Knowledge and Management Practices About Polycystic Ovarian Syndrome Among Health Care Providers in Mumbai, India: A Cross-Sectional Study

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Abstract

Background: Polycystic Ovary Syndrome (PCOS) diagnosis is very complex and due to overlapping presentation of symptoms, women with PCOS may approach various practitioners, who might be using varied definitions to diagnose and manage PCOS.

Objectives: To assess knowledge about PCOS diagnosis and management by Dermatologists, Gynecologists, Endocrinologists and Family Physicians (FPs).

Methods: This cross-sectional study was done among 529 health care providers (HCPs) practicing in Mumbai metropolitan region using a convenient sample. A self-administered pretested questionnaire was filled by the HCPs after obtaining informed consent. Pearson's Chi-square test and Analysis of Variance (ANOVA) was used to study the differences within each group.

Results: All HCPs reported that women with PCOS consulted them with a varied spectrum of symptoms. Among FPs, Allopaths had better knowledge about diagnosis and Homeopaths were more confident about PCOS management. Among Specialists, Endocrinologists were more stringent in diagnosing cases as per defined criteria, along with screening and comprehensive management of the metabolic syndrome. Although the need for multidisciplinary management was perceived, in practice holistic management was not common.

Conclusions: This study reveals the need for training and disseminating algorithms for comprehensive PCOS management across disciplines. It highlights women's preferences in seeking health care for symptom complex of PCOS. These findings would help health policymakers to develop community-based awareness modules and India-specific management guidelines for early screening and a continuum of care for PCOS patients.

Keywords: Polycystic ovary syndrome, healthcare providers, knowledge assessment, practice, management

Conflict of Interest: The authors have no conflicts of interest to declare that are relevant to the content of this manuscript.

Source of Support: This study was conducted as an Intramural project of ICMR-NIRRH and hence there was no sourced funding agency and no financial conflicts.

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Introduction

Polycystic ovary disease (PCOS) is a reproductive endocrine-metabolic disorder affecting women of all ages with multifaceted clinical presentation.[1] The escalating PCOS prevalence is now a public health concern affecting 116 million (3.4%) women worldwide.[2] Studies among young women in India report a 9.13% to 22% prevalence of PCOS.[3,4]

Many women in India are first likely to seek the advice of Family Physicians (FPs) before seeking care from different specialists. Hence, treatment might emphasize one aspect more than others leading to late diagnosis, mismanagement and progression of this important Non-Communicable Disease (NCD). It happens in current modern medicine practice where there is an emphasis on super-specialization often neglecting the holistic care of the patient. India has a pluralistic system of medicine and people often choose indigenous systems of healthcare like Ayurveda, Homeopathy, Unani and Siddha etc. apart from modern medicine.

PCOS diagnosis is very complex and most treatments may remain symptomatic. Knowledge regarding the diagnosis and treatment of PCOS among physicians of different specialties in India has not been studied substantially. This study was therefore undertaken with the objective to understand the knowledge about PCOS diagnosis and management by Dermatologists, Gynecologists, Endocrinologists and FPs. This could also help understand women's preferences in seeking health care, their symptom complex at visits and efforts to address their condition from a multidisciplinary perspective by different Healthcare Providers (HCPs). It could further guide in developing specific training modules and algorithms for uniform diagnosis and management as well as develop awareness modules for the community regarding early screening and continuum of care.

Materials and Methods

After obtaining necessary approvals from Institutional Ethics Committee and seeking informed consent, this cross-sectional study was conducted in Mumbai using convenience sampling among 529 HCPs, of whom three hundred were FPs, 100 each from Allopathy (conventional medicine), Ayurvedic and Homeopathic streams and 229 were Specialists including 100 Gynecologists, 100 Dermatologists and 29 Endocrinologists. They were approached at private clinics, nursing homes, in-hospital settings located in different parts of Mumbai including its suburbs or during a conference or Continuous Medical Education (CME) sessions. The duration of the study was 12 months (2018-2019). The self-administered tools were developed separately for FPs and Specialists and were pretested among 20 doctors for assessing the content, ease of the language used and questions framed. The data was entered and analyzed in SPSS software version 19 (IBM SPSS Statistics for Macintosh, Version 19.0 [Armonk, NY: IBM Corp]). Responses to open-ended questions were categorized and coded. Categorical data were presented as percentages and differences between groups were evaluated using Pearson's Chi-square test. Correct and incorrect answers were coded as 1 and 0, respectively. Composite scores were derived for questions based on knowledge and management practices separately. Questions with multiple responses were also coded in the above manner to derive cumulative scores; with higher scores indicating more appropriate/correct responses. Mean scores were compared between specialties using Analysis of Variance (ANOVA). Results are presented separately for FPs and Specialists.

