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A survey of the training and working arrangements of general practitioners providing asthma and chronic obstructive pulmonary disease care in a rural area of Maharashtra State

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1 **Abstract:**

2

3 **Background:** Chronic respiratory diseases (CRD), especially asthma and COPD, are common public
4 health problems resulting in a substantial burden of disease for individuals. There is a need to
5 understand the perceptions and practices of primary care physicians (“GPs”) who provide most of the
6 healthcare in rural India. We surveyed all private and public practitioners listed as practising in a rural
7 area of Western India with the aim of identifying general practitioners (GPs: graduates, registered and
8 allowed to practice in India) to understand their training, working arrangements and asthma/COPD
9 workload.

10

11 **Methodology:** We administered a short questionnaire at educational meetings or via e-mail to all
12 private and public practitioners listed as providing community-based services in the Junnar block,
13 Pune district, Maharashtra. The survey asked about qualifications, experience and working
14 arrangements, and about current asthma and COPD workload. Descriptive analysis was performed.

15

16 **Results:** We approached 474 practitioners (434 from private sector; 40 from public sector). 88 were
17 no longer practising in the study area. Response rate was 330/354 (93.2%) of private and 28/32
18 (87.5%) of public sector practitioners. We excluded 135 non-respiratory hospital specialists and 23
19 private practitioners whose highest qualification was a diploma. Our final sample of 200 GPs (70%
20 male) was 177 from private sector and 23 from public sector. The private GPs had more experience in
21 clinical practice in comparison to public GPs. (18.6 vs 12.8 years). 84% of GPs from the private sector
22 only had AYUSH (Ayurveda, Yoga, Naturopathy, Unani, Siddha and Homoeopathy) qualifications
23 though >90% provided ‘modern medicine’ services. In the public sector, 43.5% GPs only had AYUSH
24 qualifications, though all provided ‘modern medicine’ services. A minority (9% of private; 16% of public
25 GPs) provided both services. Nearly two thirds (62%) of private GPs had inpatient facilities compared
26 to only 9% of public sector GPs. In both sectors, more GPs stated that they managed people with
27 asthma than treated COPD (Private: 97% vs 75%; Public 87% vs 57%).

28

29 **Conclusion:** Many GPs practising ‘modern medicine’ only had qualifications in Ayurveda/Homeopathy
30 and fewer GPs are involved in management of COPD as compared to asthma. These are important
31 factors that form the context for initiatives seeking to improve the quality of community-based care
32 for people with CRD in Maharashtra state in India.

33

34 **Key words:** asthma, COPD, diagnosis, management, perception, practices

35

36

37 **Introduction**

38

39 Chronic Respiratory Diseases (CRDs), especially asthma and Chronic Obstructive Pulmonary Disease
40 (COPD), are common public health problems with high prevalence and mortality rates across the world
41 (1–4). In India, the population prevalence of asthma is estimated to be 5-10% (5–7) and that of COPD
42 around 5-7% (6,8–10). Despite respiratory symptoms being the commonest reason for consulting a
43 general practitioners (GPs) in India (11), diagnosis and management of the underlying condition (1,12–
44 15) requires clinical knowledge and skills as well as access to diagnostic tests which may not be
45 available in resource-poor rural areas of low and middle income countries.

46

47 India has a mixed healthcare system with private and public sectors providing both AYUSH (alternative
48 medicine encompassing Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy) and
49 ‘modern medicine’ services (Figure 1A) (16,17). In rural areas, where 60% of the Indian population
50 live, the majority of respiratory healthcare is provided by GPs and other community-based
51 practitioners (from both private and public sector) as most respiratory physicians’ practise in urban
52 areas (18). GPs are graduates and registered with the medical authority in India (19). In India, training
53 and qualifications may be in either modern medicine or AYUSH, so that their knowledge and skills
54 related to diagnosis and management of CRD varies. In addition, some community-based practitioners
55 may not be graduates. People tend to ‘shop around’ for treatment (exploring treatment options
56 available), and this ‘shopping’ for treatment means that people will go to both private and public GPs.

