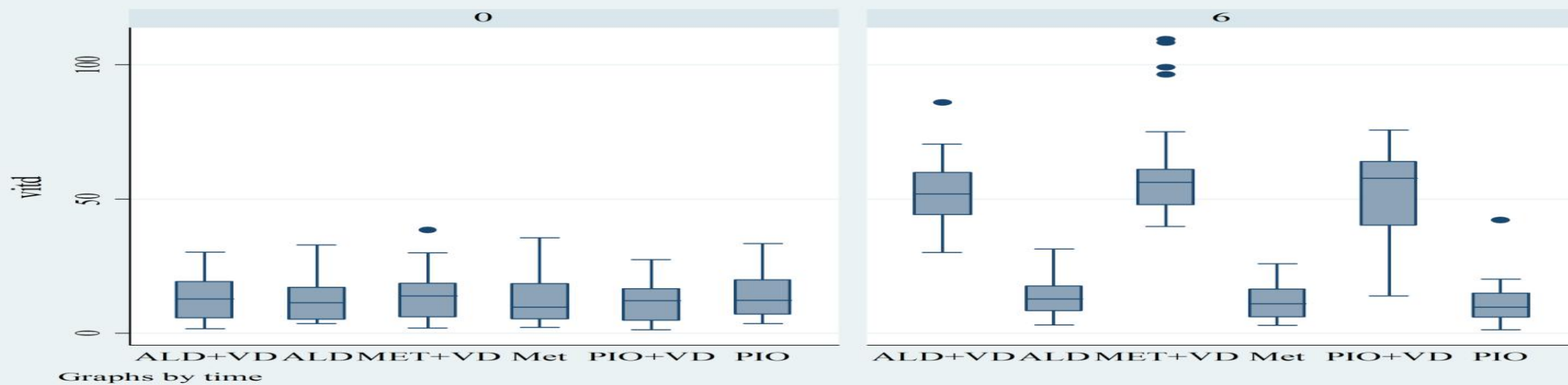
Differential Impact of Insulin Sensitizers vs. Anti-Androgen on Serum Leptin Levels in Vitamin D Replete PCOS Women: A Six Month Open Labeled Randomized Study

Aafia Rashid , Mohd Ashraf Ganie , Imtiyaz Ahmad Wani , Gulzar Ahmad Bhat , Feroz Shaheen , Ishfaq Ahmed Wani , Mukesh Shrivastava , Zaffar Amin Shah

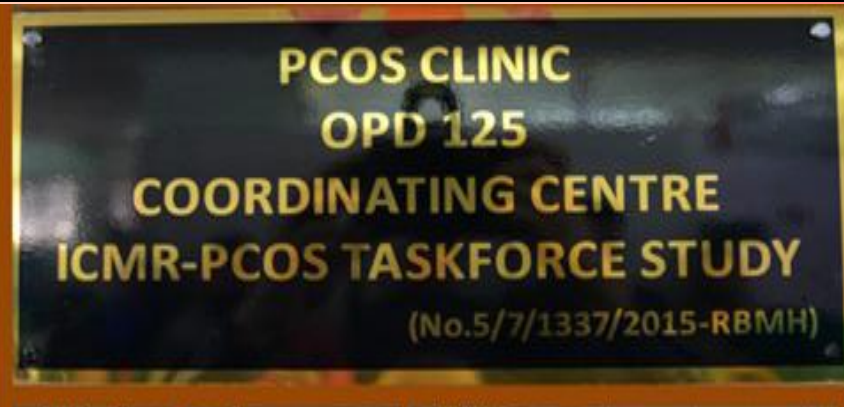
Vitamin D – Marginal benefit on IR



SERUM 25 OHD LEVELS (400 IU DAILY)



Established Multidisciplinary Clinical Care Model.



- ❖ The coordinating Centre, Sher-i-Kashmir Institute of Medical Sciences, Srinagar has set up “PCOS Station”
- ❖ it is a one-stop facility for PCOS comprehensive care that remains functional on every Thursday.
- ❖ USG Clinic-operational 5 days (3-4 patients every day free of cost).

**Communicated
to collaborating centers
for Replication-Need
Support**

E. What can be done to prevent the epidemic in Indians

Public lectures on PCOS



PCOS Awareness Drive under Among College Going Girls



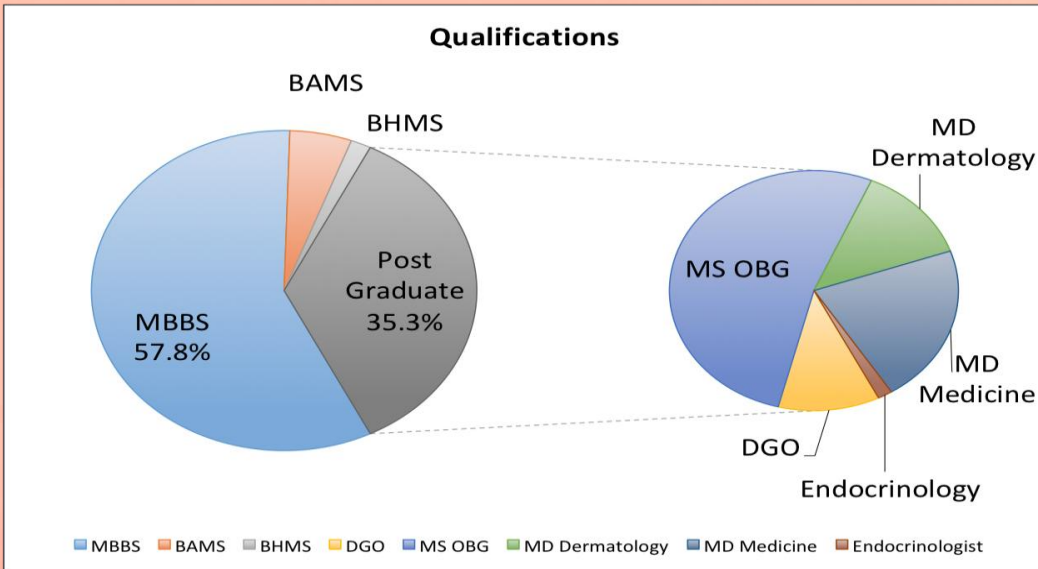
KAP STUDY

Cross Sectional Component

Tools: Semi Structured Questionnaire self administered

Study sites: 173 public health facilities in the chosen geographic area for the prevalence study

Participants- health care providers



➤ **PCOS is a common problem that women seek care at public health facilities**

➤ **Knowledge among health care providers is suboptimal**

➤ **Many diagnostic investigations were found unavailable, thus Health Systems need to be strengthened to screen and diagnose correctly**

▪ **Need to train health care providers on Algorithms for diagnosis and Multidisciplinary management**

➤ **Need to include it as one Non Communicable Disease in public health program**

Majority (60%) were not aware about any National/ International Guidelines to manage PCOS

Dr. Sarita Agrawal

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Dr. Subhankar Chowdhury

EAST ZONE Centre-V, IPGIMER, Kolkata



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Metabolic Syndrome, Pre-diabetes and PCOS Society

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OUR VISION

To create a platform of clinicians from related fields such as Endocrinologists, Gynecologists, Sonologists, Cardiologists, Internists, Gastroenterologists, Nutritionists and basic scientists to provide a common forum to these specialists to meet and to share experience on Polycystic ovary syndrome (PCOS), metabolic syndrome (M) and prediabetes (P) in a common link



<http://www.mppcossociety.com>



Prof. M Ashraf Ganie
President M.P PCOS Society



(M. P.PCOS)

mppcos.society@gmail.com

6th International Conference On PCOS
Concluded on 18-19th April, 2026 at SKIMS Srinagar

PCOS Registry

Name : Amitabh Bachhan Gender : M Age : 31 UHID : SMHPT21121400006

VIEW AND VERIFY

SAVE

VITALS

WEIGHT (kg)

70

HEIGHT (cm)

170

BMI (calculated)

24.22

BLOOD PRESSURE (mmHg)

120

80

PULSE (beats/min)

TEMPERATURE (°F)

RESPIRATORY RATE (bpm)

RBS (mg/dl)

PRESENTING COMPLAINTS / REVIEW NOTES

Add custom panel

- Abnormal Weight Gain
- Diabetic Review Visit
- Fever & Headache
- Headache
- headache & insomnia
- Head Ache & Insomnia
- Insomnia
- OSA
- Palpitation
- Patient better
- Post Surgical Follow Up
- Headache
- Fever

MEDICAL HISTORY

Add custom panel

- Baseline Medical History
- Dietary History
- Hypertension & Diabetes History
- Medical & Family History
- Vitamin D Study

Medical Condition/History	Since When		
Dietary History		Additional Details	×
T2DM (Type 2 Diabetes Mellitus)		Additional Details	×
		Additional Details	×

Normative data among Healthy Indian Women in reproductive age

1. Prevalence, Regional Variations, and Predictors of Overweight, Obesity, and Hypertension Among Healthy Reproductive-Age Indian Women: Nationwide Cross-Sectional Polycystic Ovary Syndrome Task Force Study

JMIR Public Health Surveill 2023 | vol. 9 | e43199

2. The study reported normative data on hormones biological reference interval for various hormonal parameters in the reproductive-aged healthy Indian women (Serum T4, TSH, and serum prolactin, LH, FSH, serum total testosterone, fasting insulin, morning cortisol, DHEAS and SHBG)

(Lancet Reg Health Southeast Asia. 2023 May 30:15:100226. doi: 10.1016/j.lansea.2023.100226.)

3. Common hematological reference indices among health reproductive aged India women-Data subset from Nationwide study

Indian Journal of Hematology and Blood Transfusion-In Press

4. The study reported biochemical reference intervals (RIs) data among a large representative sample of healthy reproductive-age women across the country. The resource may serve as a reference range for common biochemical analytes (liver function parameters, lipid parameters, glycemic and renal parameters) for future in this age group.

Indian J Pharmacol. 2023 Mar-Apr;55(2):76-88. doi: 10.4103/ijp.ijp_694_22.



Unfulfilled agenda

- ❑ Renaming the condition
- ❑ Revising the Criteria for diagnosis
- ❑ Indian Guidelines
- ❑ Pathogenesis- genetics/environment and gut microbiota etc.
- ❑ Future generations- Transgenerational impact
- ❑ Preventive /Therapeutics –Cost effective /indigenous

Global contribution

NEED OF EVIDENCE BASED GUIDELINES

Practice Guideline > Fertil Steril. 2023 Oct;120(4):767-793.

doi: 10.1016/j.fertnstert.2023.07.025. Epub 2023 Aug 14.