Results

The mean age of FPs was 45.0 (±13) years, and the mean number of years of practice was 18.0 (±12.4) years (Table 1). Most FPs (around 80%) were in private practice. The mean age of Specialists was 41.5 (±10.9) years and the majority were in private practice for a mean of 13 (±10.5) years. Most Endocrinologists and

Table 1: Demographic characteristic of participants

	General Practitioners (N=300)			Specialists		
	Allopaths N=100	**Ayurveda specialists N=100**	**Homeopaths N=100**	**Endocrinologists (n=29)**	**Dermatologists (n=100)**	**Gynecologists (n=100)**
Age *Mean (±SD)*	53 (±14)	42 (±12)	41 (±9)	43.4 (±9.9)	38.5 (±9.8)	43.9 (±11.7)
Number of practicing years *Mean (±SD)*	26 (±13.2)	16 (±11.2)	15 (±9.2)	13.6 (±11.3)	10.8 (±8.8)	16 (±11.2)
Type of practice						
Private practice	79 (80.6%)	79 (79.8%)	96 (96%)	15 (51.7%)	69 (73.4%)	66 (67.3%)
Institutional	15 (15.5%)	19 (19.2%)	2 (2%)	11 (37.9%)	16 (17%)	29 (29.6%)
Hospital Attachment/	7 (7.2%)	6 (6.1%)	7 (7%)	11 (37.9%)	8 (8.5%)	13 (13.3%)

Gynecologists who practiced in private clinics were also attached to larger hospitals or institutions.

Most of the women who presented to FPs sought treatment for hirsutism, weight gain, acne, infertility and menstrual disorders in descending order.

Only 10.4% of Allopathic practitioners, 8% Ayurvedic practitioners and 5.5% Homeopaths reported that they attended to cases of infertility. The majority of FPs reported that they were consulted by women who also consulted Specialists and had already been diagnosed with PCOS (92% Homeopaths, 82% Allopaths and 79% Ayurvedic).

The highest number of PCOS cases were seen by Dermatologists (47%) followed by Gynecologists (32%) and the lowest percentage consulted Endocrinologists (25%). Overall, in a year, specialists saw a high percentage of persons with the obese phenotype (66% Gynecologists, 60% Dermatologists and 75% Endocrinologists).

Gynecologists reported that women presented to them with menstrual complaints (98%), followed by infertility (56.6%), obesity/ weight gain (49.5%) and hirsutism (40.4%). Dermatologists saw women with complaints of acne (85.4%), hirsutism (79%), weight gain (28%) and irregular menses (27%). Menstrual disorders and hirsutism were the most common complaints (96.4%) reported to Endocrinologists.

Knowledge About PCOS

Among FPs, 35% reported that at least two signs and symptoms are necessary to diagnose a case of PCOS; however, 39% said three signs and symptoms are necessary (Table 2). The majority were aware that PCOS is diagnosed by exclusion and 75% said that they would exclude hypothyroidism. The other most common conditions that they would exclude were drug-induced PCOS (48.3%), hyperprolactinemia (38.3%), pituitary tumors (31%), premature ovarian failure (34%) and adrenal disorders (31%). The most commonly reported investigation was Ultrasonography (USG) (98%) followed by hormonal assays and blood sugar. Hormonal assays were advised more by Homeopaths and blood sugar levels were asked least by Ayurvedic doctors (Table 2).

One-third of practitioners believed PCOS is a hereditary condition and around half considered family history of diabetes mellitus and endocrine disorders to have an association with PCOS. Most of them (>75%) agreed that diet and physical activity have an effect on PCOS and other associated co-morbidities.

Statistically significant differences were found among FPs on questions about exclusion of thyroid disorders (p=0.032), adrenal disorders (p=0.025), assessing dysglycemia, whether they would conduct tests to diagnose blood glucose level (p=0.010), an association of family history with PCOS (p=0.000), role of dietary habits for controlling PCOS (p=0.506) and the need to involve a Dietician (p= 0.930) (Table 2). Allopaths followed by Homeopaths investigated these conditions more than Ayurveda physicians, whereas, lipid profile was advised by only 6% of physicians.

