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Barriers to implementing asthma self-management in Malaysian primary care

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1 **Barriers to implementing asthma self-management in Malaysian primary care:**
2 **qualitative study exploring the perspectives of healthcare professionals**

3

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35 **Abstract**

36

37 Asthma self-management is a crucial component of asthma management. We sought to
38 explore healthcare professionals’ (HCPs) perceptions on barriers to asthma self-management
39 implementation in primary care. We recruited 26 HCPs from six public primary care clinics
40 in a semi-urban district of Malaysia in 2019. The analysis was done inductively. HCPs
41 described barriers that resonated with the ‘COM-B’ Behaviour change framework.
42 Capability-related issues stemmed from a need for specific self-management skills training.
43 Opportunity-related barriers included the need to balance competing tasks, and limited
44 poorly-tailored resources. Motivation-related barriers included lack of awareness about self-
45 management benefits, which was not prioritised in consultations with perceived lack of
46 receptiveness from patients. These were compounded by contextual barriers of the healthcare
47 organisation and multilingual society. The approach to implementation of asthma self-
48 management needs to be comprehensive, addressing system, professional and patient barriers,
49 and tailored to the local language, health literacy and societal context.

50

51 **Key words:** asthma self-management, challenges, healthcare professionals, qualitative, low-
52 and-middle-income country

53

54

55

56 **Introduction**

57 Supported self-management is a crucial component of long-term asthma management^{1,2} in
58 adults that improves clinical outcomes and reduces healthcare costs.³ Patient-centred,
59 collaborative care that permits effective patient-practitioner communication improves
60 adherence to treatment and outcomes.^{4,5} However, studies have shown that globally, support
61 for asthma self-management is not embedded in routine practice and only a minority of
62 people with asthma have an action plan.⁶⁻⁸

63
64 In Malaysia, the prevalence of adult asthma was estimated at 5% with asthma-related deaths
65 responsible for 1.2% of all deaths in the 2006 National Health and Morbidity survey.⁹ This
66 survey also reported that 20% of adult asthma patients visited the emergency department for
67 acute exacerbations, 10% were admitted, 27% reported school/work days' loss with a mean
68 duration of 6 (4-8) days in the past 12 months.⁹ Less than half of adult asthma patients had
69 regular long term follow-up.⁹⁻¹¹ In addition, studies have reported under-utilisation of
70 controller medications,^{10,11} while the use of oral short-acting beta-agonist was common
71 among adults with poor asthma control in Malaysia.¹⁰⁻¹²

72
73 A wide range of barriers to implementing supported self-management were described in a
74 recent systematic review – these include, poor patient-professional partnership, lack of
75 patient education and concerns regarding medication safety, insufficient professional training
76 and negative views regarding asthma self-management; compounded by competing priorities
77 and limited time in consultations.¹³ Underpinning many of these barriers are challenges to
78 effective communication.^{13,14} All but one of the 56 papers included in this review were from
79 high-income healthcare systems; reflecting a gap in the understanding of barriers faced in the
80 socio-cultural context of low- and middle-income countries (LMICs), such as Malaysia.

81 Malaysia's multicultural and multilingual society may also present different barriers to the
82 implementation and delivery of asthma self-management education in primary care settings.
83 As the country is composed of three major ethnicities, Malay (70%), Chinese (22%), and
84 Indian (7%), as well as several minority ethnicities (1%)¹⁵, a significant proportion of the
85 population reads, writes, and converses in their respective native tongues, and exhibit varying
86 levels of fluency in English and the country's national language, Malay.¹⁶⁻¹⁹ Additionally, the
87 populations' predominantly 'low' to borderline 'sufficient' health literacy²⁰ and low general
88 literacy skills among the elderly²¹ may have some influence in the barriers experienced. We
89 therefore aimed to explore healthcare professionals' views of the barriers faced in
90 implementing supported self-management for asthma in adults in a primary care setting in
91 Malaysia, taking into consideration the country's cultural and socioeconomical contexts. .