Recommendations from the 2023 International Evidence-based Guideline for the Assessment and Management of Polycystic Ovary Syndrome

Helena J Teede ¹, Chau Thien Tay ², Joop Laven ³, Anuja Dokras ⁴, Lisa J Moran ², Terhi T Piltonen ⁵, Michael F Costello ⁶, Jacky Boivin ⁷, Leanne M Redman ⁸, Jacqueline A Boyle ⁹, Robert J Norman ¹⁰, Aya Mousa ¹¹, Anju E Joham ²; International PCOS Network

Collaborators, Affiliations + expand

PMID: 37589624 DOI: 10.1016/j.fertnstert.2023.07.025

Thirty-nine professional and consumer organizations covering 71 countries engaged in the process. Twenty meetings and five face-to-face forums over 12 months addressed 58 prioritized clinical questions involving 52 systematic and 3 narrative reviews.

Main results and the role of chance: The evidence in the assessment and management of PCOS has generally improved in the past five years, but remains of low to moderate quality. The technical evidence report and analyses (~6000 pages) underpins 77 evidence-based and 54 consensus recommendations, with 123 practice points. Key updates include: i) further refinement of individual

Funded by the Australian Government via the National Health Medical Research Council (NHMRC) (APP1171592)

This study has the potential

Conclusion

Key Message

- **PCOS is a major metabolic disorder, not just reproductive**
- **Early intervention reduces long-term disease burden**
- **Requires multidisciplinary approach**

Need for More Research

- Large-scale studies in **Indian populations**
- Integration of **genomics, proteomics, and metabolomics**
- **Longitudinal and intergenerational studies**
- Translational research from **lab to clinic**

Policy Making

- Integrate PCOS into **national NCD programs**
- Develop **screening guidelines** for adolescents and young women
- Include PCOS in **public health awareness campaigns**

Legislation and Healthcare Strategy

- Strengthen **women's health policies**
- Establish **standardized diagnostic and treatment protocols**
- Improve access to **endocrine and reproductive healthcare services**



Word of gratitude

Heartfelt Gratitude to NAMS-India
for Recognition of Academic
Excellence (RAE)-
Achanta Lakshmipathi

Chair persons:

Dr. K.K. Talwar,
Chairman of Cardiac Sciences at PSRI
Hospital in New Delhi,
former Director PGIMER

Dr. N.K. Ganguly,
Former Director
General of
ICMR, New Delhi

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Professor,
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NAMS Organization

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20. Sathypalan T
21. Luare M
22. Sadish Kumar
23. Joseph Selvin



DST

ICMR

AIIMS SKIMS

DBT

Dr Ashraf thanks people for their condolences

Dr Mohammad Ashraf Ganie, Professor of Endocrinology & Metabolism, SKIMS Soura has expressed gratitude to all those people who offered their condolences on the demise of his beloved mother

Mtr Taja Begum

**W/o Late Mohammad Shaban Ganie
of Dangarpora, Shadimarg,**

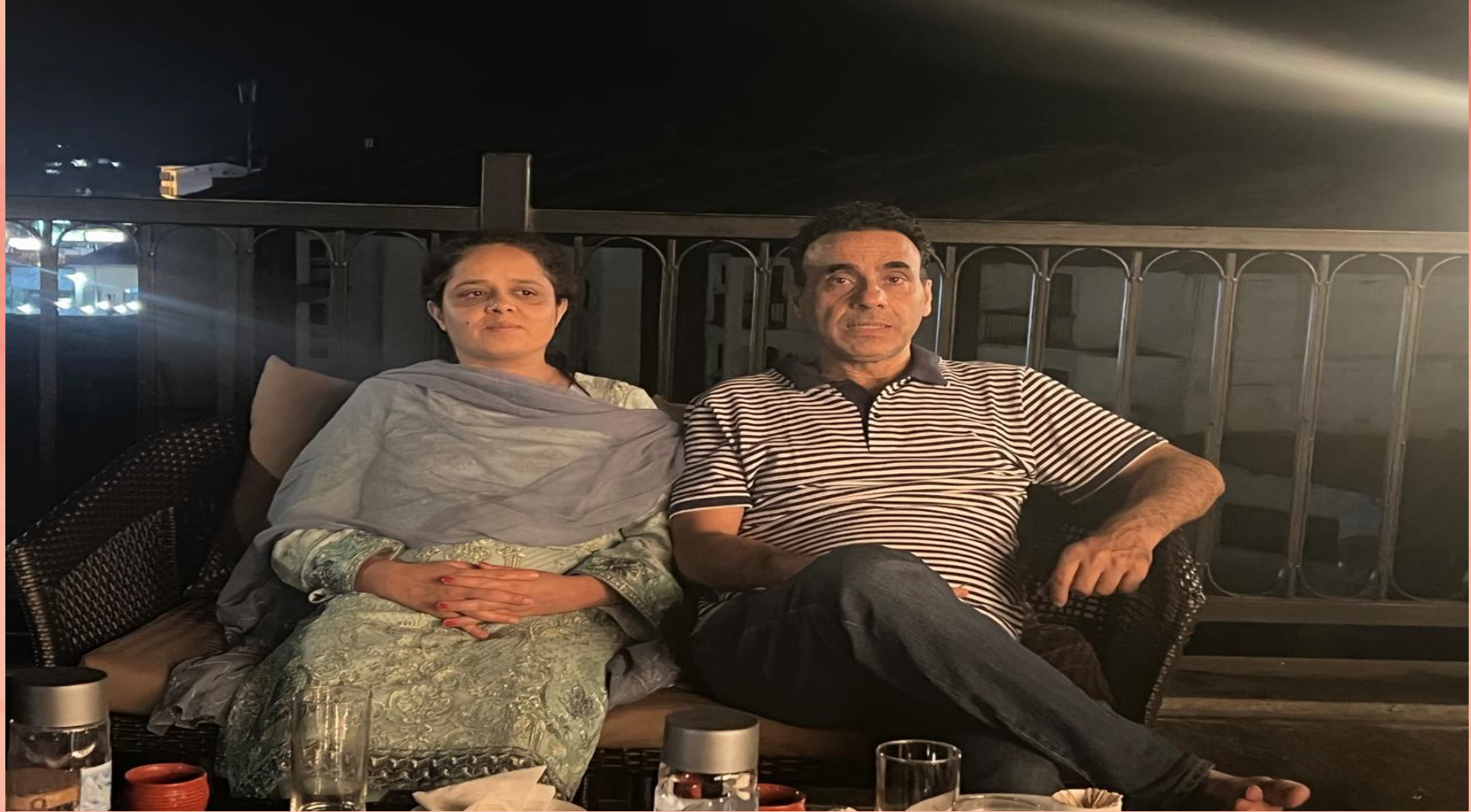
who passed away on 16th November 2023 and was laid to rest at her ancestral graveyard at Dangarpora on 17th November 2023.

“Our family expresses sincere gratitude especially to our neighbours and the inhabitants of Dangarpora, Shadimarg and its surrounding areas for reaching out and standing by to us in this moment of grief,” Dr Ashraf said.

I am also grateful to people from all walks of life, my neighbours at Al-Farooq Colony, Sanatnagar, my friends, colleagues and faculty at SKIMS, my former colleagues and faculty at AIIMS New Delhi, members of Endocrine Society of India, ITS, RSSDI, MPCOS Society and investigators of various ongoing research networks and the whole medical fraternity for offering their condolences by personally visiting our residence or reaching out to us telephonically, he said.

**We request all to remember our
beloved mother in their prayers, he said.**



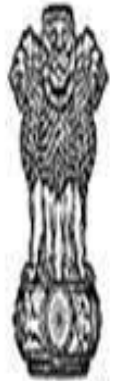




शरीरमाते खलु धर्मस्यजन्म्

AIIMS

All India Institute Of Medical Sciences



सत्यमेव जयते

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Department of
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DIABETES-A GLOBAL EPIDEMIC

- **~537 million adults (20–79 years)** worldwide are living with diabetes

- **By 2030: ~589 million** adults projected to have diabetes

- **By 2045: ~853 million** adults projected to have diabetes

- This reflects an **increase of ~59%** over the next two decades

- **~1 in 9 adults** globally are living with diabetes (*updated from 1 in 10*)
- **~75% of people with diabetes** live in low- and middle-income countries
- Diabetes remains one of the **fastest-growing global public health challenges**

NATIONAL PICTURE

- **~89–90 million adults (20–79 years)** in India are living with diabetes (2024)
- India ranks **2nd globally** in diabetes burden after China
- **Prevalence: ~10.5%** among adults
- **Approximately 1 in 7 people with diabetes globally is from India**

Concern

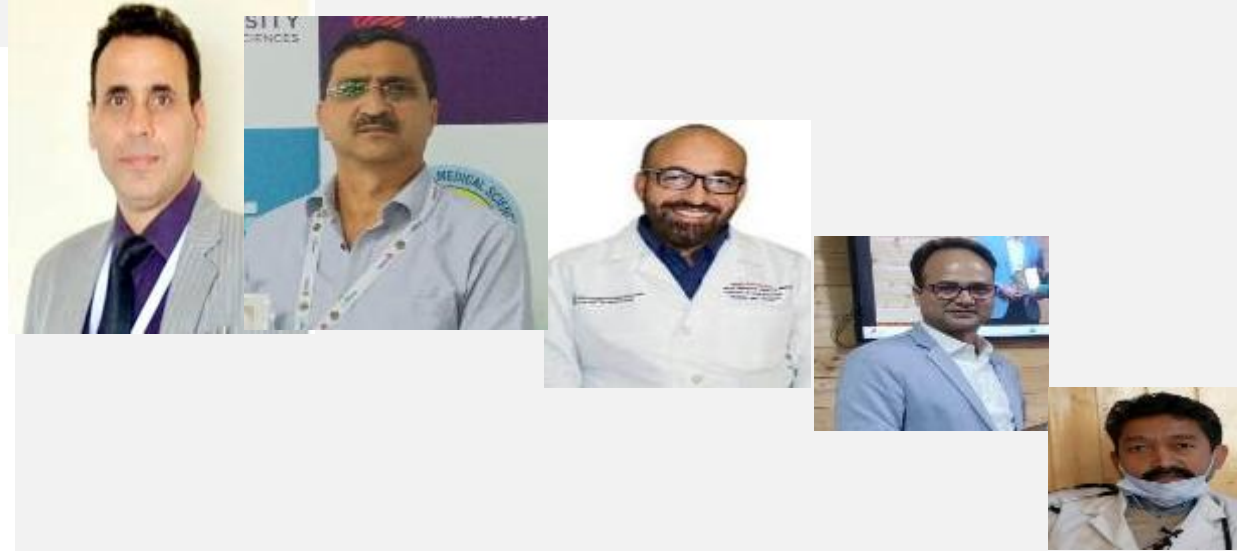
- ✓ **~43% remain undiagnosed** → major hidden burden
- ✓ **Rapid rise in prediabetes (~100+ million)** population
- ✓ **Increasing incidence in younger age groups & urban populations**

