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The dental workforce in Malaysia: drivers for change from the perspectives of key stakeholders

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Objective: The dental workforce is facing unprecedented change globally as a result of multiple influences. There is a need for research informed action to map possible drivers for change at the national level and examine their potential implications in order to shape the dental workforce to serve population needs. The objective of this study was to explore key stakeholders' views on the drivers for change for the Malaysian dental workforce and their potential implications. **Method:** Stakeholders from key dental organisations/professions in Malaysia were purposively sampled and invited to participate in a semi-structured interview (n = 20) using a pre-tested topic guide. Interviews were recorded, transcribed verbatim and analysed using Framework Analysis. **Results:** Drivers for workforce were identified across four main domains: policy-politics; trends in demography; social and economic; and, technology-scientific development. The pace of change and possible interplay between drivers, most notably government policy, liberalisation of education and health services and challenges of workforce governance, followed by Malaysian demography and health trends. Implications for the future, including possible uncertainties, particularly in relation to specialisation and privatisation were identified, together in balancing and meeting public health needs/demands with professional career expectations. **Conclusion:** Stakeholders' views on the high-level drivers for change broadly mirror those of high-income countries; however, specific challenges for Malaysia relate to rapid expansion of dental education and a young workforce with significant career aspirations, together with imbalances in the health care system. The impact of these drivers was perceived as leading to greatest uncertainty around specialisation and privatisation of the future workforce.

Key words: *Dental workforce, drivers for change, key stakeholders, Malaysian, future*

INTRODUCTION

There is an increased recognition of the need to consider key drivers for change and their potential implications for the future healthcare workforce[1–3], including dentistry[4]. Much oral disease could and should be prevented[5]. Furthermore, healthcare developments in our ageing world population[6–9], where the majority of older adults retain their teeth into older age[8,9], requires dental care to be delivered in new ways[10,11] Identifying drivers for change and their possible implications is critical when planning for an uncertain future[2,3,12]. Drivers of health service change can be divided into four broad categories or domains, 'demography and disease', 'technology and scientific development', 'policy and politics' and 'social and economic change'[1]; all of which have implications for the health workforce[4,13].

As a middle-income country with a growing and ageing population[14,15], Malaysia, has significant levels of oral disease, even though there are indications that dental caries is declining in certain age-groups[16–18]. The oral healthcare system in Malaysia involves both public and private agencies and organisations[19]. The Oral Health Program under the Ministry of Health is the leading public agency responsible for providing health and oral care to the Malaysian population within their primary, specialist, and community oral healthcare programmes[19,20]. All Malaysians are eligible to receive publicly funded dental services that provide highly subsidised treatment comprising fillings, extractions, low-cost dentures and emergency care.

The target groups for public dental services are toddlers, preschool children, primary and secondary school students, antenatal mothers, adults and elderly people, as well as special care groups who are mentally, physically or economically disadvantaged. School children up to 18 years of age receive dental treatment provided by dental therapists under the School Dental Programme that offers free dental check-ups and treatment, with parental consent[20,21].

When Malaysia gained political independence in 1957, the country's population was recorded at seven million and there were only 20 dentists working in the public sector with around 50 working in the private sector; the majority were based in urban areas[22]. To address this acute workforce shortage, several dental schools were established as Malaysia developed its national healthcare system. In recent decades, Malaysia has strived to produce dentists by rapidly increasing the number of dental schools from 3 to 13 by 2010[23]. Malaysians are also being educated abroad, most notably in India, Indonesia, the Middle East and the United Kingdom (UK)[24]. Consideration of numbers in education is particularly important for dentistry, because dentists are expensive to train, and after qualification, require expensive facilities to practice. In 2001, 3 years of compulsory public service was required from all graduates to overcome the shortage of dentists in the public sector. This was shortened to 2 years in 2012[25], and latterly, to 1 year of public service[26], due to an imbalance between graduate numbers and clinical facilities. It could be argued that while the dentist–population ratio in Malaysia is gradually improving, disparities in workforce distribution and dental facilities exist between rural and urban areas. Although the private sector is growing, the majority of dentists still work in the public sector.

At the time this research was conducted, there were 5,916 dentists serving a population of 28 million and ~900 graduates per year[14,24]. The Oral Health Program (OHP) of the Ministry of Health (MOH) in 2013 outlined their aim to achieve a dentist to population ratio of 1:4,000 by 2020; however, given the rapid growth of dental graduates, this was revised upward to 1:3,000[24,27]. Nevertheless, despite the increasing number of dentists, there are still disparities in the distribution of dentists as their numbers vary from state to state, with higher concentrations of dentists in Peninsular Malaysia and urban areas[24,28]. In 2016, the majority of dentists were working in the public sector (63.7%), mainly under the MOH while others were serving the Ministry of Higher Education and the Malaysian Dental Corps[29], as part of compulsory service requirements, or postgraduate education and training opportunities supported by an attractive remuneration scheme[21,24,26,30]. Our recent national survey of senior dental students, conducted as part of a wider programme of research to inform workforce considerations in Malaysia, reported their ambitious career aspirations in relation to specialisation and more flexible patterns of working[31,32].