92
93

94 **Results**

95 Participants

96 We recruited 26 participants. Six focus group discussions (4-6 HCPs in each group) were
97 conducted between July and August 2019 at the Klang District Health Office (5 family
98 physicians, 5 medical officers, 4 each of assistant medical officers, pharmacists, assistant
99 pharmacists, and nurses). Table 1 outlines the demographic data of the participants. There
100 was only 1 mixed sex focus group among the pharmacists (1 male, 3 females). Other focus
101 groups were all-female (Family physicians, medical officers, nurses, assistant pharmacists),
102 or all-male (Assistant medical officers).

103

104 We identified practice-based and contextual barriers to implementing asthma self-
105 management in primary care practice. Practice-based barriers related to healthcare
106 professionals' capability, opportunity, and motivation, and how these factors influenced their

107 behaviour (COM-B framework). In addition, implementation barriers were influenced by
108 external themes related to societal and healthcare organisational contexts. The interaction of
109 these barriers is illustrated in Figure 1.

110

111 ***Practice-based barriers experienced by healthcare professionals (HCPs)***

112 HCPs described a number of barriers to provision of supported self-management that
113 resonated with the COM-B model of behaviour change.²² Capability barriers included the
114 need for specific skills-based training. Opportunity-related barriers described difficulty in
115 completing tasks due to complex workloads, limited availability and often poorly tailored
116 resources (e.g. action plans), and poor documentation of previous consultations. Motivational
117 barriers included a lack of awareness of the benefits of supported self-management, hesitancy
118 to stray from their defined roles in the care of people with asthma, and perceptions that
119 patients are not receptive to counselling.

120

121 *Capability: Need for specific skills-based training*

122 The participants acknowledged that without training they would not have the necessary skills
123 to support asthma self-management. Comprehensive training was not provided for all HCPs
124 involved in the management of asthma which led to knowledge gaps and training
125 inconsistencies among HCPs. Conversely, some participants felt that while the routine
126 training provided was adequate, the motivation to incorporate into practice was lacking (see
127 below).

128

129 *“We need more hands-on teaching [of asthma self-management counselling].*

130 *Sometimes even the medical officers don’t know how to use the MDI (Metered*

131 *Dose Inhaler). Some pharmacists don’t know [how to use MDIs] as well.” – A1,*

132 *Medical Officer, 30–35 years old, 6 years of experience.*

133

134 *“Only a few of our nurses are trained in asthma [self-management counselling].*

135 *If they go on maternity leave, and they don’t teach their colleagues... I feel that*

136 *maybe a class or a course on asthma [self-management counselling] that is*

137 *detailed and more frequent is necessary to train more nurses.” – A5, Medical*

138 *Officer, 35–40 years old, 13 years of experience.*

139

140 *Opportunity: Competing tasks*

141 The HCPs acknowledged that their heavy workload and the multi-condition nature of primary

142 care limited their ability to educate patients on their asthma. The absence of protected time

143 for asthma patient education classes meant fewer opportunities for HCPs to provide self-

144 management counselling as HCPs had to balance their time seeing a very broad range of

145 other patients, as well as addressing other medical conditions in people with asthma.

146

147 *“We didn’t have any specific dates for asthma [patient education classes], so we*

148 *have to educate the asthma patients in addition to seeing other patients ... [So, the*

149 *time] to advise patients [is] limited.” – A6, Medical Officer, 30–35 years old, 8*

150 *years of experience.*

151

152 *Opportunity: Limited availability of resources (asthma action plans) in consultation rooms*

153

154 Another barrier identified by HCPs was that asthma action plans were not readily available in

155 the consultation rooms. This is related to contextual organisational barriers at the district

156 health office level due to budget constraints and lack of prioritisation which affected the

157 availability of asthma action plans.

158

159 *“Sometimes, when we want to print out the asthma action plan, we have run out of*
160 *paper, and we do not have enough money to buy more paper.”* – A1, Medical
161 Officer, 30–35 years old, 6 years of experience.

162
163 *“They will photocopy only a few asthma action plans, only 20 every time. If it*
164 *runs out, that is it.”* – A3, Medical Officer, 25–30 years old, 4 years of
165 experience.

