



Original Article

Special care dentistry in a charity clinic: Demographic analysis and barriers to care in Singapore

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ABSTRACT

Objective: Geriatric and special care dentistry (GSD) aims to improve oral health of seniors or adults disabilities facing barriers to care. This is coherent with the philosophy of “compassion relief.” Tzu Chi Singapore’s Free Clinic exemplifies this through promoting health via various avenues to reach out. This article aims to provide a demographic analysis of patients with special care needs (PSCN), including age, gender, race, medical diagnoses, and treatment rendered. The patients were appraised on their complexity with the British Dental Association case mix model. **Materials and Methods:** PSCN seen by a dentist in Tzu Chi Singapore from November 2016 to December 2017 were recorded. The profiling of patients was done retrospectively. **Results:** Fifty-five dental PSCN were treated over 82 visits. 58.2% were seen in the free clinic, 27.3% in nursing homes, and 14.5% in oral health day programs for adults with intellectual disability. Their average age was 61.2 years, and the clinic was attended by patients of different races. Their medical profiles were grouped into seven categories, and the average case mix total banded score was 21.6, indicating that the average patient had “severe complexity”. A few themes relevant to Singapore were discussed, such as specialist GSD clinics, accessing dental services, socioeconomic status, state versus charity healthcare, and provision of future GSD services. **Conclusions:** Charity dental services such as free clinic can capture a niche of complex patients who may become marginalized in an established public healthcare.

KEYWORDS: *Charity health services, Geriatric dentistry, Singapore, Special care dentistry*

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INTRODUCTION

Geriatric dentistry in Singapore

There has been an upheaval of Singapore’s healthcare recently in anticipation of a “silver wave.” With above 400,000 seniors aged above 65 years out of a population of 5.5 million in 2014, this figure will surge to a million by 2030. The boom will affect elders over 80 years, in particular, where their figure will double from 2000 to 2050 [1,2].

The concoction of physical, medical, social, and psychoemotional barriers can sideline our seniors, making geriatric dentistry subtly difficult and deceptively easy [3,4]. An interesting article evaluated the willingness-to-pay for Singaporean dental services [1]. It reported that with age, Singaporeans are less willing to pay for extractions ($rs = -0.31$), fillings ($rs = -0.34$), and cleaning ($rs = -0.25$) [1]. This implies that the elderly may avoid necessary treatment in lieu of fees. Often, the crux of geriatrics can be missed if we “specialize” into technical paradigms. Comprehensiveness, as a concept of care, emphasizes caring in the conflux of barriers.

Disability and oral health in Singapore

In 2006, the United Nations adopted the Convention on the Rights of Persons with Disabilities [5]. Singapore is a signatory of the ratified Convention that is being carried out within the 2016 SG Enable Masterplan [6]. Back in 2010, 77,200 registered people with disabilities were aged above 18 years. Those who used to see pediatric dentists became lost to care entering adulthood [7]. Special care dentistry targets this group of adults. In definition, it deals with “the improvement of oral health of individuals and groups in society who have a physical, sensory, intellectual, mental, medical, emotional, or social impairment or disability or, more often, a combination of a number of these factors [8].”

In Singapore, the field of geriatric and special care dentistry (GSD) has been linked together which the Ministry of

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Health tackles as a single public health predicament. The first GSD center opened in 2015, while the second likely in 2019 [9]. The combination of elderly and people with disabilities fulfilling the definition of special care dentistry will be termed patients with special care needs (PSCN).

It is difficult to gauge the current level of unmet dental needs in PSCN or how well the GSD centers can cope with this growing cohort, simply because this is a budding field with a paucity of literature. However, studies and reviews describing the persistence of healthcare barriers have suggested that oral health diseases are significantly more prevalent in PSCN than the average population [3,7,10].

Dentistry in Tzu Chi Free Clinic

The Tzu Chi Buddhist Compassion Relief Foundation was started and led by the Dharma Master Cheng Yen. This movement, inspiring the Tzu Chi International Medical Association, commits to relieve human sufferings through various initiatives across over 35 countries [11,12]. As part of this mission, Tzu Chi Singapore, supported by the former Health Minister, opened Tzu Chi Free Clinic (TFC) in 2004. It currently provides traditional Chinese medicine, dentistry, and primary medical services in an elderly estate [12].