Mean cumulative scores for knowledge-based questions differed significantly among FPs. The maximum possible score of 26 was achieved by only 2.4% of FPs. The lowest achieved score was 11, achieved by another 2.4%. The overall mean score was 18±3. Mean scores varied significantly between groups with Allopaths having the highest mean score among (21±2.5), followed by Homeopaths (18±2.7) and Ayurveda specialists (17±2.9).

Among Specialists, the Majority of the Endocrinologists (77%), two-thirds of Gynecologists (61%) and two-fifths of Dermatologists (46%) correctly answered about diagnostic criteria. A significantly higher percentage (p=0.003) of Gynecologists (38%) and Dermatologists (43%) compared to only 15.4% of Endocrinologists stated that all three signs and symptoms must be considered.

The number of conditions that were ruled out before diagnosing PCOS was highest among Endocrinologists (>89%). In comparison, Gynecologists mainly considered the need to rule out thyroid disorders (88.7%) followed by hyperprolactinemia (78%) and a little less than half (49%) felt the need to rule out adrenal disorders. Among the Dermatologists, 66% reported the need to rule out thyroid disorders and only >40% considered that the other two conditions must be considered. These differences between specialties were statistically significant for each condition.

The cumulative mean score on knowledge about the three most common differential diagnoses (Thyroid dysfunction, hyperprolactinemia, adrenal disorders) was significantly higher for Endocrinologists [3.17 (±1.7)] as compared to Gynecologists [1.29 (±1.7)] and Dermatologists [0.5 (±1.2)] who had the lowest mean scores.

The ultrasonographic investigation was considered important more by Gynecologists (71%) and Dermatologists (83%) than Endocrinologists (41%). Conversely, testosterone measurement was advised by 73% of Endocrinologists but by only <37% Gynecologists and Dermatologists. The majority of

Table 2: Knowledge of diagnosing Polycystic Ovary Syndrome among Healthcare Providers