166

167 *Opportunity: Poorly tailored resources (asthma action plans) available for the patients*

168

169 The HCPs felt that currently available written asthma action plans were unsuitable for their
170 Malaysian patients as they were too wordy for them to understand, especially considering the
171 high rates of limited health literacy in the population.²⁰ The HCPs also attributed this dislike
172 towards reading to be a prominent Asian cultural trait. Some suggested that a more visual
173 format of asthma action plans (e.g. pictures or animation) may help patients to understand
174 better.

175

176 *“The [patient’s] understanding of the asthma action plan is the problem because*
177 *[it has] a lot of wording here and there.”* – F1, Family Physician, 50–55 years
178 old, 26 years of experience.

179

180 *“Some of them [prefer] visual [formats] to aid them. [If it’s] too wordy [it] is also*
181 *quite difficult because [in] our culture, they don’t want to... don’t like to read,*
182 *right?”* – F7, Family Physician, 45–50 years old, 21 years of experience.

183

184 *Opportunity: Poor documentation*

185

186 In addition, some HCPs stated that due to poor medical record documentation it was unclear
187 whether counselling of asthma action plan had previously been provided.

188

189 *“...also, the documentation is very poor, so we don’t know whether [asthma*
190 *action plan counselling] is done or not by our MOs, that’s the thing.” – F4,*
191 *Family Physician, 40–45 years old, 16 years of experience.*

192

193 *Motivation: Lack of awareness and poor attitude*

194

195 Some HCPs felt that their colleagues were not motivated to empower patients for self-
196 management even if they had been trained in delivery of action plans which led to poor
197 attitude towards implementing it.

198

199 *“We send our medical officers for district training (of asthma self-management*
200 *counselling). For every session of the CME [Continuing Medical Education], we*
201 *will ask those who attend the course to go back to their clinic and brief other*
202 *medical officers who did not have the opportunity to attend. That’s why I believe*
203 *their training is not too lacking. The issue is just whether they have the motivation*
204 *to practice it.” – F1, Family Physician, 50–55 years old, 26 years of experience.*

205

206 This is because counselling of asthma self-management may need extra initiative and time
207 spent by the HCPs, an interrelating systemic issue. Reasons for low motivation overlapped
208 with other barriers, such as the limited provision of training. For example, a pharmacist of 25

209 years standing had ‘not heard of’ asthma self-management’. Limited training on asthma self-
210 management not only affected knowledge of current guidelines but also reduced awareness of
211 the potential benefits for people with asthma having an action plan, and thus affected the
212 HCPs motivation to improve their practice in empowering patients for asthma self-
213 management.

214

215 *Motivation: Unclear healthcare professional roles.*

216 Several HCP’s described their lack of motivation as a result of the feeling that supporting
217 self-management was not a responsibility under the clearly defined roles of their job position.
218 Instead, they would refer them to a healthcare professional whose role included self-
219 management counselling. This may represent a lack of awareness and motivation at
220 management level as most job positions within the clinic’s dedicated asthma team did not
221 include contributing to supporting the self-management.

222

223 *“New [patients] who need counselling will be directed to the pharmacists. I am*
224 *a... I am an assistant pharmacist. I don’t counsel them.” – E2, Assistant*
225 *Pharmacist, 50–55 years old, 25 years of experience.*

226

227 *Motivation: Perceived patients’ lack of interest in managing their asthma*

228

229 Another important challenge that reduced HCPs’ motivation was that they felt asthma
230 patients did not prioritise their self-management and were reluctant to document their
231 symptoms in asthma diaries. The HCPs thought that this problem was more common among
232 patients who were of lower education level, citing examples of patients who were illiterate
233 and were not able to write their symptoms in an asthma diary. It was felt that it would be

234 difficult to empower them to self-manage their asthma without clear record-keeping of their
235 asthma symptom and control monitoring.

236

237 *“For adults, I feel that they do not care. They do not use their action plans. If*

238 *you ask them whether they have received a copy of it in their last consultation,*

239 *[they will reply] ‘I do not remember, Doctor. Maybe it’s at home.’” – A1,*

240 *Medical Officer, 30–35 years old, 6 years of experience.*

241

242 ***Contextual barriers experienced by healthcare professionals (HCPs)***

243

244 HCPs listed a number of wider contextual barriers that limited provision of supported self-

245 management. At a societal level, the high prevalence of limited health literacy combined with

246 a multilingual society resulted in major barriers in understanding the Malay/English action

247 plans. Healthcare organisations struggled with limited manpower and a lack of priority for

248 asthma self-management.