NATIONAL INDIAB INITIATIVE

ICMR- INDIA DIABETES [INDIAB] STUDY-PAN INDIA STUDY UNION TERRITORY (UT) COMPONENT KASHMIR & LADAKH

**National Study Coordinator &
Principal Investigator [MDRF]**

: Dr. V. Mohan



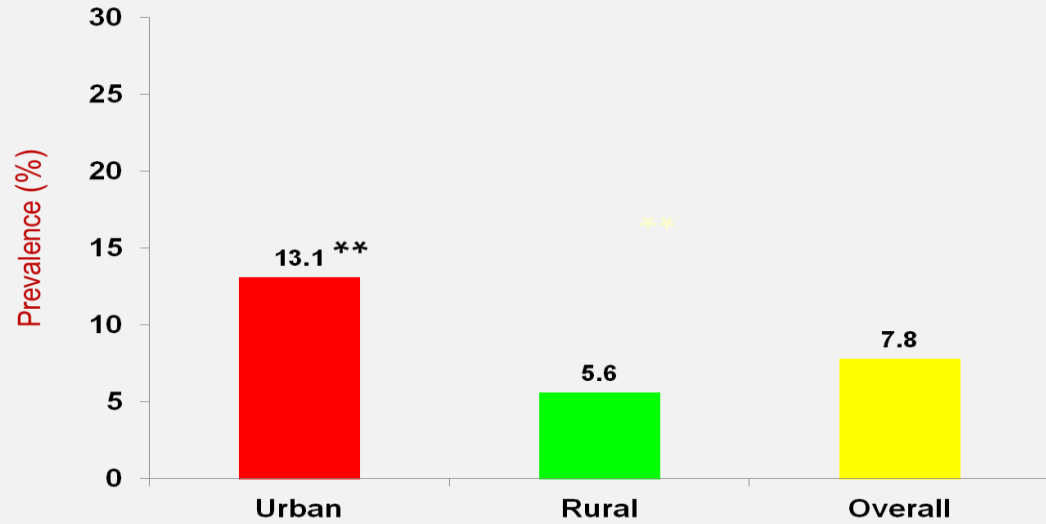
**State Principal Investigators [ROI]
(In alphabetical order of States)**

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: Dr. Ajay Kumar [Bihar]
: **Dr. Mohd Ashraf Ganie [Jammu & Kashmir]**
: Dr. Kalpana Dash [Chhattisgarh]
: Dr. Nikhil Tandon [Delhi]
: Dr. Ankush Desai [Goa]
: Dr. Banshi Saboo [Gujarat]
: Dr. Sanjay Kalra [Haryana]
: Dr. S.S. Kaushal [Himachal Pradesh]
: Dr. Mohd Ashraf Ganie [Jammu & Kashmir]
: Dr. Prabha Adhikari [Karnataka]
: Dr. P.K. Jabbar [Kerala]
: Dr. Sunil M Jain [Madhya Pradesh]
: Dr. Sidhartha Das [Odisha]
: Dr. Anil J Purty [Puducherry]
: Dr. Anil Bhansali [Punjab]
: Dr. Arvind Gupta [Rajasthan]
: Dr. Saurabh Srivatsava [Uttarakhand]
: Dr. Sarita Bajaj [Uttar Pradesh]
: Dr. D. Maji [West Bengal]



✓ **To determine the prevalence of diabetes mellitus and prediabetes in urban areas and rural areas of the UT's of India**

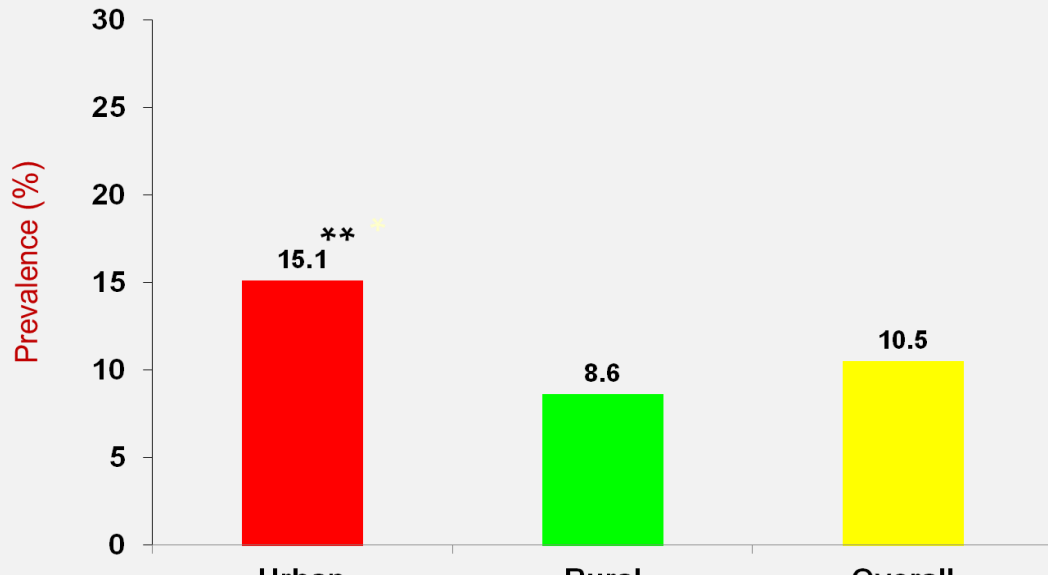
Weighted Prevalence of Diabetes in the Study Population in Kashmir & Ladakh



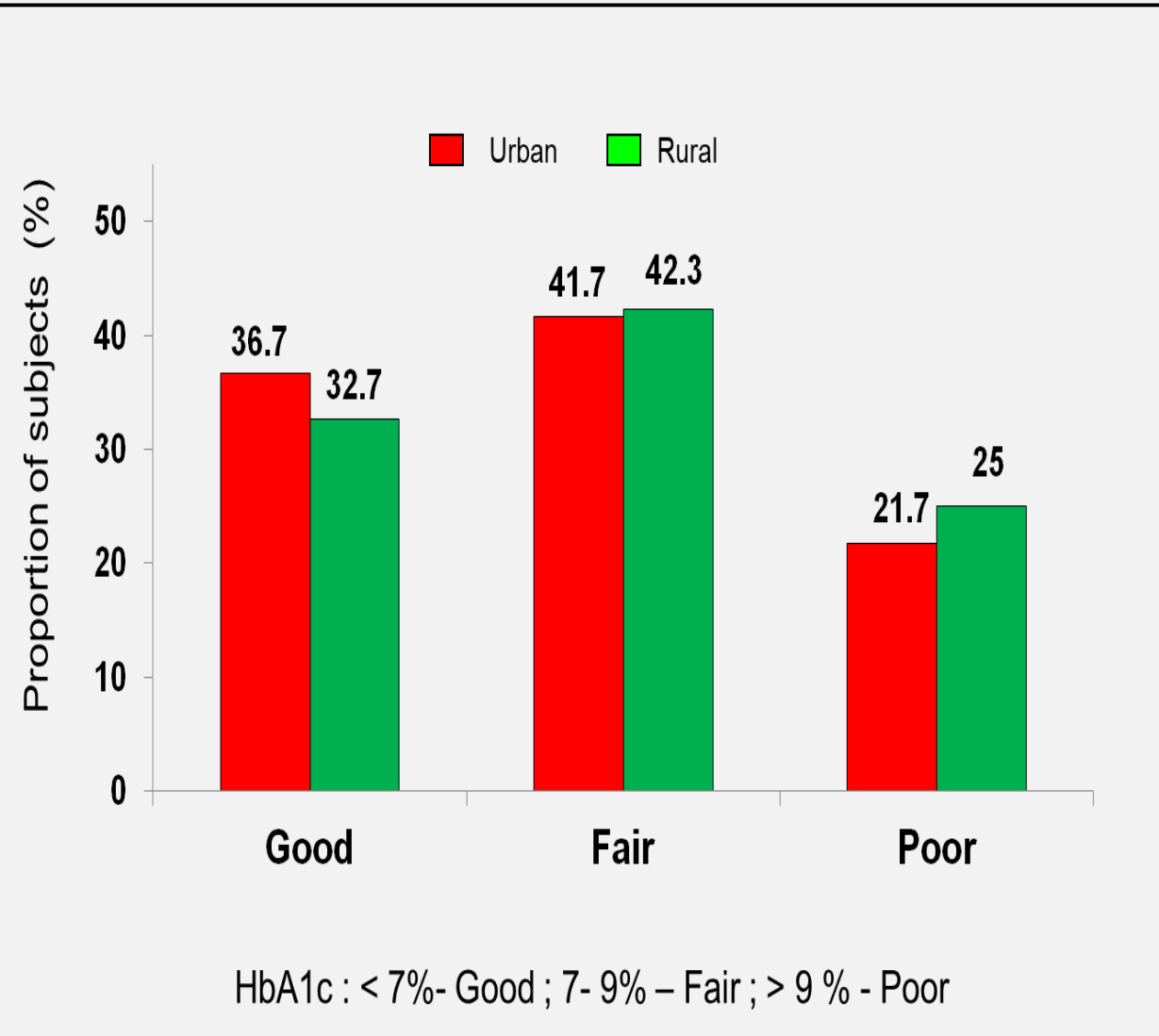
** p<0.001

Diabetes: Self-reported or fasting capillary blood glucose (CBG) ≥ 126 mg/dL or 2-h CBG ≥ 220 mg/dL

Weighted Prevalence of Prediabetes In The Study Population In Kashmir & Ladakh



Glycemic Control (HbA1c) Among Participants With Self-reported Diabetes In Kashmir & Ladakh



Glimpse of field activities in Kashmir & Ladakh



Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17)

Ranjit Mohan Anjana, Ranjit Unnikrishnan, Mohan Deeg, Rajendra Prasad, Nikhil Tandon, Ashok Kumar Das, Shashank Joshi, Smita Bhatia, Poojyavathi Kattayam Jobar, Harjota Kumar Das, Ajay Kumar, Vinay Kumar Chandharia, Anil Bhargava, Pawan Vatsanpraja Rao, Anoush Das, Sanjay Katar, Arvind Gupta, Ramakrishna Lakshmy, Sri Vanitha Madhu, Nimol Elangovan, Subhanika Choudhury, Ulaganathan Venkatesan, Radhakrishnan Subesarth, Tanvir Kaur, Rajinder Singh Dhillon, Vinayathar Mahan, for the ICMR-INDIAB Collaborative Study Group*