57

58 There is concern that non-communicable causes of chronic respiratory symptoms in developing
59 countries are poorly managed (20). The high prevalence of chronic respiratory symptoms (11) coupled
60 with limited recorded diagnoses (1) suggests that asthma and COPD (and other CRDs) are under-
61 recognised and represent an unmet health need. Understanding context is crucial to developing
62 strategies to implement improved quality of care. There is a need to work with public health systems
63 and their different stakeholders to inform quality improvement initiatives. We therefore surveyed all
64 private and public practitioners listed as practising in Junnar block (a rural area of Western India) with
65 the aim of identifying GPs to understand their training, working arrangements and asthma/COPD
66 workload.

67

68 **Methodology:**

69

70 *Study area*

71 The Junnar block is one of the 14 blocks in Pune district in Maharashtra state of India. It comprises of
72 179 villages with a total population of 400,000 (21), encompassing rural, urban, and tribal populations.
73 Out of total 12 Primary Health Centres (PHCs); three are in tribal and nine in non-tribal areas. There
74 are two rural hospitals, one at Junnar and other at Gohdegaon. Junnar has been an important trading
75 and political centre for the last two millennia as it is situated on the border of three districts

76 (Ahmednagar, Nashik and Thane). The marketplaces (Narayangaon, Otur, and Junnar) in all three
77 regions of Junnar have many private medical practitioners. The state and national highways cross in
78 this block.

79

80 *Study population and sample size*

81 We approached all private and public practitioners listed as practising in Junnar (n=474) between Mar
82 2021 to Sep 2021. Lists of private sector practitioners were obtained from their local professional
83 associations (n=434) which includes formal registered practitioners of modern medicine and AYUSH
84 systems and public GPs from the PHCs/RHCs (n=40). We aimed to identify 'GPs' who we defined as
85 graduated (in modern medicine or AYUSH) registered with their respective medical authorities in India
86 and allowed to practice in India by Indian Law. Practitioners (n=158) who did not meet our definition
87 of GPs were noted but excluded from the analysis

88

89 *Study questionnaire development*

90 The study questionnaire was developed based on tools used in previous studies [19–23] and
91 developed in consultation with local pulmonologists and study investigators. We collected
92 demographics, trainings, service arrangements and workload related to asthma/COPD care.
93 See Supplementary Table 1 for the questionnaire. Before data collection, we piloted the
94 questionnaire among GPs practising in Shirur block of Maharashtra state.

95 *Participant recruitment and study questionnaire administration*

96 We used two modes of data collection. We distributed questionnaires to all attendees at a continuing
97 medical education (CME) activity regularly provided by the King Edward Memorial Hospital Research
98 Centre, Vadu Rural Health Program (KEMHRC, VRHP) for private and public GPs in the study area.
99 Those GPs who did not attend the CME, and others who we could not reach due to the COVID-19
100 pandemic, were invited by e-mail or text to complete an on-line version of the survey (Google Form).
101 Before sending the invitation, they were contacted by telephone, and verbal consent obtained to
102 participate in the study.

103

104 *Data entry, quality check and analysis*

105 Questionnaires were checked for the completeness and accuracy of data entry (e.g by
106 checking for values outside the plausible range). Missing values were treated as discrete
107 missing values. Analysis was descriptive using Stata software (version 15).

108

109 *Stakeholder Engagement*

110 GPs and other stakeholders (e.g., local chest physicians, researchers, public and private health
111 practitioner representative) were actively engaged in developing the NIHR Global Health Unit
112 (RESPIRE) research agenda (including this study), reviewing proposals, and are now involved in
113 disseminating the findings of projects.

114

115 **Results:**

116

117 *Survey and response rate*

118 We approached 474 community-based practitioners. After excluding 88 practitioners who were no
119 longer practicing in the area, 358 of the remaining 386 (92.7%) completed the questionnaire: 93.2%
120 (330/354) of private and 87.5% (28/32) of public sector practitioners. Reasons for non-response are
121 given in Figure 1B. Most non-responders were from the public sector and were too busy treating and
122 managing COVID-19 patients to complete questionnaires.