249

250 *Societal context: Limited health literacy, and language barriers*

251

252 There was a widespread belief amongst HCPs that patients with low educational status and

253 limited health literacy could not understand explanations of an asthma action plan and self-

254 management. This was thought to be a particular problem among older patients. Language

255 was an additional barrier to communication for patients who only understood Mandarin or

256 Tamil as most HCPs could only speak English or Malay. One experienced family physician

257 observed that such patients *‘might not be able to understand whatever is written in the*

258 *asthma action plan’*. Hence, extra effort in repeated counselling and explanation was needed

259 to enhance the patient’s understanding of an asthma action plan.

260

261 “[When explaining self-management to patients], not everyone will [follow] our
262 advice... The more highly educated patients will follow our advice [to regularly
263 take controller medication]. The less educated ones [will only take it] when they
264 feel like it.” – D2, Assistant Medical Officer, 25–30 years old, 6 years of
265 experience.

266

267 “In order to deliver your knowledge to your patient, for them to actually be able
268 to understand what you are trying to say, it takes effort and many repetitions
269 (repeated sessions).” – C2, Pharmacist, 30–35 years old, 9 years of experience.

270

271 *Organisational priorities: Lack of awareness of asthma, and resource constraints*

272

273 The lack of prioritisation at healthcare service level was highlighted in two ways. First, time,
274 budget, and manpower were limited, with many different health programmes to run, and high
275 patient load constraining opportunities for chronic disease management (as opposed to acute
276 management) and even with good team work there was insufficient manpower to support
277 self-management. It was suggested that management level prioritisation was needed to
278 allocate the resources needed to allow them to spend more time with patients who needed
279 counselling to encourage self-management.

280

281 “...time is a big constraint, so if they [ministry management] can intervene and
282 have more staff then they [can] really help us greatly in order for us to spend
283 more time with patient who needs it [counselling of asthma self-management].” –
284 C2, Pharmacist, 30–35 years old, 9 years of experience.

285

286 *“We all don’t have time to clerk each patient one-by-one. Just to fill the first page*
287 *[of the clerking sheet] is already difficult. So, we [hoped] the nurses would help*
288 *us, but the nurses say that they also have a lot of work to do.” – A5, Medical*
289 *Officer, 35–40 years old, 13 years of experience.*

290

291 Second, a recurring theme that appeared in HCP discussions was a lack of prioritisation of
292 asthma (self)-management in favour of other conditions and topics. For example, some
293 campaigns (such as ‘Know Your Drugs’) had been on-going for a decade without updating
294 their education materials, but it was also noted that the campaign did not include ‘*how to use*’
295 asthma inhalers in their materials. The HCPs attributed the lack of priority to limited
296 awareness on asthma and suggested rotating the focus of the campaign regularly to raise
297 awareness and prioritise asthma from time to time.

298

299 *“There’s a Diabetes [Awareness] Month, but an Asthma [Awareness Month], I feel that*
300 *I’ve never seen before.” – F5, 41-year-old Family Physician, 17 years of experience.*

301

302

303 **Discussions**

304 *Summary of key findings*

305 This study identifies some significant challenges in the implementation of supported asthma
306 self-management in primary care practice in Malaysia. Barriers that hindered implementation
307 in routine practice were multifactorial, encompassing factors related to capability and
308 motivation of the professionals, as well as practical barriers of resource and time that reduced
309 the opportunity in day-to-day practice. A number of contextual factors external to the clinic

310 in which the HCPs practiced were highlighted: the priorities and resources of the healthcare
311 organisation and the multi-ethnic, multilingual societal context. Many of these challenges
312 could be improved or at least modified with a comprehensive approach to an intervention,
313 which will be further elaborated in the subsequent sections.