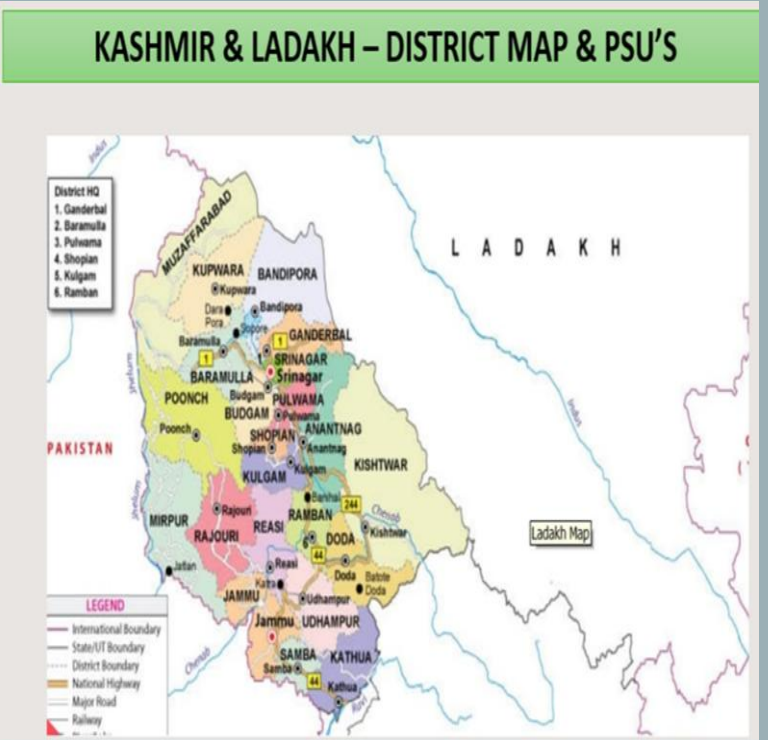
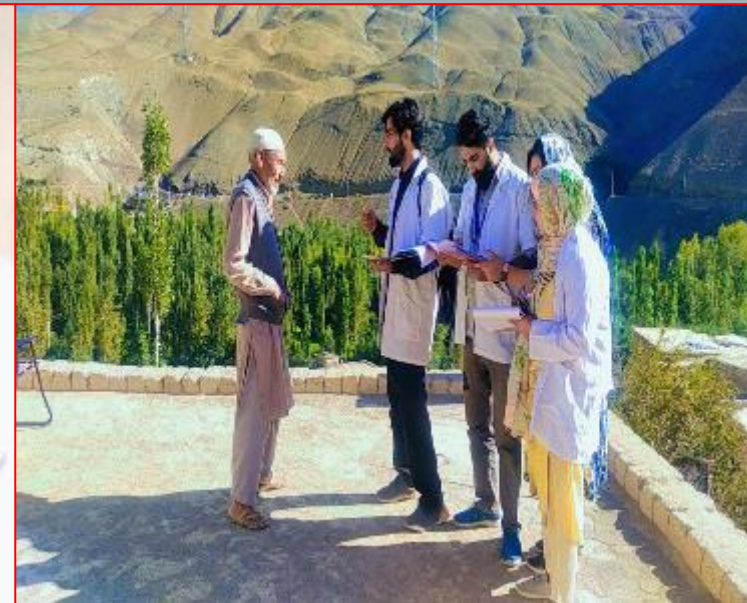
Summary

Lancet Diabetes Endocrinol
2022; 11: 474-89
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[https://doi.org/10.1016/S2213-8587\(22\)00133-5](https://doi.org/10.1016/S2213-8587(22)00133-5)
See Comment page 444

*Correspondence: listed on the end of the Article
Department of Diabetology, Madras Diabetes Research Foundation and Dr Manjunath Diabetes Centre, Chennai, India

Background: Non-communicable disease (NCD) rates are rapidly increasing in India with wide regional variations. We aimed to quantify the prevalence of metabolic NCDs in India and analyse interstate and inter-regional variations.

Methods: The Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study, a cross-sectional population-based survey, assessed a representative sample of individuals aged 20 years and older drawn from urban and rural areas of 31 states, union territories, and the National Capital Territory of India. We conducted the survey in multiple phases with a stratified multistage sampling design, using three-level stratification based on geography, population size, and socioeconomic status of each state. Diabetes and prediabetes were diagnosed using the WHO criteria, hypertension using the Eighth Joint National Committee guidelines, obesity (generalised and abdominal) using the WHO Asia Pacific guidelines, and dyslipidaemia using the National Cholesterol Education Program—Adult Treatment Panel III guidelines.



PSUs : 32 Rural & 32 Urban (Total: 64)

ICMR Expert Team Visit for INDIAB Survey



Improving the Health Care Access and Quality in the Context of Achieving Universal Health Coverage (UHC) among Scheduled Tribes: An Implementation Research

National Task Force Project

Institute and Principal Investigator

Andhra Pradesh: Visakhapatnam	Prof. Y.S. Kusuma, AIIMS, New Delhi
Assam: Kokrajhar	Miss. Preety Rekha Rajbangshi, PHFI, Delhi
Gujarat: Valsad	Dr. K.G. Kumar Varia, GMERS Med College, Valsad
Jammu & Kashmir: Srinagar	Prof. Mohd Ashraf Ganie, SKIMS, Srinagar
Karnataka: Chitradurg	Dr. Raju Sarala, IHMR, Bangalore
Madhya Pradesh: Sheopur	Dr. Dinesh Kumar, ICMR-NIRTH, Jabalpur
Maharashtra: Nagpur	Dr. S. Kalaiselvi, AIIMS, Nagpur
Odisha: Rayagada	Dr. Sanghamitra Pati, ICMR-RMRC, Bhubaneswar
Rajasthan: Karauli	Prof. Nutan Jain, IIHMR University, Jaipur
Uttarakhand: Tehri-Garhwal	Dr. Rajesh Singh, GCDW, Chamba, UK

Prevalence of diabetes and prediabetes in tribal population of Kashmir: Lessons for the future

Mohd Ashraf Ganie ¹, Tajali Sahar ², Aafia Rashid ², Mohd Saleem Baba ², Nisar Ahmad ², Hilal Bhat ², Imtiyaz Ahmad Wani ², Zafar Amin Shah ³

Affiliations + expand

PMID: 32979420 DOI: 10.1016/j.diabres.2020.108457

Abstract

Aims: Considering a surge in the incidence of Diabetes mellitus (DM) across all ethnic groups and lack of any representative data from the tribal communities of Jammu and Kashmir, the present study aimed to assess the prevalence of DM and prediabetes in them.

Methods: Subjects were recruited from five districts of Kashmir valley using multistage cluster sampling by probability proportional to size (PPS) technique. Data collection included recording of socio-demographic, medical facts, assessment of anthropometric parameters and biochemical evaluation HbA1c and random blood glucose measurements as per the American Diabetes Association (ADA) criteria were used for diagnosis of DM.

Results: A total of 6808 subjects were recruited in this study including 2872 (42%) men and 3936 (58%) women with mean age of 39.60 ± 20.19 years and 35.17 ± 16.70 years, respectively. Around 8.60% subjects were obese, 38.9% were found to be hypertensive, 73% had dyslipidemia and 3.75% had metabolic syndrome. About 1.26% (0.5% males and 0.9% females) had DM and 11.64% had prediabetes based on HbA1c cut offs. Increasing age, body mass index and family history portend significant risk factors while smoking and sedentary lifestyle increased the risk marginally.

Conclusions: Although the prevalence of DM among tribals of Kashmir valley is lower than general population, the higher prediabetes to DM ratio may indicate a future trend of increasing DM prevalence in this disadvantageous subpopulation.

Keywords: Diabetes mellitus; Glucose intolerance; HbA1c; Kashmir; Prediabetes; Tribal population.

Obesity : 8.6 %

Hypertension : 38.9 %

Metabolic syndrome :3.75%

Prediabetes : 11.64 %

Diabetes: 1.26 %

> *J Diabetes Metab Disord.* 2022 May 17;21(1):769-776. doi: 10.1007/s40200-022-01050-y.
eCollection 2022 Jun.

Family history of menstrual irregularity or diabetes mellitus enhances the susceptibility to polycystic ovary syndrome among subjects harboring rs7903146 genetic variant of *TCF7L2*

Rabiya Rashid^{1 2 3}, Idrees A Shah², Mir M Asrar², Meena Godha¹, Bashir A Ganai⁴,
Mohd Ashraf Ganie^{2 3}

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PMID: 35673429 PMID: PMC9167401 (available on 2023-05-17)

DOI: 10.1007/s40200-022-01050-y

Abstract

Purpose: *TCF7L2* mediated Wnt signaling cascade regulates glucose homeostasis by orchestrating expression, processing, and hepatic clearance of insulin. Type 2 diabetes mellitus (T2DM) and polycystic ovary syndrome (PCOS) significantly overlap in pathophysiological features with insulin resistance as a central driver. While *TCF7L2* is the most potent T2DM locus, studies on the association of *TCF7L2* with PCOS are limited and inconclusive. Therefore, in addition to expression profiling, the association of *TCF7L2* polymorphic variant rs7903146 with PCOS was evaluated.

Methods: Using Rotterdam-2003 criteria for the diagnosis, 120 PCOS cases, and 120 age-matched controls were recruited. Subjects underwent clinical, biochemical, and hormonal assessment, followed by genotyping for rs7903146, carried out by PCR-RFLP and *TCF7L2* expression profiling by qRT-PCR. Genotype-phenotype correlation analysis was performed to evaluate any such associations. Odds ratios (ORs) with 95% confidence intervals (95% CIs) were computed by conditional logistic regression.

Results: Higher odds of developing PCOS were observed in the women having a family history (FH) of either T2DM (OR = 3.86, 95% CI: 1.90 - 7.83), hirsutism (OR = 4.74, 95%CI: 1.91 - 17.21) or menstrual irregularities (MI) (OR = 3.07, 95%CI: 1.61 - 8.54). The genotypes of rs7903146 did not confer any risk for developing PCOS (OR = 0.46;95%CI: 0.15 - 2.03). However, the elevated risk was seen in the subjects who harbored the variant allele and had FH of either T2DM (OR = 6.71; 95%CI: 1.89 - 23.78) or MI (OR = 9.71; 95% CI:1.89 - 23.78).

Conclusion: *TCF7L2* polymorphic variant rs7903146 is not independently linked to PCOS risk, but modulates the risk in the subjects having a family history of either T2DM or MI.



From Community Screening to National Genomic Missions:

**Strengthening Maternal, Newborn, and NCD
Care through DBT-UMMID and DBT-SAHAJ
at SKIMS**



Sher-I-Kashmir Institute of Medical Sciences Srinagar

Principal Investigator: Prof. Mohd Ashraf Ganie, Professor Department of Endocrinology SKIMS, Srinagar

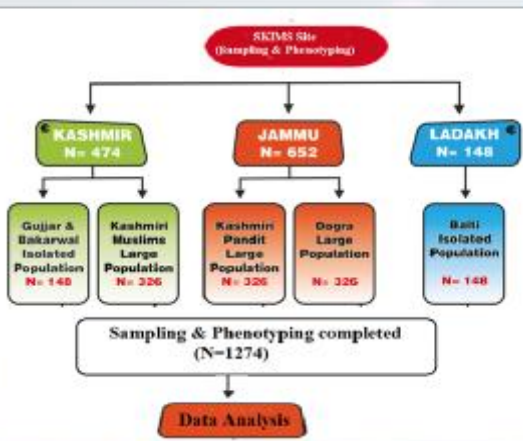
Co-Investigators: Prof. Bashir Ahmad Charoo, Professor & Head Department of Neonatology & Paediatrics, SKIMS, Srinagar Dr. Mahrukh Hameed Zargar, Associate Professor, Advanced Centre for Human Genetics, SKIMS, Srinagar

Contributors: Dr. Imtiaz Ahmad Wani, Scientist D, Department of Endocrinology SKIMS Srinagar, Research staff

Role of the Institution in the GenomeIndia Project: Sher-I-Kashmir Institute of Medical Sciences, (SKIMS), Srinagar has a role of sampling and phenotyping of five ethnic groups from Jammu, Kashmir and Ladakh divisions of UT of Jammu and Kashmir. The ethnic groups include Kashmiri Muslims, Kashmir Pandits, Gujjar-Bakarwal and **Baltis**.