S. No	Question	Options	Allopaths	Ayurveda specialists	Homeopaths	p-Value
1	How many signs and symptoms are mandatory to diagnose a case of PCOS among the following?	Any One	5 (16.1%)	14 (45.2%)	12 (38.7%)	0.295
		Any Two	34 (33.3%)	32 (31.4%)	36 (35.3%)	
		All the Three	44 (38.9%)	39 (34.5%)	30 (26.5%)	
		Option 2 & 3	14 (31.8%)	14 (31.8%)	16 (36.4%)	
2	What conditions should be excluded before making the diagnosis?	Thyroid	78 (35.9%)	62 (28.6%)	77 (35.5%)	0.032
		Adrenal Disorders	40 (44.4%)	22 (24.4%)	28 (31.1%)	0.025
		Hyperprolactinemia	45 (39.5%)	33 (28.9%)	36 (31.6%)	0.244
3.	Do you get investigations/ Laboratory tests done?	Sonography	96 (33.2%)	94 (32.5%)	99 (34.3%)	0.582
		Hormone assays	84 (35.1%)	78 (32.6%)	77 (32.2%)	0.202
		CBC	69 (34.5%)	62 (31%)	69 (34.5%)	0.194
		Fasting and Post-prandial blood glucose	86 (38.4%)	66 (29.5%)	72 (32.1%)	0.010
4.	Is PCOS hereditary?	Yes	34 (40%)	24 (28.2%)	27 (31.8%)	0.208
5.	Impact of family history of diabetes mellitus and endocrine disorders with respect to PCOS?	Yes	83 (61.9%)	24 (17.9%)	27 (20.1%)	0.000
6.	Is PCOS affected by:	Dietary habits	80 (35.7%)	76 (33.9%)	68 (30.4%)	0.506
		Physical Activity	85 (37.1%)	76 (33.2%)	68 (29.7%)	0.000
7.	Do you feel the need to involve Dietician for wt. management	Yes	93 (34.7%)	86 (32.1%)	89 (33.2%)	0.930
			Dermatologists	**Endocrinologists**	**Gynecologists**	**P-value**
1.	How many of these variables are needed to label a person as PCOS	One of the above	10 (76.9%)	2 (15.4%)	1 (7.7%)	0.003
		Two of the above	45 (35.7%)	20 (15.9%)	61 (48.4%)	
		All of the above	42 (50%)	4 (4.8%)	38 (45.2%)	
2.	Which conditions would you rule out before making a diagnosis of PCOS	Thyroid	64 (35.8%)	29 (16.2%)	86 (48%)	0.000
		Hyper prolactinaemia	40 (28.2%)	26 (18.3%)	76 (53.5%)	0.000
		Adrenal disorders	42 (36.5%)	26 (22.6%)	47 (40.9%)	0.000
3.	Is metabolic syndrome associated with PCOS	Yes	85 (40.1%)	29 (13.7%)	98 (46.2%)	0.000
4.	Which of the following may be associated with PCOS	Sleep Apnea	14 (25%)	16 (28.6%)	26 (46.4%)	0.000
		Menstrual disturbances	91 (42.7%)	27 (12.7%)	95 (44.6%)	0.540
		Acne	97 (43.7%)	26 (11.7%)	99 (44.6%)	0.036
		Hirsutism	95 (44%)	27 (12.5%)	94 (43.5%)	0.911
		Difficulty in losing weight	68 (37.8%)	22 (12.2%)	90 (50%)	0.001
		Acanthosis Nigricans	87 (46.5%)	26 (13.9%)	74 (39.6%)	0.029
		Skin tags	66 (54.1%)	23 (18.9%)	33 (27%)	0.000
		Hair fall / Female Pattern Hair loss	70 (49.3%)	18 (12.7%)	54 (38%)	0.066
		Depression	52 (42.3%)	19 (15.4%)	52 (42.3%)	0.394
		Insulin Resistance	81 (42.6%)	26 (13.7%)	83 (43.7%)	0.551
		Infertility	77 (39.3%)	25 (12.8%)	94 (48%)	0.003
		Obesity	83 (40.1%)	25 (12.1%)	99 (47.8%)	0.000
		Menorrhagia	29 (33%)	17 (19.3%)	42 (47.7%)	0.010
		Hypertension	19 (22.1%)	21 (24.4%)	46 (53.5%)	0.000
		Dyslipidemia	37 (29.8%)	21 (16.9%)	66 (53.2%)	0.000
5.	Is family history relevant in these patients	Yes	77 (45.6%)	26 (15.4%)	66 (39.1%)	0.000
6.	What are the investigations that you would undertake for PCOS_	USG	73 (49.7%)	12 (8.2%)	62 (42.2%)	0.000
		Testosterone	24 (33.3%)	23 (31.9%)	25 (34.7%)	0.000

Gynecologists (75%) and Dermatologists (50%) said that ovarian volume >10ml is a significant USG finding, compared to 83% of Endocrinologists who considered antral follicle count >12 as more important.

Menstrual disturbances, acne, hirsutism, insulin resistance, obesity and sleep apnea were the most commonly reported PCOS-associated features that significantly differed among specialties (Table 2). The majority (94%) of Gynecologists reported infertility as a major associated feature compared to only 77% of Dermatologists. Depression was identified by half of the Gynecologists and Dermatologists and by two-

Table 3: Management practices and experiences of Healthcare Providers regarding Polycystic Ovary Syndrome

		Allopaths (n=100)	**Ayurveda specialists (n=100)**	**Homeopaths (n=100)**
Do you see patients already diagnosed as PCOS	Yes	81.9%	79.8%	91.7%
What are the concerns expressed by mothers / parents of the patients	Irregular of menstruation	95.8%	94.7%	99%
	Heavy menstrual flow	65.1%	66.7%	74.2%
	Infertility / problems with conception	90.6%	89.8%	93.4%
	Whether treatment will need to be continued long-term	85.3%	76.5%	87.2%
Do you feel the need to involve a Dietitian/Nutritionist for weight management	Yes	94.9%	94.5%	95.7%
Is there any treatment in Allopathy conventional for PCOS	Yes	91.3%	11%	8.1%
Have you worked together with doctors from other system for treatment of PCOS Multidisciplinary team / Integrative medicine	Yes	43.8%	83.7%	90.9%
To what extent can your system of medicine address the problem of PCOS	Fully	55.2%	82%	90%
	Partially	44.8%	57.5%	59%
If you feel it is partial, would you say that your system can be used as adjuvant therapy along with allopathic treatments	Yes	83.9%	50%	49.5%
		Dermatologists (N=29)	**Endocrinologists (N=100)**	**Gynecologists (N=100)**
Do PCOS patients feel social isolation	Yes	50%	17.2%	52%
Do you refer PCOS patients to other specialties	Gynecologist	72%	48.3%	NA
	Nutritionist	28%	72.4%	76%
	Exercise expert	18%	27.6%	46%
	Counselor	9%	10.3%	22%
	Infertility specialist	10%	65.5%	37%
	Endocrinologist	79%	NA	51%
Do you believe you are primary physician for PCOS	Yes	20.2%	93.1%	93%
Need for multidisciplinary clinics	Yes	97%	89.7%	92%
Do you consider PCOS as a Public health issue	Yes	80.6%	100%	94%