123

124 We excluded 130/330 (39.4%) practitioners from the private sector and 5/28 (17.9%) from the public
125 sector who had community-based specialist practices and (apart from paediatricians) were not
126 involved in providing care for people with CRD. Of these 74 had post-graduate specialist qualifications,
127 and 61 were graduate trained. We further excluded 23/200 (11.5%) private sector practitioners as
128 their highest qualification was a diploma and thus not meeting the definition of a GP. Analysis was
129 therefore on 200 GPs (177 GPs from private sector and 23 GPs from public sector) Figure 1B.

130

131 *GPs demography, qualifications and medical practice*

132 The demographic characteristics of GPs with their experience and qualifications are given in Table 1.
133 Almost 70% of GPs were male both in private and public sector. The private GPs had more experience
134 (Mean 18.6 years, SD 8.9 years) in clinical practice compared to public GPs (Mean 12.8 years, SD 9.1
135 years).

136

137 Of the 177 GPs from the private sector 148 (83.6%) only had qualifications in AYUSH medicine although
138 135 (76.2%) of the AYUSH-trained GPs provided modern medicine services. All 23 of the GPs in the
139 public sector provided modern medicine services, though 10 (43.5%) only had AYUSH qualifications.
140 A minority in both sectors provided both AYUSH and modern medicine services. Nearly two thirds
141 (61.6%) of private sector GPs had inpatient facilities compared to only 8.7% of public sector GPs. All
142 others managed patients at clinic level only. Inpatient facility helps for better treatments.

143

144 **Table 1:** Demographic characteristics of GPs with their experience and qualification and number of
145 asthma and COPD cases with them.

146

Sr. No.	Characteristic	Private GPs (N=177)	Public GPs (N=23)
------------	----------------	------------------------	----------------------

1	Age (mean, SD)	44.0, 9.2	39.3, 9.8
2	Gender (Male: Female)	124:53 (70.1%: 29.9%)	16:7 (69.6%:30.4%)
3	Qualification		
	<i>Graduate in Ayurveda (n, %)</i>	87 (49.1%)	10 (43.5%)
	<i>Graduate in Homeopathy (n, %)</i>	61 (34.5%)	0 (0%)
	<i>Graduate in Modern Medicine (n, %)</i>	14 (7.9%)	13 (56.5%)
	<i>Graduate in Modern Medicine + Diploma in Paediatrics (n, %)</i>	15 (8.5%)	0 (0%)
4	Experience of clinical practice in years		
	Mean, SD	18.6, 8.9	12.8, 9.1
	Min	3	1
	Max	50	32
5	Current practice		
	<i>Ayurveda</i>	5 (2.8%)	0 (0%)
	<i>Homeopathy</i>	10 (5.6%)	0 (0%)
	<i>Modern Medicine</i>	134 (75.8%)	21 (91.3%)
	<i>Integrated AYUSH and Modern Medicine</i>	28 (15.8%)	2 (8.7%)
6	Cross practice (Ayurveda/Homeopathy trained practicing Modern Medicine)	140 (79.1%)	10 (43.6%)
7	Place and Facility of clinical practice		
	<i>Government Clinic</i>	3 (1.7%)	21 (91.3%)
	<i>Private Clinic</i>	65 (36.7%)	0 (0%)
	<i>Private Clinic with IPD</i>	109 (61.6%)	0 (0%)
	<i>Government Rural Hospital</i>	0 (0%)	2 (8.7%)
8	Asthma cases		
	In last 3 months (Mean, SD)	12.6, 11.5	10.4, 13.4
	Currently (Mean, SD)	8.6, 11.5	5.4, 4.3
9	COPD cases		

	In last 3 months (Mean, SD)	4.2, 5.3	4.7, 12.4
	Currently (Mean, SD)	2.9, 4.8	2.0, 4.4
	Total	177 (100%)	23 (100%)

147

148 *Asthma and COPD case load*

149 Of the 177 GPs from the private sector, almost all (172 (97.2%)) treat/manage asthma, but only 133
 150 (75.1%) treat/manage COPD. Similarly, from public sector, more GPs treat/manage asthma [n=20,
 151 87.0%] than treat/manage COPD [n=13 (56.5%)]. Figure 2A-2D shows cases currently in treatment with
 152 GPs and cases in last three months with GPs.