Accomplishments and Outcomes

The SKIMS site has completed its target of sampling and phenotyping **is as:** Kashmir Pandits (N=326); Kashmir Muslims (326); Dogra (326); Gujjar-Bakarwal (148) and Baltis (148). Personal information, socio-demographic details and other relevant information has been captured as per the approved questionnaire. All the subjects are done with laboratory tests and samples were shipped to IGIB, Delhi and CBR Bangalore for sequencing and Biobanking respectively.



Tasks accomplished by the SKIMS team



Sample collection by the SKIMS team

GenomeINDIA



Genomics Data Conclave: Release of GenomeIndia Data




Mapping genetic diversity with the GenomeIndia project

[Chandrika Bhattacharyya](#), [Krithika Subramanian](#), [Bharathram Uppili](#), [Nidhan K. Biswas](#), [Shweta Ramdas](#), [Karthik Bharadwaj Tallapaka](#), [Prathima Arvind](#), [Khader Valli Rupanagudi](#), [Arindam Maitra](#), [Tulasi Nagabandi](#), [Tiyasha De](#), [Kuldeep Singh](#), [Praveen Sharma](#), [Nanaocha Sharma](#), [Sunil K. Raghav](#), [Punit Prasad](#), [E. V. Soniya](#), [Abdul Jaleel](#), [Shijulal Nelson Sathi](#), [Madhvi Joshi](#), [Chaitanya Joshi](#), [Mayurika Lahiri](#), [Santosh Dixit](#), [L. S. Shashidhara](#), [Nachimuthu Senthil Kumar](#), [H. Lalhruaitluanga](#), [Lal Nundanga](#), [Venkataram Shivakumar](#), [Ganesan Venkatasubramanian](#), [Naren P. Rao](#), [Mohd Ashraf Ganie](#), [Imtiyaz Ahmad Wani](#), [Ganganath Jha](#), [Ashwin Dalal](#), [Murali Dharan Bashyam](#), [Pritish Kumar Varadwaj](#), [Sanjeev BS](#), [Yogesh Simmhan](#), [Chirag Jain](#), [Durai Sundar](#), [Ishaan Gupta](#), [Pankaj Yadav](#), [Himanshu Sinha](#), [Manikandan Narayanan](#), [Karthik Raman](#), [Raghu Padinjat](#), [Radhakrishnan Sabarinathan](#), [GenomeIndia Consortium](#), [Yadati Narahari](#), [Vijayalakshmi Ravindranath](#), [Kumarasamy Thangaraj](#) , [Divya Tej Sowpati](#) , [Mohammed Faruq](#) , [Analabha Basu](#)  & [Bratati Kahali](#) 

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An Atlas of Indian Genetic Diversity

 [Krithika Subramanian](#),  [Chandrika Bhattacharyya](#), [Pratheusa Machha](#), [Ankit Mukherjee](#), [Devashish Tripathi](#),  [Shreya Chakraborty](#),  [Sauma Suvra Majumdar](#),  [Shouvanik Sengupta](#),  [Priyanka Singh](#), [Vinay More](#), [Shreya Bari](#), [MS Sreelekshmi](#),  [Eric Macwan](#),  [Debasrija Mondal](#), [Arghya Dey](#), [Haya Afreen](#),  [Siddhi P Jani](#), [Payel Mukherjee](#), [Neha Singh](#), [Tiyasha De](#), [Pooja Sharma](#), [Bharathram Uppili](#),  [Arindam Maitra](#),  [Kuldeep Singh](#),  [Praveen Sharma](#),  [Nanaocha Sharma](#),  [Sunil K. Raghav](#),  [Punit Prasad](#),  [E.V. Soniya](#),  [Abdul Jaleel](#),  [M Radhakrishna Pillai](#),  [Shijulal Nelson Sathi](#),  [Madhvi Joshi](#),  [Chaitanya Joshi](#),  [Mayurika Lahiri](#), [Santosh Dixit](#), [L. S. Shashidhara](#),  [Nachimuthu Senthil Kumar](#),  [H. Lalhruaitluanga](#),  [Lal Nundanga](#), [Venkataram Shivakumar](#), [Ganesan Venkatasubramanian](#), [Naren P. Rao](#),  [Mohd Ashraf Ganie](#),  [Imtiyaz Ahmad Wani](#), [Ganganath Jha](#),  [Ashwin Dalal](#),  [Murali Dharan Bashyam](#),  [Pritish Kumar Varadwaj](#),  [BS Sanjeev](#),  [Yogesh Simmhan](#),  [Chirag Jain](#),  [Arun Kumar](#),  [Durai Sundar](#),  [Ishaan Gupta](#),  [Pankaj Yadav](#),  [Manikandan Narayanan](#),  [Karthik Raman](#),  [Padinjat Raghu](#),  [Radhakrishnan Sabarinathan](#), [Sridhar Sivasubbu](#), [Vinod Scaria](#), [GenomeIndia Consortium](#),  [Prathima Arvind](#), [Suman K Paine](#), [Tulasi Nagabandi](#),  [Khader Valli Rupanagudi](#),  [Himanshu Sinha](#), [Nidhan K. Biswas](#),  [Shweta Ramdas](#), [Karthik Bharadwaj Tallapaka](#), [Vijayalakshmi Ravindranath](#), [Yadati Narahari](#), [Kumarasamy Thangaraj](#),  [Divya Tej Sowpati](#), [Mohammed Faruq](#),  [Bratati Kahali](#),  [Analabha Basu](#)

Capturing India's phenotypic diversity: Health insights from the GenomeIndia project

[Debasrija Mondal](#), [Chandrika Bhattacharyya](#), [Dolat S Shekhawat](#), [Nayan G Tada](#), [Tanuja Rajjal](#), [Arun Sree Parameswaran](#), [Deepak Jena](#), [Sudeshna Datta](#), [Mamuni Swain](#), [Sudarshan Jena](#), [Adyasha Mishra](#), [Soumendu Mahapatra](#), [Shijulal Nelson Sathi](#), [Mahabub Alam](#), [Azad Ali](#), [Parveena Choudhury](#), [Poulomi Ghosh](#), [Devashish Tripathi](#), [Shobha Anilkumar](#), [Divakar Ashwath](#), [Mohana Chithimmaiah](#), [Shafeeq K Shahul Hameed](#), [Rajesh Gunasegaran](#), [Neha Singh](#), [G Mala](#), [Tiyasha De](#), [Shahrumi Reza](#), [Ankit Mukherjee](#), [Bhumika Prajapati](#), [Bhagirath Dave](#), [Silvia Yumnam](#), [Kshetrimayum Vimi](#), [Gurumayum Nimesh Sharma](#), [Ajay Malik](#), [Ranjan Jyoti Sarma](#), [Andrew Vanlallawma](#), [Doddaladka Krishnaya Samartha](#), [S G Tejaswini](#), [Paranthaman V Kavya](#), [Sanjay Deshpande](#), [GenomeIndia Consortium](#), [Kuldeep Singh](#), [Praveen Sharma](#), [Sunil K Raghav](#), [Punit Prasad](#), [E V Soniya](#), [Chaitanya Joshi](#), [Madhvi Joshi](#), [Nanaocha Sharma](#), [Santosh Dixit](#), [Mayurika Lahiri](#), [L S Shashidhara](#), [H Lalhruaitluanga](#), [Lal Nundanga](#), [Nachimuthu Senthil Kumar](#), [Ganesan Venkatasubramanian](#), [Naren P Rao](#), [Venkataram Shivakumar](#), [Mohd Ashraf Ganie](#), [Imtiyaz Ahmad Wani](#), [Arindam Maitra](#), [Nidhan K Biswas](#), [Bratati Kahali](#), [Divya Tej Sowpati](#), [Mohammad Faruq](#), [Sridhar Sivasubbu](#), [Vinod Scaria](#), [Yadati Narahari](#), [Kumarasamy Thangaraj](#), [Vijayalakshmi Ravindranath](#), [Prathima Arvind](#), [Abdul Jaleel](#), [Ganganath Jha](#), [Suman Paine](#), [Karthik Bharadwaj Tallapaka](#), [Analabha Basu](#), [Shweta Ramdas](#)

doi: <https://doi.org/10.64898/2026.04.01.26349926>

► JAMMU & KASHMIR

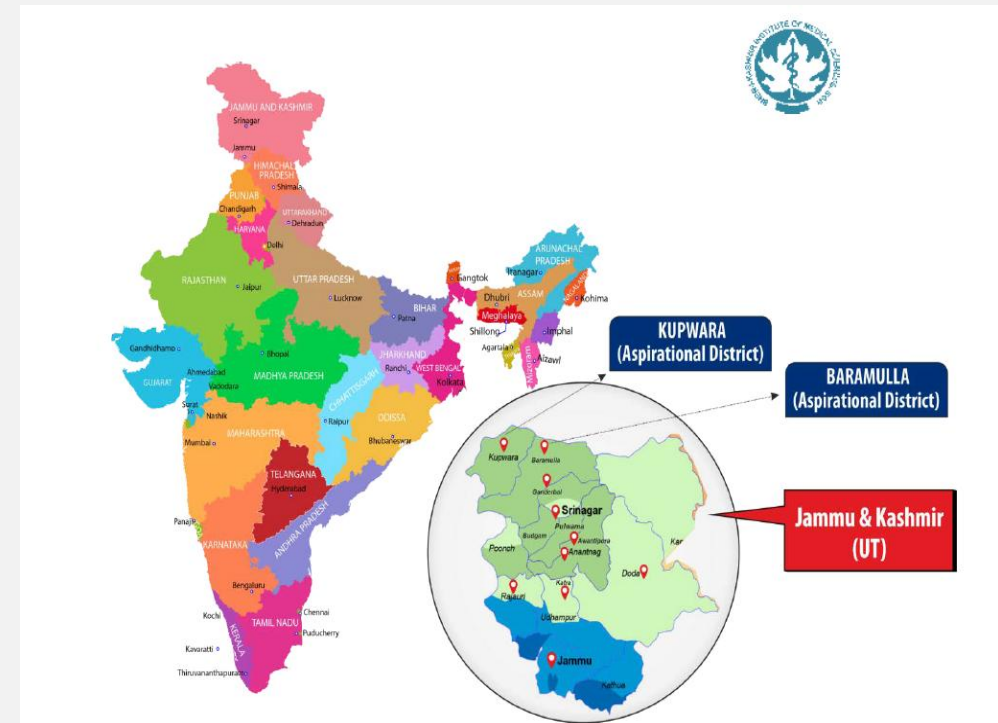
GenomeIndia report maps genetic diversity of India, places J&K within Northern Indo-European cluster

The preprint 'An Atlas of Indian Genetic Diversity' shows J&K population falls squarely within the Indo-European non-tribal (IE_NT) cluster, the dominant group scattered in northern India.