thirds of the Endocrinologists.

Management of PCOS: According to FPs experience, the major concerns of mothers/parents of women with PCOS pertained to menstrual irregularity, conception-related issues, and nature of the treatment, particularly hormonal treatment for excessive bleeding. Counseling both patients and their family members (parent/spouse, etc.) were regarded as important by 66% of practitioners. Also, majority of Allopaths and Homeopaths (>90%) strongly felt the need to involve Dieticians as compared to a lesser percentage of Ayurvedic Practitioners (94.5%) (Table 3).

More than 85% of Ayurvedic and Homeopathic practitioners believed that Allopathy does not offer specific treatment for PCOS and largely provides symptomatic relief. Homeopaths were more confident that their treatment would be effective to manage PCOS (90%) compared to Allopaths (55.2%) and Ayurvedic doctors (82%). But around 50% of Ayurvedic and Homeopathy practitioners also believed that their treatment can be a good adjuvant therapy along with Allopathy treatment. However, less than half of Allopaths and >80% of Ayurvedic and Homeopathic Practitioners had participated in patient management in a multidisciplinary team to manage PCOS comprehensively. More than 20% of both Ayurvedic and Homeopathic doctors provided medications as per their respective disciplines.

All FPs focused on prescribing drugs (69%), diet and lifestyle (56.2%), or referral (12%). Pharmacological treatment focused on antidiabetic drugs (35.6%), OC Pills (26.3%), homeopathic medicines (23%), Ayurvedic (22.2%) and Clomiphene (3.7%).

Among Specialists, Gynecologists consulted more women with complaints of menstrual irregularities, infertility and weight issue; similarly, Dermatologists attended to more of acne, hair loss, acanthosis and Endocrinologists reported seeing most cases with hirsutism as patients considered respective specialties to be more skilled to manage their specific complaints. Eliciting family history of PCOS was reported by the majority of Endocrinologists (90%) and Dermatologists (93%) and by a lesser percentage of Gynecologists (70%). Dermatologists also focused on recording the use of OC pills and history of hair loss as well as lifestyle details, whereas Gynecologists enquired about family history of obesity. Endocrinologists probed on relevant family history regarding metabolic syndrome, PCOS and obesity.

In terms of investigations needed to rule out to diagnose PCOS, the maximum possible expected score was 5 (hypothyroidism, hyperprolactinemia and adrenal disorders along with USG and testosterone values). The highest mean scores were among Endocrinologists 2.21 (±1.30), followed by Gynecologists 1.51 (±0.81) and Dermatologists 1.27 (±0.66).

Investigations for assessment of metabolic syndrome were advised by 64% of Endocrinologists, 54% Gynecologists and 26% Dermatologists and these differences were statistically significant ($p<0.005$).

The majority of the Gynecologists (93%) compared to only 20.2% of Dermatologists, believed that they are the primary physicians to treat PCOS. Sixty percent of Dermatologists treated hirsutism with laser at their own clinics and 65.9% of Dermatologists stated that they observed paradoxical hair growth post-laser treatment.

Gynecologists referred patients to Nutritionists (76%), Endocrinologists (51%), exercise expert (46%), Dermatologists (45.9%), Infertility Specialists (37%) and Counsellors (22%). Similarly, 79% of Dermatologists referred patients to Endocrinologists, 72% to Gynecologists and 28% to Nutritionists. Endocrinologists mainly referred cases to Nutritionists (72.4%), Infertility Specialists (65.5%) and Dermatologists (50%).