153

154

155 We also looked at CRD case load by the GP's training (AYUSH or Modern Medicine) given in Table 2.
 156 Similar patterns emerged across both groups with more asthma than COPD cases, though two thirds
 157 60/158 (37.9%) of AYUSH trained GPs were not involved in asthma management compared to only
 158 2/42 (4.7%) of GPs trained in modern medicine (See Figure 2E-2F).

159

160 **Table 2:** CRD workload by GPs training

161

Sr. No.	Characteristic	GPs trained in AYUSH (N=158)	GPs trained in Modern Medicine (N=42)
1	GPs not involved in asthma management	60	2
2	GPs not involved in COPD management	41	13
3	Asthma cases seen		
	In last 3 months (Mean, SD)	11.0, 9.0	17.4, 18.0
	Currently (Mean, SD)	7.0, 7.1	13.0, 19.0
4	COPD cases seen		
	In last 3 months (Mean, SD)	4.2, 5.0	4.4, 10.4
	Currently (Mean, SD)	2.6, 4.2	2.7, 6.3

162

163 **Discussion:**

164 Our survey reveals that many GPs in Junnar block of Maharashtra state are practising modern
165 medicine despite only having qualifications in ayurveda or homeopathy. This was particularly evident
166 amongst private GPs, but also applied to nearly half the GPs in the public sector. Although almost all
167 GPs looked after patients with asthma, but only three quarters provided COPD care.

168

169 *Interpretation and implications*

170 There may be several reasons for the mismatch between qualifications and practice. Healthcare is a
171 state responsibility, and cross practice is allowed legally in the state of Maharashtra. Secondly, most
172 the of the doctors trained in modern medicine prefer to practice in urban areas, whilst rural areas in
173 centuries-old tradition are served by ayurveda and other AYUSH practitioners. Maharashtra state has
174 almost 60 homeopathy and 70 ayurvedic colleges compared to only 48 modern medicine colleges, so
175 that the number of ayurvedic and homeopathic practitioners trained far exceeds the number of
176 modern medicine doctors in the state. Every year, of the 10,000 medical graduates in India only 2,800
177 are from government medical colleges where medical education is heavily subsidised on condition
178 that the doctor serves at least one year in one of the 1,814 government-run primary health centers
179 (PHCs). Having served their 12-month mandatory postings, few continue in rural practice (19).

180

181 Both asthma and COPD are both common causes of chronic respiratory symptoms in LMICs like India
182 (1–10), yet there was a marked discrepancy in the proportion of GPs who cared for patients with these
183 two conditions suggesting that COPD may be under-recognised and under-treated compared to
184 asthma. Reasons for this are likely to be multifactorial, including poor community awareness so that
185 people with insidious onset of breathlessness may not present to their GP in a timely manner (22) and
186 both GPs and patients may be unfamiliar with the terminology - asthma and COPD. A further problem
187 is that there is no specific word for COPD in the local dialect and the word ‘dama’ which means asthma
188 in the local dialect is commonly also used for COPD. Under recognition of COPD by GPs could be the
189 result of inappropriate training and misdiagnosis though modern medicine trained GPs had similarly
190 low COPD caseloads (23). In addition, as COPD requires some special diagnostic equipment (e.g.,
191 spirometry) which may be difficult to access, it may be a diagnosis that GPs feel unable to make.

192

193 Strategies to improve the quality of care for respiratory disease in rural India will need to understand
194 the perception and practice of GPs (both public and private) involved in diagnosis and management
195 of asthma and COPD. In depth qualitative interviews could explore the challenges of diagnosing and
196 managing asthma and COPD and identify strategies that could facilitate better care. COVID-19 has
197 raised the profile of respiratory disease both for GPs and the community which may be an incentive
198 for developing care. More broadly, there is a need to understand the healthcare context, in particular
199 the infrastructure at government facilities enabling diagnostic services and specialist support for GPs.
200 The perception and needs of patients are equally important.