The current dental workforce in Malaysia is largely made up of general dentists, with some specialists, and dental auxiliaries. The latter, known as dental care professionals (DCPs) in the United Kingdom (UK), comprise dental therapists (nurse), dental hygienists, and clinical dental technicians, supported by dental technicians and dental surgery assistants (DSAs)[20]. In Malaysia, the only operating clinicians are dentists and dental therapists, and the scope of a dental therapist depends on a patient's age and the therapist's level of training[33]. There are no dental hygienists training or working formally in Malaysia. Although dental therapists have traditionally only been permitted to work in the public sector[24], recent legislation is opening up the opportunity to practice in the private sector and treat children up to the age of 18 years[21]. In the meantime, dental therapists who have undergone post-basic training of 6 months in various disciplines are allowed to work in specialists' clinics and provide treatment for adults[27]. Other relevant legislative change involves the need for registration of specialists and dental therapists[21], in a similar manner to the UK.

While new policies on dental services have included privatisation of dental care[4,8], dental insurance[9], dental team working[4,34], and trade liberalisation in both education and healthcare[35–38], these reforms have implications for health systems, specifically in cost-management, which remains unexplored[34,39]. Stakeholders including health providers, professionals, patients, the public and the government, have to take account of the drivers for change[4,40,41] and their possible implications.

The literature has a paucity of research in this field globally, particularly in middle-income countries. It is therefore timely to examine the dental workforce in the case of Malaysia as a middle-income country to capture various perspectives on the drivers for change and their implications for the oral and dental workforce. In light of the above, the objective of this study was to explore key stakeholders' views on the drivers for change for the Malaysian dental workforce and their potential implications for the future.

METHODS

Study population

This study used heterogeneous purposive sampling[42], of experts[43]. Expert views, knowledge and experience were of particular interest in relation to future health planning and informing workforce

modelling[44,45], due to their position and reputation[46] and their power and influence on policy decisions[47]. Maximum variation sampling, otherwise known as heterogeneous sampling, ensured a range of relevant views were captured from experts in strategic positions across key organisations[43]. Organisations in Malaysia were selected primarily based on their relevance to dentistry and their strategic perspective across: academic institutions (public/private), government bodies and non-government professional organisations with responsibilities in relation to dental care and services in Malaysia (*Table 1*); along with front line representatives from primary care. Nursing heads (matrons) were recruited to assess the future role, career development and initiatives of dental auxiliaries and senior dental practitioners (both public and private practice). Professional leaders in these organisations and settings were approached to participate or nominate a representative. Additionally, new graduates (junior dentists and dental therapists) in primary care were recruited to elicit the professional motivation and career expectations of Malaysian dental students, including those who studied abroad. Approval for the study was obtained from BDM Research Ethics Subcommittee (RESC) at King's College London (BDM/12/13-129). This study was conducted in accordance with the World Medical Association Declaration of Helsinki.

Table 1 List of informants in semi-structured interviews with key stakeholders

No	Organisations	Informants (*n*)
1	Academic institutions	
	a) Ministry of Education	1
	b) Dental schools (heads of school)	
	i. Public schools	2
	ii. Private schools/+ with nursing school	3
2	Government bodies	
	a) Oral Health Program (OHP), Ministry of Health (MOH)	
	i. Principal/deputy/senior principal assistant directors	3
	ii. State deputy/assistant deputy directors (from East Malaysia)	2
	iii. Head of specialist	1
	iv. Head of dental nurse	1
	v. Senior general practitioner	1
	vi. Junior general practitioner	1
	vii. Dental therapist	1
	b) Malaysian Dental Council (MDC)	1
	c) Ministry of Defence (Dental Corps)	1
3	Non-government organisations (NGOs)	
	a) Malaysia Dental Association (MDA)	1
	b) Malaysia Private Dental Practitioner Association (MPDPA)	1
	Total	20

Topic guide

Semi-structured interviews were conducted in English by one interviewer (MFCM). A topic guide informed by workforce policy and research literature[40,48–50], was used to guide the discourse and address the aim of this study[51], ensuring relevant issues on workforce development and provision were covered[52–54]. Drivers for change and their implications were explored across five areas: (i) individuals and their roles in the dental workforce; (ii) recruitment to dental education; (iii) dental education and training; (iv) workforce retention; and (v) models of care, exploring their views and suggestions regarding future directions. It was piloted with one senior dentist who is experienced as both a clinician and administrator, to ensure its coherence and relevance. Research findings on the motivation and career expectations of dental students in Malaysia were shared with interviewees prior to the interview to facilitate insight to the views of the next generation of dentists[31,55], as part of our linear mixed methods study[32,56]. Newly emerging themes were explored in subsequent interviews, but the main topic areas were kept constant.

Recruitment and interviews

Potential participants were approached by letter, including confirmation of ethical approval, outlining the purpose of the study and inviting them to consider participation. Non-responders were contacted by email and phone to determine whether they were interested in participating. An email containing an information sheet and consent form was sent to all interested participants. Arrangements were made for a semi-structured interview at a mutually convenient date and time. Interviews were conducted in English in which most participants were fluent, because dentistry is taught in English.

Interviews were conducted in a quiet location chosen by the participants, mainly at their workplace. On average, each interview lasted 1 hour. Each session started with explaining the purpose of the interview and participants were then invited to ask questions and seek clarification about the study prior to providing written consent. Interviews were audio-recorded, and field notes made during the session. All recordings were transcribed using a confidential transcribing service and the lead researcher (MFCM) listened to the recordings and checked each of the transcripts. Scripts were shared with and also checked by participants. All scripts were pseudo-anonymised using a generated participants' ID for analysis (e.g. B1). Recruitment continued until coverage achieved across key organisations and primary care with no new themes was emerging.