A large majority of Gynecologists (92%), Dermatologists (97%) and Endocrinologists (90%) emphasized the need for a multidisciplinary clinic and considered PCOS as a public health problem as well as felt the need for training (Table 3). About 50% of Dermatologists and Gynecologists felt that PCOS patients feel social isolation compared to 17.2% of Endocrinologists (p-value<0.000).

Discussion

To the best of our knowledge, this is one of the first studies in urban India exploring PCOS related knowledge and practices among HCPs. Our findings confirm that PCOS affected women approach physicians from different disciplines in large numbers. The menstrual disorder was a common presenting symptom to all faculties followed by hirsutism and acne followed by infertility and weight gain.

Our study indicated that large percentages of respondents were unaware of the Rotterdam criteria. Endocrinologists and Allopaths had better knowledge scores than their respective counterparts. Lack of consensus and use of different diagnostic criteria could result in delayed diagnosis of the problem since its onset.[5,6] More recently, it was reported that the majority of Endocrinologists and OBGYNs surveyed in Nordic countries and Estonia, were using Rotterdam criteria.

[7] Reproductive Endocrinology and Infertility-ObGyn (REI-ObGyn) were more likely to use Rotterdam criteria compared with ObGyn and for each decade increase in age; older physicians were less likely to use Rotterdam criteria in the USA.[5]

Family Physicians felt they are the primary physicians from whom women seek care. These findings are in line with an Australian study that general physicians are responsible for initial diagnosis and treatment referred to as 'port of call'.[8,9] Counselling on lifestyle management was considered important by a substantial percentage of FPs in the study mostly generic as reported in the literature.[9]

Since patients are likely to approach FPs first and be in contact with them regularly and perhaps for a longer duration it is important for FPs to have a full understanding of PCOS diagnosis and management including the need for lifestyle management. Several reports in the literature from other countries indicated that FPs often lacked confidence or had limited specific training to help support sustainable changes in behavior that are needed.[5,8-11] It is possible that FPs are not updated about the extensive nature of clinical guidelines. Our study found that only approximately one-tenth of the FPs referred PCOS patients to Specialists. A little more than half of them stated that they relied on diet and lifestyle management as lines of treatment, with only one-third prescribing anti-diabetics and about one-fourth prescribing oral contraceptive pills or other hormonal therapy.

For FPs high patient load, lack of time, competing interests and low fees charged could well be constraints for holistic management including lifestyle. Although insulin resistance underpins many of the physical and biochemical sequelae in PCOS,[12] investigation into metabolic syndrome was advised by 66% of Endocrinologists, compared to just a little more than half of the OB-GYNs and only about one-fourth of the Dermatologists similar to that reported elsewhere.[13-16] One study reported that only 12% of women recalled being told about the risk of developing diabetes and none were told about endometrial hyperplasia, and 35% despite being overweight were not told anything about it.[17] Although PCOS women are more likely to gain weight than other women in the same age group [18,19] many studies have observed that Endocrinologists are more likely to discuss lifestyle management than are OBGYNs.[6,7,20] Our study also observed that referrals to Dieticians and Exercise Experts were also negligible.

Among Specialists, the highest numbers of PCOS cases were seen by Dermatologists followed by Gynecologists and Endocrinologists. This reflects the importance given by patients to cosmetic and menstrual or infertility related issues similar to a study that noted acne-related treatment was commonly used to treat probable cases.[21]

Practitioners referring patients to counsellors was not high highlighting neglect of psychosocial morbidities associated with PCOS.[22] Addressing the social burdens of PCOS and improving patient-provider relationships is a key to improve healthcare-seeking. [23] A limitation of the study is that it is restricted to a small geographical area and no details on individual case management were elicited. Also, the number of endocrinologists was less compared to other specialties given that the proportion of these experts is less in our community compared to the others included in the survey being a super specialty branch.

We conclude that there is a need for training HCPs by developing India specific management guidelines with simple algorithms to facilitate uniform holistic treatment using a multidisciplinary approach, particularly in the context of India's pluralistic health system.

Acknowledgements

We acknowledge the encouragement and support provided by Dr. Smita Mahale, Director, Indian Council of Medical Research- National Institute for Research in Reproductive Health (ICMR-NIRRH). We would also like to acknowledge Mr. Pravin Sanap and Mr. Iranna Mashal from ICMR NIRRH for data collection and data entry. We acknowledge and thank all participants of the survey without whom this was an impossible task. We also acknowledge the support extended by many organizations conducting CMEs for doctors to approach them for this survey.

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