COMPREHENSIVE COMMUNITY ORIENTED SCREENING OF PREGNANT MOTHERS AND NEW BORN BABIES FOR INBORN METABOLIC AND GENETIC DISORDERS ACROSS TWO ASPIRATIONAL DISTRICTS OF JAMMU AND KASHMIR WITH ESTABLISHMENT OF NIDAN KENDRA UNDER DBT-UMMID INITIATIVE



Prof. M Ashraf Ganie
Coordinator



Sponsored By: Department of Biotechnology - New Delhi
Govt. of India

I. To Screen **Pregnant Mothers** for Common Genetic Conditions, including *Thalassemia and Sickle Cell Disease (SCD)* and Perform Genetic Diagnostics for other identified Genetic Disorders.

II. Comprehensive **Newborn Screening** Program for **Five Inborn Metabolic Errors** across two Aspirational Districts of Jammu and Kashmir.

III. Establishment of **NIDAN Kendra** for Prenatal Testing and Newborn Screening for Genetic and Metabolic Disorders.

Metabolic Disorders screening among New-borns

- Biotinidase Deficiency
- Galactosemia
- G6PD
- Hyperthyroidism
- Congenital Adrenal Hyperplasia

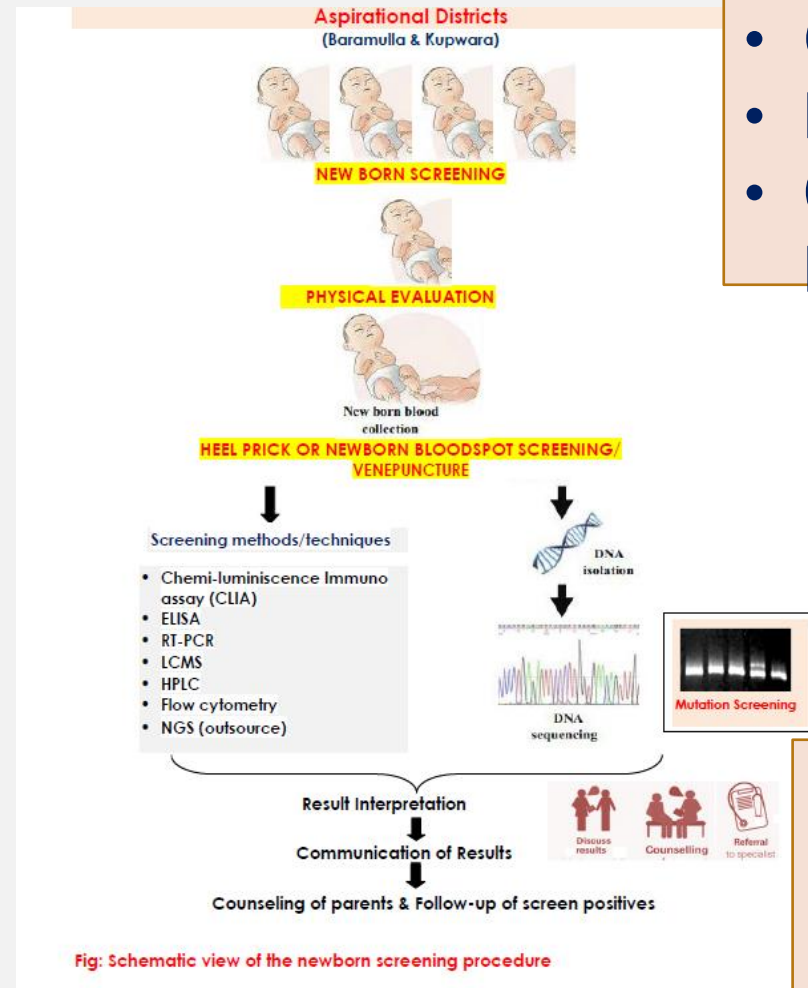
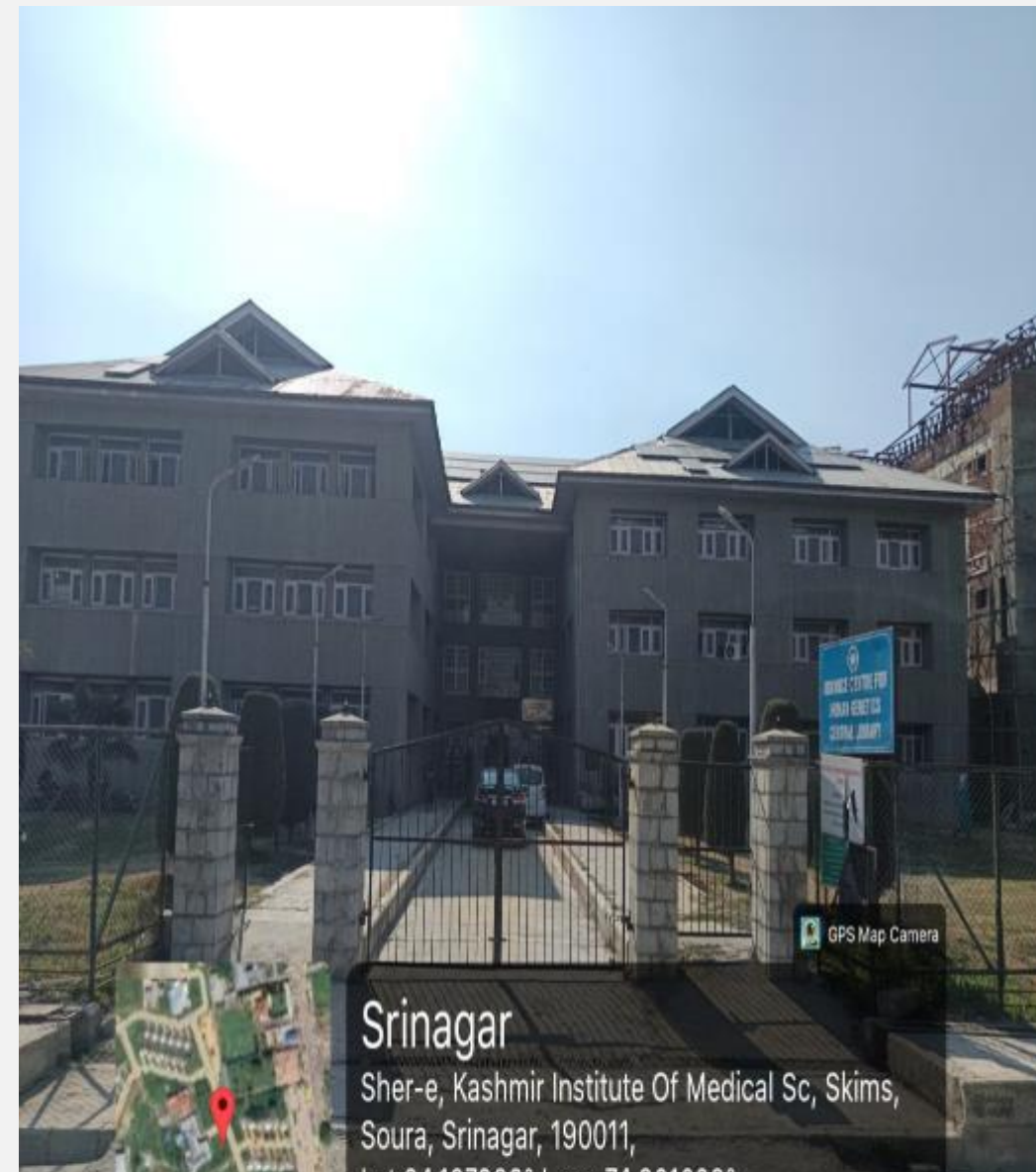


Fig: Schematic view of the newborn screening procedure

Genetic Disorders screening among New-borns

- Spinal Muscular Atrophy
- Downs Syndrome
- Cystic Fibrosis
- Duschene Muscular Dystrophy
- Turners Syndrome

Establishment of NIDAN Kendra under DBT UMMID initiative at SKIMS-Soura





Team of Investigators Lead by Prof. (Dr.) Mohd Ashraf Ganie



Glimpses from Community outreach Medical Camps

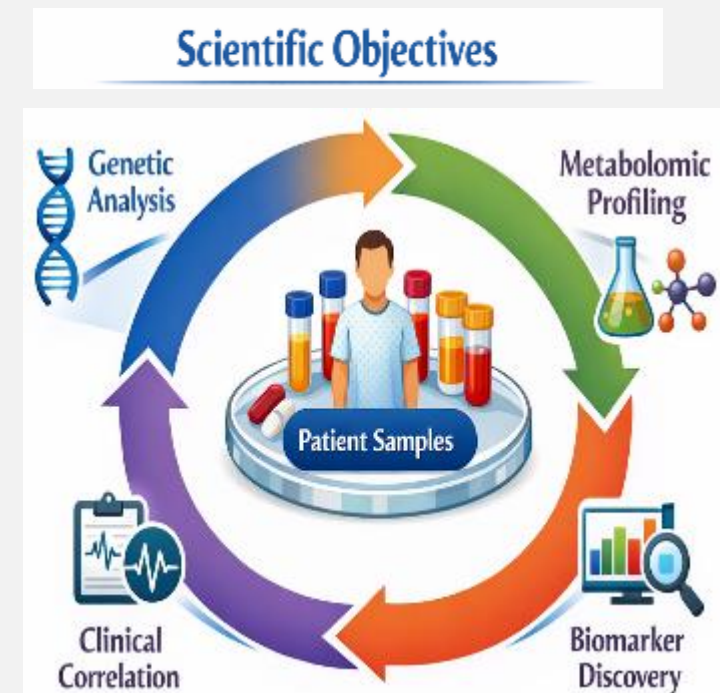


Training of ASHAs & ANMS

Augmentation of advanced technology at SKIMS Srinagar through DBT-SAHAJ Infrastructure Programme

~10 CRORE

S. No.	Objective	Description
1	Strengthening Diagnostic & Research Infrastructure	To augment diagnostic and research capabilities by establishing a high-throughput digital PCR and LC-MS/MS platform at SKIMS
2	Genetic Predisposition Analysis	To investigate the genetic basis of prevalent and locally relevant NCDs, including cancers, acute pancreatitis, diabetes, hypertension, coronary artery disease (CAD), and PCOS , using digital PCR technology.
3	Metabolomic Profiling & Biomarker Discovery	To perform <u>serum and urine metabolomic profiling</u> to identify diagnostic and prognostic biomarkers for selected NCDs and correlate these biomarkers with disease phenotypes and clinical outcomes.