Qualitative data analysis

Interview data were analysed using the Framework Analysis approach[51]. This approach comprises of data management, followed by descriptive analysis and

finally, an explanatory analysis. The key steps involved in data management involved familiarisation with the data, development of an index or conceptual framework of themes and subthemes; indexing of the data; sorting by theme or concept; and finally, synthesising the data to provide descriptive and explanatory summaries.

RESULTS

Interview participants

Twenty interviewees ($n = 20$) comprising senior management from academic institutions (old and new; public and private dental schools), representatives of government bodies, and non-government organisations (NGO), as well as representatives from primary care dentistry and dental therapy contributed to this research. All of the prospective participants approached agreed to be involved in the research with none of them withdrawing following their interview. Most participants had postgraduate qualifications (70%; $n = 14$); over 25 years' experience (70%; $n = 14$), female (50%; $n = 10$); and were working as dental public health specialists (45%; $n = 9$). Almost all had been involved in one or more meetings regarding workforce planning nationally or at the state level (90%; $n = 18$).

Drivers for change: domains

Drivers for change relating to the oral and dental workforce were present across four domains notably: policy and politics, trends in demography, social and economic influences, and technology and scientific development (*Figure 1*). The leading drivers are principally related to the first three domains and included: rapid growth in dental education, recent capping of schools and student intake; the impact of trade liberalisation on dentistry (education and health services), and trends in dental diseases, together with meeting the needs of the growing and ageing population. The four domains were interrelated, such that a change in one area was perceived to have a likely impact on the others as outlined below.

Each of the domains is presented in turn below, illustrated by anonymised quotes in support of the concepts. Each quote is labelled by participant ID, location in the transcript (page), status, sector and gender to provide insight into the nature of the participant while protecting identity (ID). Quotes have been cleaned grammatically to facilitate ease of understanding and sections removed denoted accordingly as [...]. In each domain, a broad overview is presented first, before presenting the divergent views to provide an understanding of relevant workforce issues.

Policy and politics

Although policy and politics were mentioned by the interviewees, there were differing views on specific policies and the degree to which individuals felt they were evidence-based and appropriate. Divergence of view was most apparent between dental professional and government leaders. The primary issues raised were related to the liberalisation of the education and health services sectors, which will be examined in detail below. Thus, it was recognised that these issues, and subsequent responses, held long-term consequences for the wider population and patients' health as well as the dental profession, external organisations, and individual dental careers.

Increasing liberalisation in the education sector

Government education policy was largely perceived as a driver or catalyst for the number of dental schools in existence, resulting in more places in dental schools to address national workforce shortage. Furthermore, trade liberalisation in education was considered to further stimulate workforce growth as part of the drive to expand the 'knowledge economy':

> We, the member of [name], we try to produce dental graduate[s] that will meet the country's need. By the year 2020, one [...] to four thousand. But now with the new policy, it [will be] one to three thousand. (B5) 3 [specialist, public, male (♂)]

> They weren't projecting what the needs would be and all that. So, because of that, we were facing very acute or critical shortage of dentists in the country. (D1) 2 [specialist, public, female (♀)]

Most dental professionals (public and private) raised concerns over rapid growth in the number of dental schools as it is deemed to not correspond with, or be reflective of, population need; this was particularly in relation to the subsequent distribution and placement of new graduates to ensure access across the public sector. Professional participants were particularly concerned that the health care system is not able to absorb and utilise new dental graduates given pressure on public sector resources, including clinical facilities. This was perceived as delaying graduates' employment, as demonstrated in the following quotations:

> What is the readiness of our public service in terms of facilities? Are we ready to accommodate these one thousand graduates with the existing other professionals in the Government service? Do we have enough facilities? (D1) 8 [specialist, public, ♀]