201

202 Understanding context represents the first stage of developing and evaluating a complex initiative to
203 improve the quality of chronic respiratory disease care in our locality (24). The findings of this study

204 highlight the need to provide training for GPs with a background in Ayurveda or homeopathy as well
205 as offering advanced training on asthma and COPD diagnosis and management for modern medicine
206 practitioners. It raises policy questions about eligibility to practice modern medicine and the training
207 that should be required before a practitioner is licenced to prescribe modern medicines.

208

209 *Strengths and limitations*

210 As this study was conducted only in one block of Maharashtra state, the findings may not be applicable
211 to other blocks within the state or more widely in India. We achieved a good response rate (92.7%)
212 but to do this we kept the questionnaire short which limits the inferences we can make. Several joint
213 husband and wife practices responded but only completed one questionnaire limiting the information
214 that we have about the individual GPs workload. Our assumption that practitioners with specialist
215 training were providing specialist services in the community and not practicing as general practitioners
216 may not always be correct, but we have no further information on this group.

217

218 **Conclusion:**

219 Many GPs practising modern medicine only had AYUSH qualifications. Fewer GPs are involved in
220 management of COPD as compared to asthma. About half of the GPs who treat/manage these
221 common respiratory symptoms have in-patient facilities. To develop strategies to improve respiratory
222 care it will be necessary to recognise the diverse backgrounds of the practitioners providing general
223 medical services in the community, and to understand the challenges they face in diagnosing and
224 managing people with asthma and COPD.

225

226

227 **Declarations:**

228

229 **Ethical approval and consent to participate:**

230 Ethics approval was obtained from the KEM Hospital Research Centre ethics committee and the study
231 was sponsored by the University of Edinburgh (ACCORD: Reference number: AC18111). Written
232 informed consent was provided by all study participants. Permissions were obtained from the relevant
233 health officers at district and block level, and from the private GPs' association. The study was
234 implemented following National Ethical Guidelines for Biomedical and Health Research involving
235 Human Participants issued by the Indian Council of Medical Research in 2017 and the recent National
236 Guidelines for Ethics Committees Reviewing Biomedical & Health Research During COVID-19
237 Pandemic issued in 2020.

238

239 **Consent for publication:**

240 Not applicable

241

242 **Availability of data and materials:**

243 Data analysed during the current study are not publicly available as data collection for qualitative
244 aspect of the study is still ongoing. Corresponding author will upload data on Edinburgh DATASHARE
245 data sharing repository (<https://datashare.ed.ac.uk/>) after completion of data collection for the
246 current study. However, data used for current publication will be available from the corresponding
247 author on reasonable request.

248

249 **The RESPIRE collaboration:**

250 The University of Edinburgh, Edinburgh, UK; The Allergy & Asthma Institute, Islamabad, Pakistan;
251 Maternal Neonatal and Child Health Research Network, Islamabad, Pakistan; University of Malaya,
252 Malaysia; KEM Hospital Research Centre, Pune, India; Aga Khan University, Karachi, Pakistan; Christian
253 Medical College, Vellore, India;

254

255

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331

332 **Figure Legends:**

333

334 **Figure 1:** 1A: Indian Health System; 1B: Questionnaire filling status, reasons for not filling
335 questionnaire and reasons for not including them in the analysis both from private and public sectors.

336 **Figure 2:** Number of cases for asthma and COPD currently and in last three months (2A-2D): 2A- cases
337 currently in private sector, 2B- cases in last 3 months in private sector, 2C- cases currently in public
338 sector, 2D- cases in last 3 months in public sector; Number of cases for asthma and COPD currently
339 and in last three months according to GP training (2E-2F)- 2E- cases currently, 2F- cases in last 3
340 months.