LCMS/MS



Digital PCR

RESEARCH PIPELINE & WORKFLOW



Patient Cohort Recruitment

T2DM / Metabolic Syndrome
Esophageal Cancer (ESCC)
PCOS
Colorectal & Breast Cancer
Acute Pancreatitis / CAD



Sample Collection & Biobanking

- ✓ Blood (Serum/Plasma)
- ✓ Urine Samples
- ✓ Tissue Biopsies
- ✓ Storage at -80°C



Genetic Analysis (dPCR)

- ✓ Rare Mutation Detection
- ✓ Rare Pathway Variation (CNV)
- ✓ SNP Genotyping (5-plex)
- ✓ High-Sensitivity Quantification



Metabolomic Profiling (LC-MS/MS)

- ✓ Targeted & Untargeted Metabolomics
- ✓ Biomarker Quantification (IM sensitivity)
- ✓ Pathway & Network Analysis



Data Integration & Biomarker Discovery

- ✓ Genotype-Phenotype Integration
- ✓ Metabolomic Signatures (identification)
- ✓ Peak Annotation Applications

Key Objectives

- 1 Establish state-of-the-art dPCR & LC-MS/MS platforms at SKIMS MRU
- 2 Characterise genetic predispositions for NCDs in Kashmiri population
- 3 Discover metabolomic biomarkers for diagnosis, prognosis & therapy monitoring
- 4 Develop biobank & comprehensive database (REDCap)
- 5 Build sustainable infrastructure for research, training & diagnostics

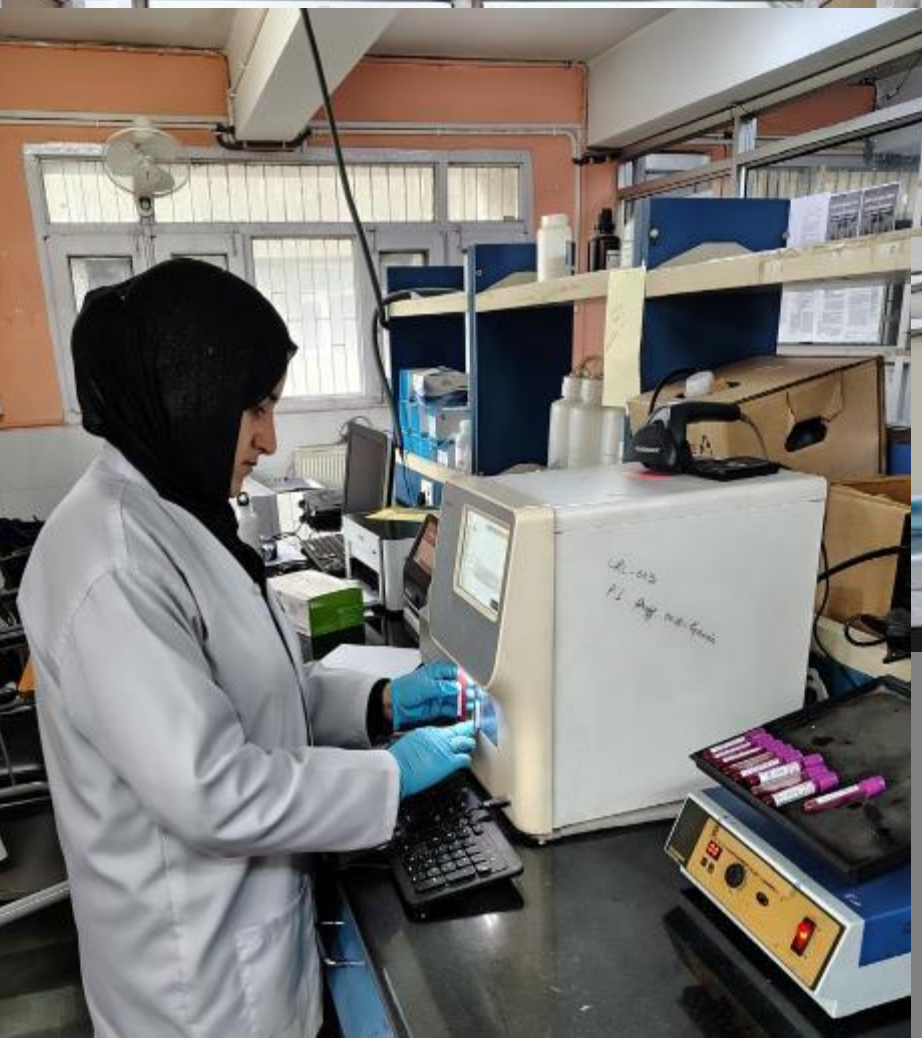
ESTABLISHMENT OF MULTIDISCIPLINARY RESEARCH UNIT

MULTIDISCIPLINARY RESEARCH UNIT (MRU)
under
Department of Health Research (DHR)
Ministry of Health & Family Welfare, GOI, New Delhi

3 Scientists
4 Technical Staff
Workshops
15 intramural/extramural Projects



ESTABLISHMENT OF CLINICAL RESEARCH LABORATORY



- ✓ Trained over 200 scholars and students till date
- ✓ 7 Post Doc. Scientists (Present)
- ✓ Junior Medical Officer
- ✓ 15 Technical Staff
- ✓ Over 15 projects completed (Notably INDIAB, GenomeIndia, PCOS taskforce study, NTF-UHC (Tribal) etc.
- ✓ 7 major projects ongoing

DM Scholars Endocrinology, SKIMS Srinagar



Research Scholars in Clinical Research Lab, SKIMS



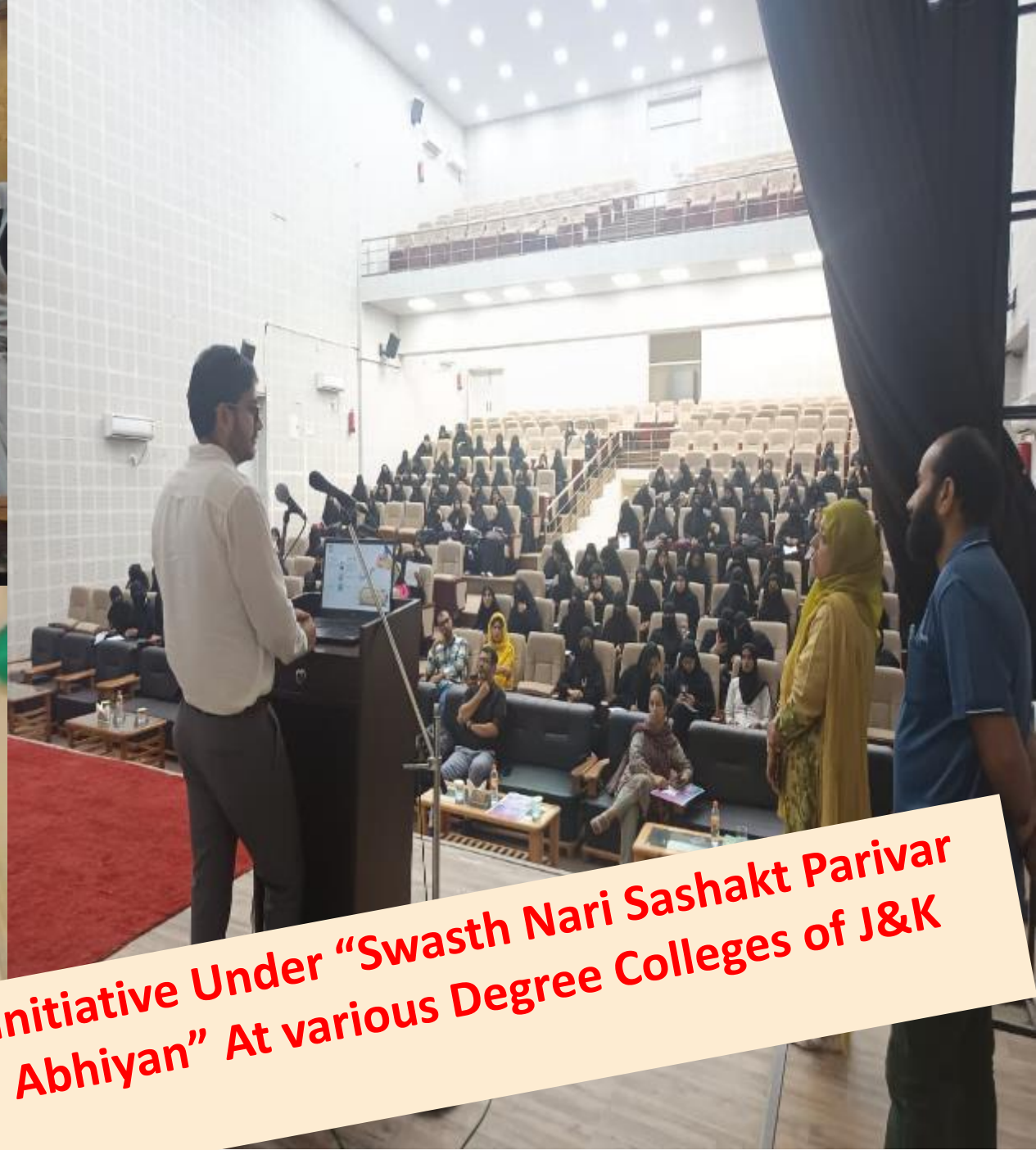
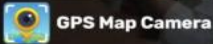


Dr M Ashraf Ganie on ICMR PCOS Task Force study results presented at Research Dissemination Meet



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22/09/2025 12:51 PM GMT +05:30



**Initiative Under "Swasth Nari Sashakt Parivar
Abhiyan" At various Degree Colleges of J&K**



Scientific Contribution in the area of PCOS

Prevalence, phenotypes, and comorbidities of polycystic ovary syndrome among Indian women

MA Ganie, S Chowdhury, N Malhotra, R Sahay, PK Bhattacharya, ...
JAMA Network Open 7 (10), e2440583-e2440583

Diffuse pulmonary hemorrhage as a rare presentation of pheochromocytoma: a case report with review of the literature

A Rasool, MA Ganie, S Modi, D Kandasamy, CS Bal, S Agarwal, T Sahar
The Egyptian Journal of Internal Medicine 36 (1), 80

Public Health System's Preparedness to Address Polycystic Ovarian Syndrome: A Rapid Assessment Survey of Health-care Providers in India (vol 68, pg 180, 2024)

BN Joshi, SA Shaikh, A Shukla, MA Ganie, IA Wani, V Suri, N Malhotra, ...
INDIAN JOURNAL OF PUBLIC HEALTH 68 (3), 471-471

Common Hematological Reference Indices Among Healthy Reproductive Age Indian Women- Data Subset from Nationwide Study

MA Ganie, S Chowdhury, V Suri, B Joshi, PK Bhattacharya, S Agrawal, ...
Indian Journal of Hematology and Blood Transfusion 40 (3), 479-486