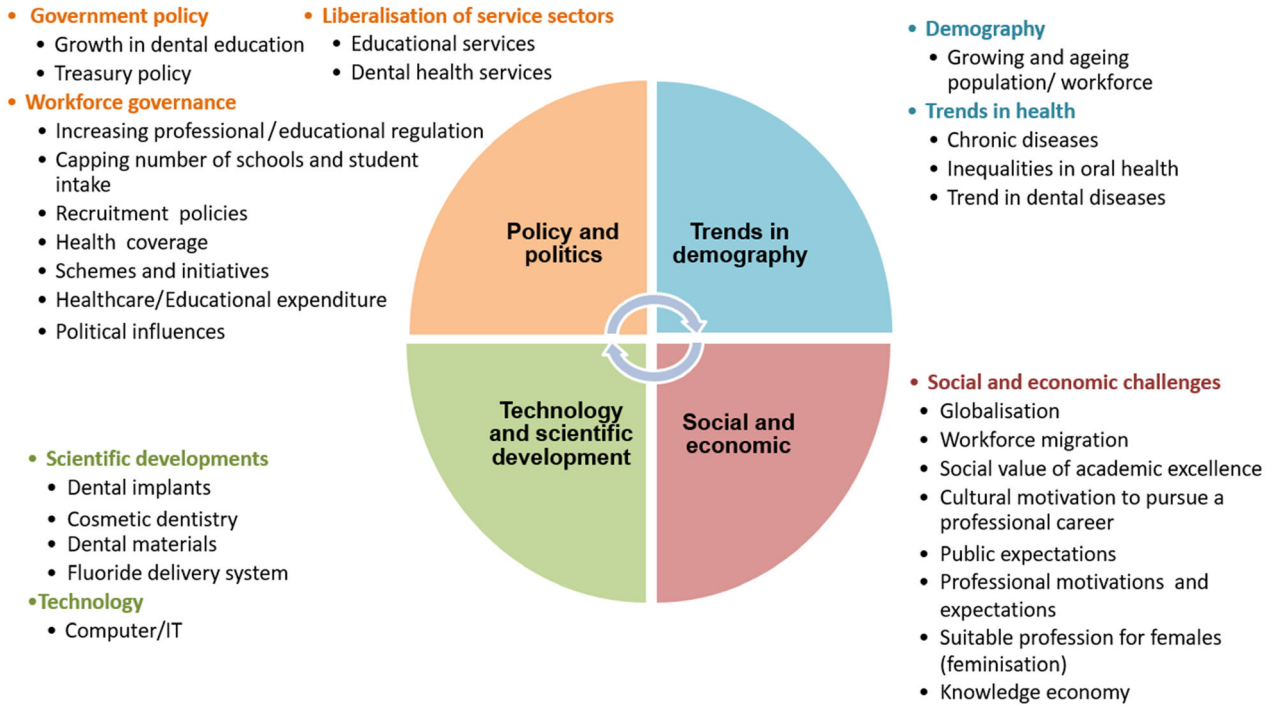

Figure 1. Four domain themes and their respective subthemes for the overall drivers for change in the Malaysian context.

> If you overdo it (increasing the workforce volume), at the end of the day, what will they [workforce] do? (B4) 13 [generalist, private, ♂]

Participants also argued that recent educational growth had been strongly influenced by politicians. They raised concerns that professional advice on such matters was ignored, albeit local dental professionals themselves recognised conflicting interests at play:

> But the mushrooming of [...] institutions is to some extent beyond our control because it lies under the [name] to give permission to the institutions to set up (a dental school). Although they actually [do] come to the professional regulatory authority to give input and we did give input. So, there have been times in the past when we said no but the [name] have gone ahead to allow them to do so. That's our problem, this override on (of) our advice by some other party from the [name]. (D3) 5 [specialist, public, ♀]

Increasing liberalisation in the health services sector

Some participants argued against recent legislation and its effect on the healthcare system and workforce market. This included changes to the location where the dental therapists may practice including allowing them to work in the private sector. Participants working in the private sector perceived this as a potential threat:

> The so-called therapists, they are only employed in the public service at the moment. So, you do not have them outside in the private sector. They are going to be regulated under the new Dental Act; and, once it is in force, they will then be allowed to work in the private sector. (D1) 21 [specialist, public, ♀]

> But one of the key issues was the inclusion of dental therapists in the Dental Act. And we were concerned when that happens, we don't know what their scope of practice is? What is their role especially in the private sector? (C3) 5 [specialist, private, ♂]

Workforce governance

Dental professionals shared their concerns over the educational liberalisation and the subsequent response by the Malaysian Dental Council and its co-organisations which introduced a dental moratorium to implement short-term capping of the number of schools and limiting dental student entrant numbers to 50–75 per school, which represented around 900 per year nationally. There was recognition that this policy focused on quantity, rather than the quality of students, which also needed to be addressed:

> When, we couldn't stop the establishment of the institutions, we went for the moratorium. So, we actually worked for the moratorium. (D3) 6 [specialist, public, ♂]

> We have a moratorium from March 2013 until 2018, not because we're scared with the increasing number of students, but we are worried about the standard of graduates. We want to maintain that competency (quality); therefore, we want to make sure they have enough lecturers, facilities and patients for their practical (clinical education and training). (D2) 18 [specialist, public, ♀]

Furthermore, there were concerns that the policy does not consider the large number of Malaysian students studying abroad and returning home to join the dental profession:

> They should put the same control (on students going overseas to study dentistry). There are enough dental schools here. We have fifteen dental schools here, you know. You do not have to send overseas, for whatever reason. (C1) 18 [specialist, private, ♀]

Increasing professional regulation has introduced specialist polices in recent legislation, and having formal lists considered important as a way to potentially control the quality of both local and foreign specialists:

> Specialists are not registered at the current moment, so under the new Act suggesting a new register, a new division for specialists in the Dental Bill. (D3) 22 [specialist, public, ♀]

> That's why 'liberalisation' in Asian countries, we allow the free movement of specialists, but again they must go on [. . .] procedure. (The) Basic degree must be recognised by the MDC; if not, they must sit PQE (Professional Qualification Exam) under (the) proposed new act. With these, they are allowed to work in private hospitals in Malaysia only, but not at (a) standalone clinic. (D2) 16 [specialist, public, ♀]

In summary, there was evidence that policies are influencing the dental system, and dentistry is high on the policy agenda, suggesting policy-induced problems in a Malaysian context. There is also a strong sense of controlling the uncontrollable, particularly in relation to dental student numbers and restriction of specialisation. Although the above quotes demonstrate the strong sense of respectful obedience to health policy, most participants, both in the public and private sector agreed that some aspects in the country's health and educational policies need to be altered for the benefit of the population and the dental profession, rather than allowing unfettered growth of third level dental education.