341

342

Response to Reviewer Comments

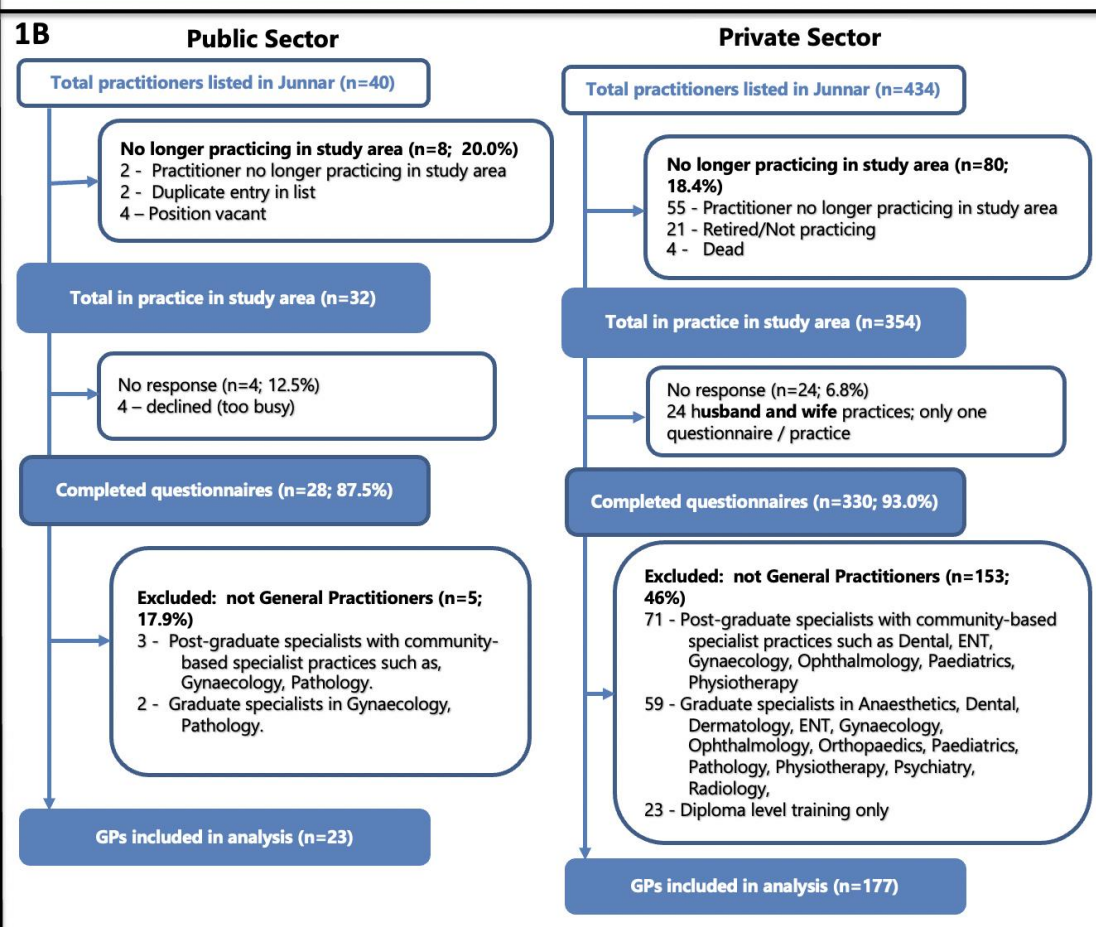
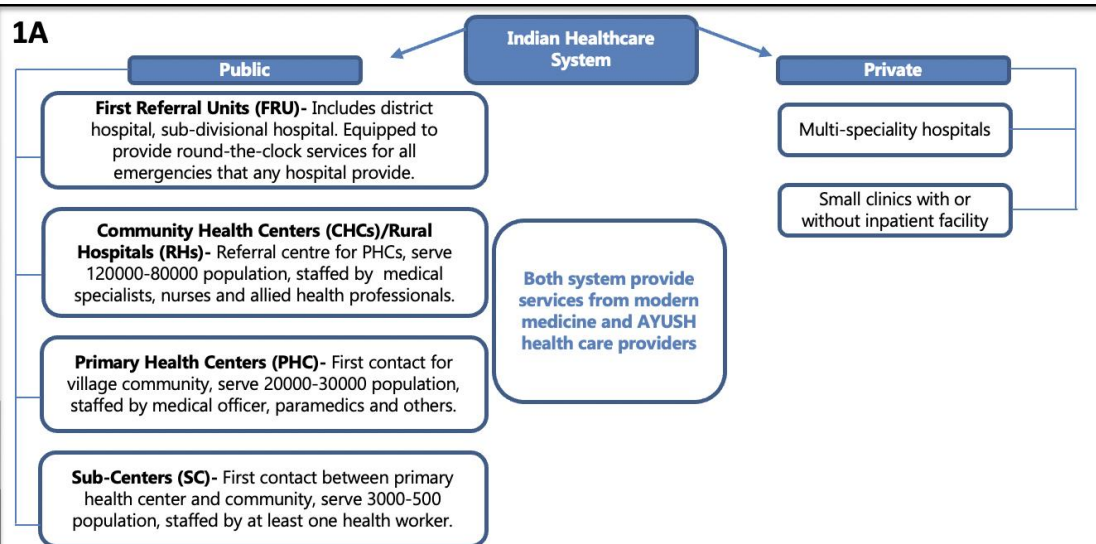
Sr. No.	Comment	Authors Response
1	<p>All the comments of the reviewers have been adequately addressed.</p> <p>The technical instructions of the Original Articles require that the number of figures and tables be limited to a maximum of four (https://ijph.in/contributors.asp).</p> <p>The authors are requested to make suitable changes to this effect.</p>	<p>We thank the reviewer for the comment. Accordingly we have done the changes in the revised manuscript.</p> <p>We have now 2 figures and 2 tables in the revised manuscript.</p>