314

315 *Interpretation with reference to other published studies*

316 As highlighted by a systematic review¹³, our findings of professionals' barriers related to the
317 COM-B framework overlapped with similar themes identified in other studies. Lack of
318 training and poor patient-HCP partnerships limited capability; opportunity was reduced
319 because of pressure of time, and lack of awareness regarding guideline recommendations and
320 action plans, and perceived poor patient receptiveness all reduced motivation have all been
321 described in other (typically high-income country) settings.^{13,23-26} Our study noted that
322 opportunity was further reduced by limited supplies of poorly-tailored self-management
323 resources, and poor documentation of whether (or not) self-management had previously been
324 discussed. Lack of awareness about self-management benefits and a hesitancy to work
325 beyond their defined role were additional barriers to motivation.

326

327 Healthcare and societal contextual factors are identified in other studies,^{13,23-25,27,28} but the
328 Malaysian context of a multi-ethnic multilingual LMIC compounded some of these barriers.
329 Lack of awareness about asthma self-management at the level of healthcare management and
330 lack of prioritisation of asthma self-management meant that initiatives did not address the
331 heavy workloads and manpower constraints, for example, by enhancing teamwork.

332

333 *Implications for delivery of healthcare services*

334 An issue identified in this study was the differing views and expectations on the adequacy of
335 training for HCPs in supporting asthma self-management, a situation that is not limited to a
336 developing country like Malaysia.^{6,13,23} Furthermore, we noted a marked separation of roles
337 in the current healthcare provider system, where only doctors and pharmacists were given the
338 responsibility of self-management counselling, which promoted silo-working, poor
339 teamwork, and hesitancy of healthcare providers to support self-management as it was
340 outside their job description. Study participants were recruited from attendees of an asthma
341 training workshop, who had been selected to attend because of their direct involvement in the
342 care of patients with asthma. Any negativity elicited within this study may be more
343 pronounced in HCPs less involved (and thus less confident) in asthma care. All these are
344 modifiable barriers. Team-based, comprehensive training of HCPs including nurses, assistant
345 medical officers, assistant pharmacists in performing – or supporting – asthma self-
346 management counselling may not only facilitate asthma self-management,^{13,29–32} but also help
347 overcome the resource limitations.

348

349 Only some HCPs were able to attend the structured training relating to asthma self-
350 management in the hope that they would share their learning with their peers who had stayed
351 back to carry out clinic duties. Dependence on opportunistic peer training may have led to
352 inconsistent skills and knowledge gaps among some groups of HCPs. Among our study
353 population none of the four assistant pharmacists (10-25 years of experience) had heard
354 asthma self-management, highlighting how they were not involved in the asthma team and
355 had received minimal training regarding asthma. Their main roles were to dispense
356 medication and check inhaler technique. Training and extending assistant pharmacist and
357 nurse roles within the team may alleviate HCP capability- and opportunity-related barriers.
358 Better training can improve motivation.^{33–35} Blended learning using web-based mobile

359 applications can be considered as an option for training delivery as it provides HCPs with
360 increased accessibility to and interactivity with training material and allows for scheduling
361 flexibility for HCPs with heavy workloads.³⁶ In addition, the use of motivational
362 interviewing, training of lay educators and group consultations may help to overcome some
363 of the barriers in the delivery of asthma self-management support and care.³⁷⁻³⁹

364

365 *Implications for overcoming societal barriers*

366 Low levels of literacy and language barriers were perceived as major barriers preventing
367 patients from understanding asthma self-management. Similarly, studies from other countries
368 have reported poor understanding of asthma in South Asian patients and those with low
369 literacy,⁴⁰⁻⁴³ and language barriers prevented HCPs in educating ethnic minority patients on
370 asthma management.^{23,44} In addition, the asthma action plan was perceived to be too wordy
371 and information was not available in all the languages widely used in Malaysia. This, in
372 addition to lack of interpretation services, compromised the effective delivery of supported
373 self-management in a multiethnic Asian country. However, the perception that literacy is a
374 barrier to self-management may represent a subconscious justification on the part of the
375 HCPs for not offering self-management advice. The use of pictures or videos and the
376 provision of multilingual resources are potential ways to overcome both language and literacy
377 barriers as perceived by HCPs. As reported in other studies, pictorial format tools which
378 offered information in literacy sensitive manner have been shown to enhance consultations
379 and facilitate understanding of management plan⁴⁵⁻⁴⁶ including in Malaysia⁴⁷, and can
380 improve asthma outcomes.⁴⁸ In addition, all material should be checked for reading age and
381 readability. Within this programme of work, we are exploring the perspective of patients, and
382 co-developing asthma self-management support materials (including paper and mobile format
383 of pictorial asthma action plan) with users.