Trends in demography

Growing and ageing population presenting with chronic diseases

Participants' knowledge regarding global demographic trends and diseases recognised the relationship between these two themes, for example, specific healthcare is increasingly required for older people as demonstrated by the following quotations across public and private sectors:

> As you know, our population, like a lot of populations in many other countries, is ageing. But we need to know that the quantity of elderly people is going to increase as the number of the young increases, therefore they will need healthcare. (B8) 6 [specialist, private, ♀]

> Things like, you know, gum recession, periodontal disease, edentulous or missing teeth, root caries, thinning mucosa, other mucosal lesions. Um, the wearing of prostheses and the conditions that come[s] with it [ageing population]. (B1) 11 [specialist, public, ♂]

This domain was strongly expressed by the participants as having powerful capabilities in shaping the future system, level of care and career pathway of the workforce, and the implications it might have on the dental education and expectations of both the dental professional and the patients. The ageing Malaysian population is recognised as being more prone to chronic diseases, requiring distinctive and complex care by qualified specialists:

> You know the oral health conditions of the geriatric population for example. But with this pattern, some school[s] probably have to look at it in their undergraduate training, and then I suppose our dental graduates should be well equipped. (B2) 10 [specialist, public, ♂]

> With the growing awareness and the need for, or the demand for, specialty services increasing, that will also dictate the type of maybe postgraduates. And also, complexity of care I believe may also increase with people living longer, for example. (B2) 8 [specialist, public, ♂]

Trends in dental diseases (health)

In addition to demographic change the influence of changing patterns of dental diseases across the age

spectrum on future care requirements and workforce capacity required was raised by the professionals:

> Given the low status of caries experience; it is however unbalanced across the population group. The declining trend of dental caries is only among school children. There are still a lot of untreated diseases, unmet needs among the other age-bands. (D1) 23 [specialist, public, ♀]

> There should be a consistent study of the number of dentists and the future population growth and what the need to be met is. (B4) 7 [generalist, private, ♂]

Participants also raised concerns over the high volume of periodontal disease urging joined-up efforts by all team members as demonstrated by the following quotation. It also highlights the issue of a lack of clinical facilities to enable graduates to practise:

> There is really a serious need of periodontists in Malaysia. You need a lot of people within a short period of time. We want the numbers, but we don't have places, seats locally. But sending abroad is expensive; and, also, they don't know the trend and diseases of the local people. (C5) 17 [specialist, public, ♂]

Given current workforce capacity and periodontal diseases, there were diverse views across the profession concerning the type of workforce the country should have, for instance, introducing dental hygienists, extending the role of dental therapists or the need to increase secondary services to address this disease:

> There's mixed feelings, even among our stakeholders in the same profession, on the introduction of dental hygienists." (D1) 37 [specialist, public, ♀]

> "When we talk about the perio conditions [in] the country, we're talking [with key players] to establish a curriculum for [...] dental therapists of the future. [...] The establishment of people who can actually do the dental hygienist component regardless of what you're called." (D3) 31 [specialist, public, ♀]

Inequalities in oral healthcare

Under this sub-theme, participants highlighted the unequal use of dental services by the population. It was recognised that the majority of the population wished to access the public sector and generally only seek treatment when needed. Differences in the pattern of dental service utilisation depending on the social status of people, both in public and private settings, were recognised as a challenge that required action from health providers to address inequity in society:

> We have got a different segment of people who come here [public]. These people, they are middle-income people. There are low-income people. (C5) 24 [specialist, public, ♂]

> There are still a lot of untreated diseases, and unmet needs among the other population. (D1) 23 [specialist, public, ♀]

In summary, there are various concerns by those in authority and practitioners on the ground. In acknowledging the potential impact of serving a changing population with different oral health needs, policy makers need to consider the appropriate nature, volume and level of care (general or specialist) required and facilitate access to care.

Social and economic influences

Participants acknowledged the contribution of social and economic factors regarding global movement and expectations, of both the dental workforce and Malaysian society, underpinned by economic factors. This domain can be characterised by globalisation, which was seen as a trend that affects both the workforce and population profile. Furthermore, health professionals addressed the topic of increasing expectations and demands within contemporary society.

Globalisation of knowledge economy

Economic inbound migration to Malaysia, especially among the health workforce, is perceived as being driven by the policy of trade liberalisation that is changing the market and profile of the local dental workforce, leading to concerns over intense competition between the local and international workforce, as highlighted in the following quotations:

> People from overseas come into your country and make money. People do want to move here because this country has progressed so much. If they are allowed [under liberalisation], they are the ones having a lot of money to pump in to set up (dental practices). They were worried about the [name] group coming in and setting up a lot of clinics. (B6) 18-19 [specialist, private, ♀]

> Um, however when you look into, you know, how does it affect our local dentists and specialist. Yes, definitely there is going to be competition. (B1) 18 [specialist, public, ♂]

Nevertheless, one participant viewed this issue positively and welcomed the potential for healthy competition within Malaysia to drive up standards:

> There are people who look at it positively. Because they think that a free flow of people across the [name] region will build better quality, better standards, and more competitiveness. (D3) 21 [specialist, public, ♀]

Professional expectations

The participants also recognised the needs of the emerging graduate workforce and their career expectations, wishing to support them as outlined below:

> And we feel that somebody who has studied a course in dentistry… we must have for them, a good career, you know. So how are we going to provide for them? That's our concern there, you know. And they should have a good career, and will we have facilities and approaches to cater for them? (C3) 9 [specialist, private, ♂]

Some of the professionals also suggested that the failure to fulfil graduates career aspirations will have negative implications on workforce mobility and stability. They recognised the need to balance workforce aspirations and opportunities that can be provided by the employer to ensure retention within the profession and, where possible the public sector. Participants suggested that graduates stay longer in the public sector when they are given the opportunity to undertake specialist training:

> We see some restless young officers who wish to become specialists at an early age. That means upon completion of compulsory service - if possible after finishing their degree! Which to us is they just cannot go without experience so; the restless ones will leave. (D1) 36 [specialist, public, ♀]