343

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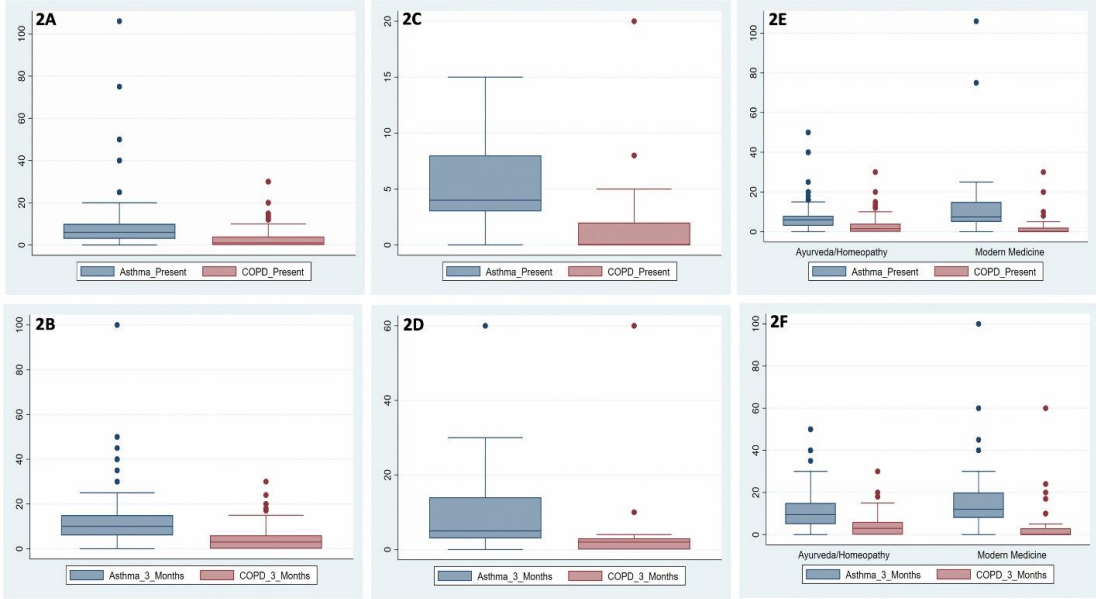
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