384

385 Our participants highlighted that engaging patients in maintaining asthma diaries (as
386 recommended by Malaysian asthma guidelines)⁴⁹ is challenging. This is not unexpected;
387 patients tend to be motivated to manage their asthma when symptoms cause discomfort,
388 affect their daily activities, or if they believe asthma may cause serious consequences.^{40,50-52}

389 Some HCPs in this study suggested internet or mobile monitoring interventions might
390 support monitoring for those interested and able to use such platforms. An example of such
391 intervention is as a mobile application with graphic icons representing asthma symptoms as
392 visual aid to log daily symptoms.^{30,44,53-59} Globally, however this may not as effective as
393 hoped, as despite prioritising symptom and peak flow diaries as core components of asthma
394 apps, in reality few patients engage regularly with monitoring tasks.⁶⁰ Future studies will
395 need to explore the feasibility of using digital support for self-management for asthma in
396 Malaysia. In addition, interventions on a larger contextual scale to promote awareness and
397 understanding of guideline-recommended care include policy changes that support social
398 movements, such as through online health communities that involve patient and public
399 participation may be the way forward.⁶¹⁻⁶² Furthermore, the literacy and language barriers,
400 and the lack of training enabling HCPs to overcome these barriers may mean that some
401 patients may not understand the implications of a diagnosis of asthma. Hence, comprehensive
402 education, culturally appropriate and tailored to the education and literacy level while taking
403 universal health literacy precautions,⁶³ about asthma and promotion of self-management is
404 necessary.

405

406 The factors that contributed to the challenges of implementing asthma self-management in a
407 Malaysian primary care setting were multifactorial, but most are potentially modifiable.

408 Interventions will need to adopt a comprehensive approach tailored to the local healthcare

409 system and address the societal context of multiple languages and limited health literacy.
410 Prioritisation of asthma, and supported self-management is needed at policy, management,
411 practice, community, and individual levels to enhance access to training, address flexibility of
412 roles, increase awareness, and explore innovative digital approaches to improve supported
413 self-management for asthma.

414

415 *Strengths and limitations*

416 This study included the views of all groups of healthcare professionals in the management of
417 asthma in Malaysian primary care, and our recruitment strategy during an asthma training
418 event achieved a good response. The qualitative study design enabled an in-depth exploration
419 of the barriers that hindered the delivery of supported self-management for asthma among the
420 healthcare professionals. We did not approach professionals who are not involved in asthma
421 care; this could have limited the perspectives heard though we considered that they would
422 have been unlikely to be aware of the issues we wished to explore. Focus groups were
423 organised flexibly, and most of the professionals we invited participated. However, some
424 participants may have hesitated in expressing individual reservations or concerns in the
425 context of a group. Offering the option of one-to-one interviews might have enabled the
426 recruitment of a few more participants and supported more open discussion. To mitigate this,
427 we grouped HCPs of the same role together and experienced qualitative researchers
428 facilitated the discussions to ensure everyone had a chance to contribute. We may thus have
429 missed some factors, especially from the perspective of patients who were not included as
430 participants of this study.

431

432 The researchers were all primary care physicians with an academic interest in supported self-
433 management which will have influenced the data collection and analysis. We remained aware
434 of this and discussed emerging findings with a wider group.

435

436 **Methods**

437

438 *Design*

439 This was a qualitative study using focus group discussions (FGDs) to explore HCPs'
440 perspectives on the barriers and challenges of supporting patients to self-manage their asthma
441 in their day-to-day practice.