Several participants suggested that policy should be adapted to facilitate suitable working hours for the workforce, including a minority view to introduce flexible working:

> Normal working conditions, of course, when this Government open this one centre, one Malaysian clinic, they are open twenty-four hours at the weekend. But again, to me, shouldn't be that because you don't have to do every day, just normal eight to five working hours. (B5) 25 [specialist, public, ♂]

With regard to entering the field of dentistry, some participants acknowledged that there is a built-in culture of valuing academic achievement in this society, resulting in applicants to choose their future career, such as dentistry based on their academic results, rather than based on their interests. In addition, some participants perceive that there is a cultural motivation reinforced by their families that compels Malaysian students to study dentistry. It has been well recognised that this cultural motivation to study dentistry has led students to study abroad due to the limited places offered at local institutions and thereafter face fierce competition for positions on their return:

> Like entrance to the school now, dental and medical (education are) widely publicised […] (and in) very high demand; and you need a very high super qualification to just enter a school. People who got the highest marks always apply for the course (dentistry). Not really knowing whether they are really interested in the course. They enter into it because they've got the correct qualifications, although the course is not really of their choice. (B7) 9 [specialist, public, ♂]

> It's their parents' choice. I think [it is] not really the students' choice; [it is] the parents that brainwash their children. They say that this is a secure job. (D2) 20 [specialist, public, ♀]

> There are still quite a high number of graduates (returning) from overseas. Because […] we cannot provide them with places to study at home. (C5) 5 [specialist, public, ♂]

Moreover, some participants acknowledged the influence of global trends in the country, including the large number of female applicants entering the dental schools, which they perceived may have implications for working patterns and capacity of the future workforce and, thus, health service delivery:

> We can look through the old fact and see that eighty per cent are ladies…as the top performers in the school or the universities are also ladies. When they graduate and become dentists, their work is a bit more [regular], usually [working] until five o'clock, it really suit(s) females, so more people (are) applying for the dental programme. However, especially young female(s), when they get married, they [get] pregnant. You have ten new female officers on maternity leave, so it may provide sudden [effects]. (B5) 24 [specialist, public, ♂]

Public expectations

Participants were aware of the need to meet the demands of the population whereby current society

places a high level of expectation on dental services and there are greater pressures on local dental practitioners to upgrade their education and training to deliver aesthetic and cosmetic dentistry:

> The country is striving to achieve Vision 2020, to reach a developed nation status and that means, there is going to be an increased awareness of oral health which may translate into a higher demand or an increased demand for dental care. And the profession has to react to this demand. There will be also some control of distribution for an equitable distribution of professionals, dentists. (B1) 32 [specialist, public, ♂]

> The population, of course is becoming more cosmopolitan. They're asking for aesthetic dentistry…adhesive dentistry. You know there is demand for things like tooth whitening and orthodontic care and so …grooming, like self-grooming. (D3) 23 [specialist, public, ♀]

In summary, participants' responses provide evidence of social and economic factors influencing the future system (public *vs.* private), level of care, profile of the dental industry, as well as working patterns and career expectations including specialist versus general care. There was also a strong sense of challenge in meeting social's expectations in a situation of current economic restriction. Most participants, both public and private sector, agreed that having good understanding of the drivers in this domain can assist healthcare providers to manage better workforce planning.

Technology and scientific development

Scientific development of new technology and innovation

This domain was characterised by innovation, with cosmetic dentistry, dental implants and the impact of the internet being the most common inventions mentioned. Participants recognised the influence of this domain in shaping the future skills and knowledge required, including implants and the internet. The interviewees feel that there is a need to equip the future workforce by ensuring that the education and training facilitates understand and use these technologies:

> And of course, now people are looking at bio-aesthetics, implants, some schools are really putting in some early training on this, and all sorts of things. (B5) 15 [specialist, public, ♂]

> Because we're in such an educated area… many patients here are Mr. Google. They have loads of information and all sorts of questions you know, the treatment options sometimes, [and] their expectations are very high. (C7) 2 [generalist, public, ♂]

Participants recognised that these technologies and scientific innovation are progressing over time, creating a need for the dental curriculum to be updated regularly, improving the efficiency and effectiveness of treatments:

> No dental curriculum should remain stagnant. It's dynamic, you should always then be progressing because it's not only the disease pattern, [and] it is also the type of care, the research. (B8) 15 [specialist, private, ♀]

> I would suggest that they should learn about implants. So that when they come out of the programme, they can proficiently do it especially for the edentulous patients. These dental students are going to learn to do implants. And they have a mini implant or a traditional implant. (C3) 10 [specialist, private, ♂]

In summary, the findings suggest that participants perceived that this domain might influence the type of skills and knowledge that practitioners need to adopt and respond to these new technologies and innovations, thus embracing technology and innovation. Although it is capable of revolutionising the field of health and healthcare, the contribution of this driver was considered uncertain; stakeholders argued that rigorous and effective policy interventions are needed to ensure that the future dental workforce is skilful and knowledgeable, to be able to provide optimum dental care and services to the population amidst changing technologies.