Association of *TCF7L2* Gene Variant (rs12255372) with Polycystic Ovary Syndrome and its Effect Modification of the Disease Phenotype

R Rashid, IA Shah, MJ Makhdoomi, A Rashid, M Godha, BA Ganai, ...
Indian Journal of Clinical Biochemistry 39 (3), 373-379

Clinical Perspective and Overview of Spinal Cord Disorders and Cerebellar Ataxias

S Mushtaq, T Bilal, I Khurshid, WM Sheikh, A Khursheed, J Jan, SA Ali
Evidence-Based Neurological Disorders, 229-266

HTA10 Unveiling the Impact of Spironolactone in Women with PCOS: Beyond Its Anti-Androgen Properties-Insights From a Systematic Review and Meta-Analysis

MM Asrar, R Bashir, MA Ganie
Value in Health 27 (6), S245

Unravelling Prevalence and Pattern of Various Hormonal Dysfunctions Among Reproductive Age Community Dwelling Indian Women: Lessons From ICMR PCOS Task Force Sub Study
MA Ganie, P Dutta, MS Ahamed, IA Wani, N Malhotra, PK Jabbar, ...
Clinical Endocrinology

Evaluating spironolactone monotherapy against combined treatment with metformin in rat PCOS model

SM Bashir, SI Ali, MA Rather, WM Sheikh, H Singh, SU Nabi, MA Ganie, ...
European Journal of Pharmacology 998, 177516

RAB5B Gene expression and its association with insulin resistance in women with PCOS
T Arora, K Padder, N Jahan, M Yousuf, GM Ashraf
Endocrine Abstracts 110

Trends of Age at Onset of Menarche Among Indian Women of Reproductive Age and Its Association with the Presence of PCOS and Related Features: A Multicentric Cross Sectional ...

A Shukla, GM Ashraf, V Sudharsan, T Arora, KUI Rather, S Chowdhury, ...
The Journal of Obstetrics and Gynecology of India 75 (Suppl 1), 70-77

Interplay between elevated *RAB5B* gene expression and insulin resistance among women with PCOS-insights from a case-control study

KA Padder, MA Yousuf, N Jahan, SD Yousuf, MA Ganie
Endocrine 88 (1), 323-329

Association of *TCF7L2* genetic variants rs12255372 and rs7903146 with the polycystic ovary syndrome risk: systematic review and meta-analysis

IA Shah, R Rashid, H Rashid, A Bhat, MA Ganie
Journal of ovarian research 18 (1), 2

New Onset Diabetes After COVID 19 (NODAC) is predominantly due to exacerbated Insulin Resistance (IR) rather than beta cell dysfunction: Lessons from tertiary care hospital ...

J Jamwal, A Chhabra, A Qadir, MA Ganie, SM Qadri, A Lone, NN Shah
Endocrine 87 (1), 126-135

Azoospermia factor gene microdeletions in infertile men with non-obstructive azoospermia and normal karyotype: First case-control study from Kashmir

F Ahmad, MH Zargar, M Lateef, A Hussain, TM Malla, MA Ganie, I Qasim, ...
Journal of Inherited Metabolic Disease 45 (1), 103-111

Public Health System's Preparedness to Address Polycystic Ovarian Syndrome: A Rapid Assessment Survey of Health-care Providers in India

BN Joshi, SA Shaikh, A Shukla, MA Ganie, IA Wani, V Suri, N Malhotra, ...
Indian journal of public health 68 (2), 180-188

Inter-relationship between PCOS, insulin resistance, and metabolic syndrome
W. Mushtaq, T. Bilal, I. Khurshid, W. M. Sheikh, A. Khurshid, J. Jan, S. A. Ali
Journal of Inherited Metabolic Disease 45 (1), 103-111

Pre-polycystic ovary syndrome and polymenorrhoea as new facets of polycystic ovary syndrome (PCOS): Evidences from a single centre data set

MA Ganie, A Rashid, MS Baba, MA Zargar, IA Wani, S Nisar, IA Wani, ...
Clinical Endocrinology 99 (6), 566-578

Efficacy of serum anti-mullerian hormone (AMH) levels for prediction of polycystic ovary syndrome (PCOS) and its association with clinical, biochemical and hormonal parameters

S Sumji, A Bhat, A Rashid, R Bashir, IA Wani, V Vasudevan, T Sehar, ...
Indian Journal of Clinical Biochemistry 38 (4), 457-465

Prevalence, regional variations, and predictors of overweight, obesity, and hypertension among healthy reproductive-age Indian women: nationwide cross-sectional polycystic ...
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Evaluation of the Prevalence, Regional Phenotypic Variation, Comorbidities, Risk Factors, and Variations in Response to Different Therapeutic Modalities Among Indian Women: Proposal for the Indian Council of Medical Research–Polycystic Ovary Syndrome (ICMR–PCOS) Study

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Original Investigation | Diabetes and Endocrinology

Prevalence, Phenotypes, and Comorbidities of Polycystic Ovary Syndrome Among Indian Women

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Abstract

IMPORTANCE The prevalence of polycystic ovary syndrome (PCOS) varies across the globe. Indian studies on PCOS are limited by poor design, small sizes, regional representations, and varying methods.

OBJECTIVES To estimate the nationwide prevalence of PCOS in India, examine the phenotypic spectrum, and assess the magnitude of comorbidities associated with PCOS.

DESIGN, SETTING, AND PARTICIPANTS This cross-sectional study recruited 9824 women aged 18 to 40 years from November 1, 2018, to July 31, 2022, across 5 zones of the country. A prevalidated questionnaire dichotomized women into screen-positive and screen-negative groups. Relevant clinical, hormonal, and sonographic assessments categorized women as either women with criteria-based PCOS (ie, National Institutes of Health [NIH] 1990 criteria, Rotterdam 2003 criteria, or Androgen Excess and Polycystic Ovary Syndrome Society [AE-PCOS] criteria), women with partial phenotypes (hyperandrogenism, oligomenorrhea, or polycystic morphology labeled as pre-PCOS), or healthy women, in addition to quantitating various comorbidities.

MAIN OUTCOMES AND MEASURES The prevalence and phenotypes of PCOS among women of

Key Points

Question What is the prevalence, variation of phenotypes, and comorbidities associated with polycystic ovary syndrome (PCOS) in India?

Findings In this cross-sectional study of 9824 women aged 18 to 40 years, the weighted national prevalences of PCOS by the National Institutes of Health 1990 and Rotterdam 2003 criteria were 7.2% and 19.6%, respectively, and PCOS phenotype C was the most prevalent (40.8%). Among women with PCOS, 43.2% had obesity, 91.9% had dyslipidemia, 32.9% had nonalcoholic fatty liver disease, 24.9% had metabolic syndrome, 3.4% had diabetes, and 8.3% had hypertension.

Normative range of various serum hormonal parameters among Indian women of reproductive age: ICMR-PCOS task force study outcome

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Summary

Background The hormonal profile varies considerably with age, gender, ethnicity, diet or physiological state of an individual. Limited population-specific studies have studied the variations in hormonal parameters among apparently healthy women. We aimed to analyse the biological reference interval for various hormonal parameters in the reproductive-aged healthy Indian women.

- ✓ Early Disease diagnosis, management and treatment
- ✓ Access to expertise and cutting-edge technology
- ✓ Informs evidence-based policy-making

The study establishes population-specific normative ranges for hormonal parameters among Indian women providing a critical

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Prevalence, Regional Variations, and Predictors of Overweight, Obesity, and Hypertension Among Healthy Reproductive-Age Indian Women: Nationwide Cross-Sectional Polycystic Ovary Syndrome Task Force Study

Mohd Ashraf Ganie¹; Subhankar Chowdhury²; Vanita Suri³; Beena Joshi⁴; Prasanta Kumar Bhattacharya⁵; Sarita Agrawal⁶; Neena Malhotra⁷; Rakesh Sahay⁸; Puthiyaveetil Khadar Jabbar⁹; Roya Rozati¹⁰; Imtiyaz Ahmad Wani¹; Amlin Shukla¹¹; Taruna Arora¹¹; Haroon Rashid¹

Common Hematological Reference Indices Among Healthy Reproductive Age Indian Women-Data Subset from Nationwide Study

Mohd Ashraf Ganie^{# 1}, Subhankar Chowdhury^{# 2}, Vanita Suri^{# 3}, Beena Joshi^{# 4}, Prasanta Kumar Bhattacharya^{# 5}, Sarita Agrawal^{# 6}, Neena Malhotra^{# 7}, Rakesh Sahay^{# 8}, Puthiyaveetil Khadar Jabbar^{# 9}, Roya Rozati^{# 10}, Rohina Bashir^{# 1}, Reshma Roshan^{# 1 11}, Imtiyaz Wani^{# 1}, Haroon Rashid^{# 1}, Gaivee Meshram^{# 6}, Shouvik Choudhury^{# 2}, Amlin Shukla¹², Taruna Arora¹²

Affiliations + expand
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The study establishes standardized hematological reference ranges for healthy reproductive-age Indian women, providing a robust baseline for accurate clinical assessment and research.

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Variation in normative values of major clinical biochemistry analytes in healthy reproductive-age women in India: A subset of data from a National Indian Council of Medical Research-Polycystic Ovary Syndrome task force study

Mohd Ashraf Ganie^{1,*#} Subhankar Chowdhury^{2,#} Vanita Suri^{3,#} Beena Nitin Joshi^{4,#} Prasanta Kumar Bhattacharya^{5,#} Sarita Agarwal^{6,#} Neena Malhotra^{7,#} Rakesh Sahay^{8,#} P. K. Jabbar^{9,#} Roya Rozati^{10,#} Amlin Shukla^{11,#}

Health System's Preparedness to Address Polycystic Ovarian Syndrome: A Rapid Assessment Survey of Health-care Providers in India

Beena Nitin Joshi¹, Sharmeen Akhtar Shaikh², Amlin Shukla³, Mohd Ashraf Ganie⁴, Imtiyaz Ahmad Wani⁵, Vanita Suri⁶, Neena Malhotra⁷, Sarita Agarwal⁸, Subhankar Chowdhury⁹, Prasanta Kumar Bhattacharya¹⁰, Rakesh Kumar Sahay¹¹, Roya Rozati¹², Puthiyaveetil Khadar Jabbar¹³, Abilash Nair¹⁴, Bharti Kulkarni¹⁵, Aafia Rashid¹⁶, Sunny Khajuria¹⁷, Monica Rajput¹⁸, Gaivee Vinam Meshram¹⁸, Shouvik Choudhury¹⁹, Rahul Harish Bamon²⁰, Muhammed Shahid Pasha²¹, Farhana Begum²², Manoj Rema Aravind²³, Taruna Arora²⁴

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My Work in Community & Research Integration

- Dissemination of Research Findings
- Organizing awareness workshops (e.g., PCOS & lifestyle interventions)
- Promoting:
 - Yoga and lifestyle modification
 - Preventive health strategies
- **Bridging:**
 - **Research evidence → Community practice**