442

443 *Healthcare context*

444 Malaysia operates a dichotomous primary care system (public and private). Public primary
445 care clinics are funded through general tax revenues and each consultation costs RM1 (USD
446 0.20) inclusive of investigations and medication. The private sector is funded by out-of-
447 pocket payments. The public sector provides 60% of outpatient care.⁶⁴ In these clinics, a
448 number of healthcare professionals (HCPs) contribute to the provision of asthma
449 management services. Their roles are summarised in Table 2.

450

451 *Study setting*

452 The study was conducted in six urban and semi-urban (three urban and three semi-urban)
453 public primary health care clinics in the district of Klang, Selangor, Malaysia that cater to the
454 lower- and middle-income populations of the country. At 22%, Selangor has the highest
455 prevalence of adults with asthma in Malaysia.⁹ All the six selected clinics are headed by
456 trained family physicians. Each clinic had 11–26 medical officers, 13–55 nurses, 4–8
457 assistant medical officers, 6–10 pharmacists and 3–6 assistant pharmacists. This wide

458 variation was related to the size of the clinics and number of patients attending per day in the
459 clinics; each doctor could expect to see 50–70 patients daily. As part of routine practice, all
460 patients with asthma on follow up were given asthma dairies to record their symptoms and
461 encouraged to bring the dairies along during their follow up.

462

463 ***Participants, recruitment, and sampling***

464 Participants were approached during a workshop on asthma management attended by all the
465 HCPs (30) who were involved in the care of adult patients with asthma in the six primary
466 care clinics in the Klang district. Those who agreed to be contacted about the study provided
467 telephone numbers which were used (via telephone calls or text messages) to confirm their
468 interest to participate and to arrange the focus groups. Composition of the focus groups was
469 according to the participants' profession to facilitate interaction and avoid hierarchical
470 barriers.

471

472 ***Data collection***

473 We developed a semi-structured interview guide based on our reading of literature (mostly
474 from high-income countries),^{13,14} our knowledge of the Malaysian socio-cultural context,^{16–21}
475 and our experiences in the public health system. The topics covered asthma management and
476 the healthcare professional's perspectives on the barriers of providing supported counselling
477 on self-management for people with asthma.

478

479 We used open-ended questions in the FGDs, with prompts used when important issues did
480 not emerge spontaneously during the interview [Appendix 1]. Sessions, which lasted between
481 60 to 90 minutes, were conducted by PYL, ATC or SSG, with field notes on non-verbal cues
482 and interview dynamics taken by an assistant. All interviews were audio-recorded,
483 transcribed verbatim, and checked. Interviews and analyses were performed iteratively until

484 no new themes emerged. Recruitment was stopped after six focus group discussions when
485 researchers agreed that the analysis had reached thematic saturation.

486

487 *Data analysis and validation*

488 We used NVivo 12 software to manage the data. Thematic analysis was used.⁶⁵ Data from
489 FGDs and field notes were coded for themes and analysed inductively to identify recurring
490 themes. Comparison of themes both across and within sub-groups allowed the understanding
491 of the issues specific to each group. Two researchers (PYL and ATC) coded one transcript
492 independently and created a list of free nodes (themes). Subsequently, the themes were
493 merged to form categories. The coding was then compared for inter-rater consistency and
494 discrepancies. Any disagreements were resolved through consensus. The final framework
495 was then used to code subsequent transcripts. Any new themes that emerged were added to
496 the list with consensus of the research team. The quotes that best represent the essence of the
497 themes were extracted for inclusion in the results in this article.

498

499 *Interpretation and reflexivity*

500 The three researchers (PYL, ATC, SSG) involved in data collection and the analysis were
501 female academic primary care physicians. They had frequent open discussions enabling them
502 to reflect on themes and remained mindful of their professional views and biases about
503 asthma self-management support throughout the analysis.

504

505 *Ethics approval*

506 This study received ethical approval from the Medical Research and Ethics Committee of the
507 Ministry of Health, Malaysia (NMRR ID: NMRR-18-2683-43494) and sponsorship approval

508 from the Academic and Clinical Central Office for Research & Development (ACCORD) at
509 the University of Edinburgh. All participants provided written informed consent.

510

511

512

513 **Data availability**

514 The data are not publicly available due to them containing information that could
515 compromise research participant privacy.