Emerging theory for the drivers for change for the Malaysian dental workforce

This study provides evidence of 'policy-induced problems' in Malaysia, which, along with drivers from other domains that have potential implications for the recruitment, education/training, retention and future models of care, particularly in addressing the needs and demands of the population (*Figure 2*). Underpinning theory to explain these drivers for change for the future Malaysian dental workforce namely, controlling the uncontrollable through policies, compliance with policy, the overwhelming challenge of meeting the expectations of both professionals and society in serving a changing population with different oral health needs and uncertainties caused by liberalisation

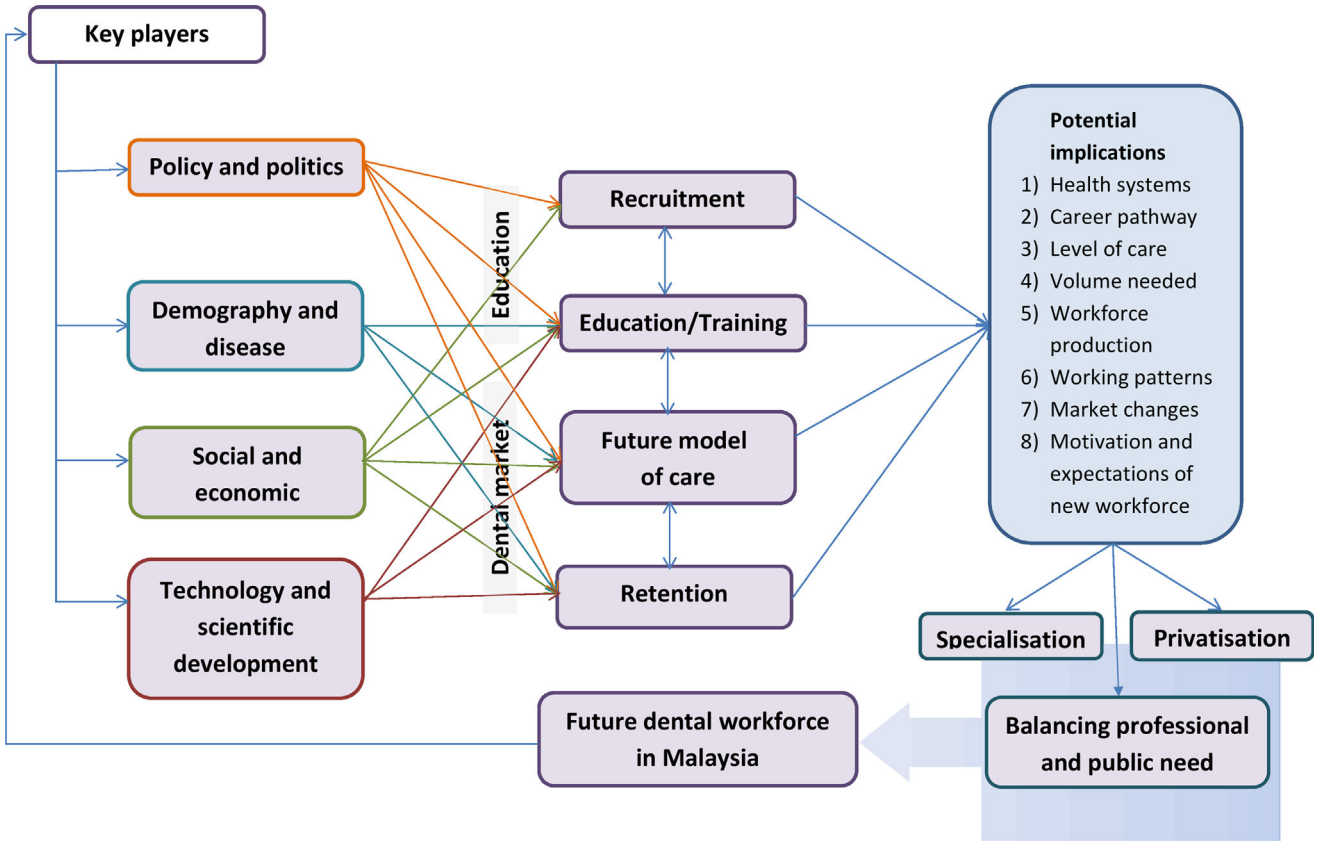

Figure 2. Overall interactions of the four main domains for the drivers for change and their potential implications, influenced by the key players, in regard to the workforce recruitment, training, retention and future model of care for the future Malaysian dental workforce.

across the education and health sectors and the moves towards specialisation and privatisation.

DISCUSSION

The findings from these interviews, largely conducted with experts actively involved with organisational transformation, highlight a range of global and domestic drivers for change in the Malaysian dental workforce. These drivers fit the future framework proposed by Sausman[1], and mirror those advocated for dentistry in the UK[4]. As illustrated in *Figure 1*, the domains are integrated across the dynamic healthcare systems and organisations[1,2]. The implications of these issues could be modelled and examined in further operational research given the importance of workforce issues[41,57,58].

Greatest emphasis was placed on the 'policy and politics' domain. This may be explained by the fact that participants are informed leaders, holding power in constructing or influencing policy and legislation related to dental education and care provision. However, policy and political conflict are perceived as common in the health sector, and misunderstanding and the lack of knowledge about organisational directions and priorities contribute to the situation as in other countries[59,60]. Furthermore, the greatest national changes in recent years are policy-related influenced by neo-liberalistic philosophy in the health and education sectors. In the latter, this includes the rapid growth in dental schools[61,62], the short-term moratorium to control the overproduction of dentists[63,64], and the lack of government places to absorb new graduates, given that they require at least a year of compulsory service training to work within dentistry[65]. It is also clear that, despite these conflicts, there is in equal measure a strong sense of compliance with the health policy identified, in line with the country's culture. In our global environment, structures and processes to create alignment and integration between centralised government, professional organisations, and individuals often create increasing conflicts due to the different priorities and pressures in governing the workforce[66,67]. Professional challenge and debate is important to test and shape possible solutions in an informed manner and is vitally important to shape the workforce of the future[57]. In this regard, as we report these findings the moratorium limiting dental schools and dental places has expired[68], and thus as we go to publish this paper,

this important governance issue of managing workforce production and capacity are particularly relevant. Furthermore, if there are concerns regarding quality, consideration should be given to introducing requirements for international graduates to sit for a post qualification entrance exam[21], and internationals to take the Overseas Regulation Exam[69], to enter the country as with the UK. Perhaps Malaysia should consider an equivalent approach.

'Trends in demography' was the second most important domain emphasised by the stakeholders. This is somewhat expected as the majority of interviewees held a dental public health or strategic perspective and these issues are pertinent globally as well as nationally. Participants were concerned about the impact of demographic changes, notably the ageing population[14,15], with possible increasing special-care needs and perhaps requiring more complex treatments in line with other countries[4,41]. Stakeholders, therefore, raised the need for extended health provision to tackle this issue, and the challenge of restricted health funding and facilities. Educators play a critical role in preparing the workforce to meet the changing needs and demands of the population; however, wider workforce deliberations such as those in England[4], are required to examine workforce implications for the future and consider levels of specialisation, use of skill-mix and models of care and think creatively about future oral and dental care. In doing so the workforce expectations of dental graduates could potentially be harnessed[31,32].

Participants perceived that the 'social and economic' domain shapes the future profession nationally and could either facilitate or limit necessary changes. This relationship is important and has caused the Malaysian society to develop better health awareness, resulting in higher expectations, including the need for government support to address their needs and demands. However, as this domain is unmanageable by policy makers alone, the findings show great uncertainty. None-the-less it is important that, health educators and providers prepare the workforce to recognise and better understand the potential impact of these drivers. Subsequently, this could minimise negative influence and increase positive influences in support of health workforce considerations. Many other countries face similar issues. For example trade liberalisation in the UK has permitted dentists from across the European Union to contribute to the dental workforce in the country for several decades, particularly in more rural areas; however, Brexit may have significant workforce implications for the UK[70]. In contrast, Malaysia's liberalisation has only focused on specialists who are less likely to address rural access issues. The market or business of dentistry needs careful and open discussion to ensure that private and public systems together can deliver the healthcare required.

Stakeholders also perceived that the influence of technology and scientific development could potentially transform healthcare and the approach to treating and handling oral and dental disease. In this regard, drivers in this domain were least prominent during the interviews. However, participants also recognised the importance of continuing professional development for existing and future practitioners to cope with the challenges of scientific and technological developments. It is important that they do so as technology is recognised to have major implications for professions[71], and dental professionals need to be prepared for future change.

Strengths and limitations

One strength of semi-structured interviews is the opportunity to enable participants to explore a process or phenomenon[51], central to the current research problem[72]. This method has provided rich data[51,54], which complemented the earlier research findings involving a national questionnaire survey of dental students[31,55], and enabled the researcher to consider the implications of student views. However, weaknesses of this study must also be acknowledged. First, the interviewer is himself a Malaysian dentist and therefore, could not be considered independent from the study. However, his background potentially helped to establish trust with interviewees given his understanding of the dental system and externality was provided by the research team which brought externality and an international perspective to the research. Second, this study did not involve interviews with Malaysian students studying abroad. As this is a growing trend, it will be important to understand their views on motivations and career expectations, and their re-integration to the Malaysian system. This should be the subject of future research. Third, most of the participants are senior professionals and specialists, therefore, they are not representative of frontline professionals. In this regard, their views are not in line with those in primary care. The greater difference appeared to be between public and private sector, as highlighted in the interviews. Fourth, it is important to note that the stakeholders' views represent their perspectives at the time the research was conducted and, given the nature and pace of change, opinions evolve over time, so there is a need to revisit this research regularly as part of long-term future planning. Nonetheless, the major strength of this

study is that it draws on the views of senior professionals with a strategic overview for dentistry. This helps presents an important and authoritative perspective that could inform and influence future changes. Substantial changes in dental workforce will require interactions between these domains and their key drivers. The relationship between these key elements need to be identified, and harnessed, if it is to support positive transformational change.

CONCLUSION

To conclude, stakeholders' views on the high-level drivers for change broadly mirror other studies in high-income countries; however, specific challenges for Malaysia relate to the rapid expansion of dental education, resulting in a young workforce with significant aspirations and raising issues regarding current dental healthcare systems. The impact of these drivers was perceived as leading to greatest uncertainty around specialisation and privatisation of the future workforce. This research highlights the importance of a flexible strategy regarding training and retention of the dental workforce for the benefit of healthcare and the population and effective governance. The implications of these findings should be examined further in additional operational research.

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Conflicts of interest

Two of the authors (JEG and EB) are academic staff at King's College Dental Institute. MFCM is a member of staff at the Unit of Dental Public Health, Kulliyyah of Dentistry, International Islamic University Malaysia, Pahang, Malaysia.

Disclosure

MFCM is a member of staff at Unit of Dental Public Health, Kulliyyah of Dentistry, International Islamic University Malaysia, Pahang, Malaysia. Two of the authors (JEG and EB) are academic staff within the Faculty of Dentistry, Oral & Craniofacial Sciences. One author (JEG) has provided advice and support to Health Education England.

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