516

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527

528 **Competing interests**

529

530 The authors declare no competing interests.

531

532

533

534 **Authorship contributions:**

535

536 PYL, ATC, SSG and JW were involved in data collection, analysis and writing of the original
537 draft of the manuscript. All authors contributed to the funding acquisition, conceptualization,
538 writing, editing and review of the manuscript. All authors approved the final version.

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542 **References**

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Table 1: Demographic data of participants (N=26)

		Number
Age (years)	< 30	6
	30 – 39	12
	40 – 49	5
	50+	3
Sex	Female	21
	Male	5
Ethnicity	Malay	18
	Chinese	2
	Indian	6
Time in current clinical role (years)	< 5	6
	5 – 9	8
	10 – 14	3
	15 – 19	5
	20 – 24	1
	25+	3
Position	Medical officer	5
	Nurse	4
	Pharmacist	4
	Assistant medical officer	4
	Assistant pharmacist	4
	Family physician	5
Used asthma action plans with patients?	No	10
	Yes	16

Figure 1: Practice-based and contextual barriers to implementing asthma self-management education in primary care.

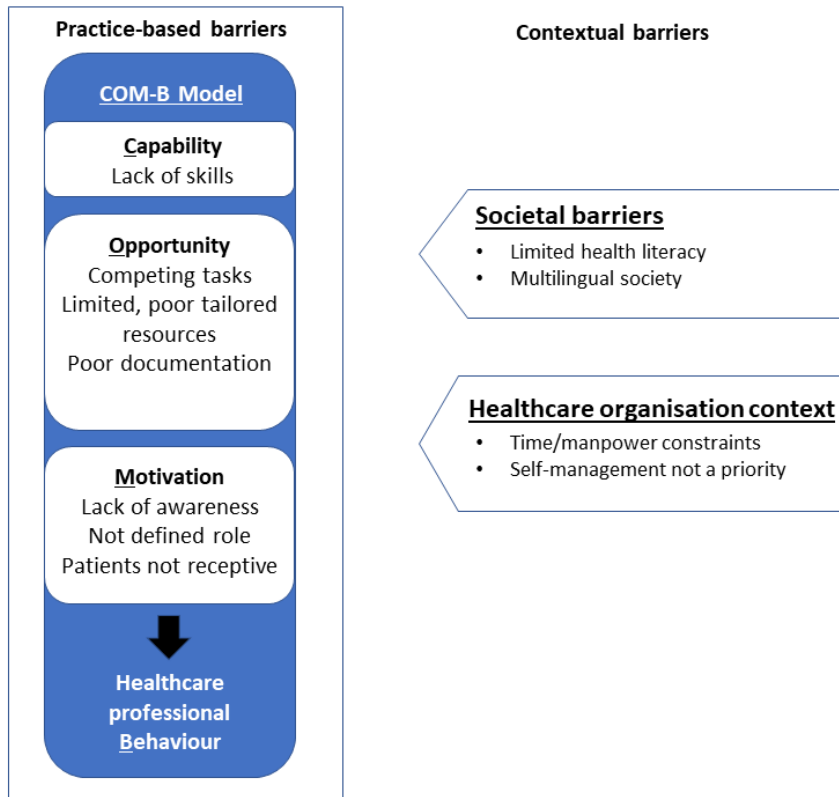


Table 2: Healthcare professional roles in the provision of asthma management services within public healthcare clinics

Professional	Roles
Doctors (Family physicians and medical officers)	<ul style="list-style-type: none"> • Assess status of asthma control • Manage long-term care of asthma symptoms • Prescribe medication • Counsel on self-management
Pharmacists	<ul style="list-style-type: none"> • Assess medication adherence • Counsel patients on inhaler technique • Counsel on asthma action plan
Assistant pharmacists	<ul style="list-style-type: none"> • Dispense medication
Assistant medical officers	<ul style="list-style-type: none"> • Manage acute exacerbations of asthma • Refer to medical officers or family physicians for long-term care
Nurses	<ul style="list-style-type: none"> • Assist in assessment for acute exacerbation of asthma and follow-up care • Refer to medical officers or family physicians