While helping patients with lower socioeconomic status, TFC recognizes that obstacles faced are seldom singular. The definition of special care dentistry well describes these barriers [8]. The team currently puts together the following dental activities:

- Weekday free dental services
- Sunday free dental services by volunteers
- Medical relief missions annually to Indonesia, Sri Lanka, Cambodia, and the Philippines, providing medical, optometry, traditional Chinese medicine, and dental services
- Monthly voluntarism domiciliary care to beneficiary long-term care facilities (LTCFs)
- Oral health promotion activities including Movement for the Intellectually Disabled of Singapore (MINDS) oral health day
- Continual professional education and encouraging voluntarism in Singapore's dental fraternity.

Universal healthcare and marginalization

Singapore was reportedly the most efficient healthcare system in the world, where the average resident enjoys a high life expectancy on a low gross domestic product [13]. Indeed, the World Health Organization advocates universal health coverage where the governing body commits fully, or largely, to ensure "universality" of health services, and that the poorest users are not denied quality care [14].

However, marginalized patients may slip through the net of even a comprehensive system. These patients face social and health inequities, forming a persistent minority in societies, and with niche demands that the public healthcare finds difficult to provide for. This diverse group is thought to experience higher oral health needs due to neglect but, by virtue of their isolation, has seldom been assessed at the national level [7,9]. Even the established National Health Service in the UK required

charity dental services, such as Dentaid from developing countries, to bridge shortfalls in marginalized areas over the past two years [15]. Few studies, if any, have evaluated the role of dental charity services within developed healthcare systems, catering to PSCN and overcoming their barriers.

Aims and objectives

This article presents a basic demographic analysis of PSCN covered by charity work, including age, gender, race, medical diagnoses categories, and types of treatment rendered. The PSCN are also quantitatively appraised on their complexity and barriers to care. Various themes are then discussed to illustrate the interplay of societal factors in Singapore.

MATERIALS AND METHODS

The PSCN seen by the author under TFC's dental activities were recorded in a logbook [16,17]. Only patients who satisfied the definition of special care dentistry were included. Those seen in overseas relief were excluded. Data recorded include patient's age, dates seen, gender, ethnicity, medical history, treatment received, pain and anxiety control methods, complexity index, and location where dentistry was carried out. PSCN in the period from November 2016 to December 2017 were included.

To understand the patient profile, the PSCN were retrospectively allocated into the following seven medical diagnostic categories:

- a. Intellectual disabilities or neurocognitive impairments (e.g., Down's syndrome, Alzheimer's dementia)
- b. Sensory disabilities or physical impairment affecting mobility (e.g., bedridden, fall risk, hearing or visually impaired)
- c. Geriatric patients (65 years or older)
- d. Medically compromised patients with American Society for Anesthesiologists grading of III
- e. Mental health issues or people who inject and abuse substances (smokers or alcoholics are not included)
- f. Dental anxiety and hyperactive gag reflexes
- g. Cross-infectivity concerns (e.g., human immunodeficiency virus, hepatitis B or C virus).

These medical diagnoses can impact the delivery of oral health and are adapted from the logbook summaries of the Royal Colleges of Surgeons [16,17].

The British Dental Association (BDA) case mix model was developed in 2007 to describe the complexity of PSCN for commissioning purposes and was subsequently validated through multiple trials [18-20]. The model measures patient complexity objectively against six criteria of barriers to care, each with published set of definitions. Each criterion is further measured on a four-point scale of increasing complexity (0-A-B-C). Each scale point has a respective weighted score that can be summed up to provide a banded total score, which is an arbitrary measure of overall patient complexity. A banded total score of 1–9 indicates "some complexity," 10–19 "moderate," 20–29 "severe," and 30+ "extreme" [18].

Ethical approval

The study was conducted in accordance with the Declaration of Helsinki and was approved by the committee for TFC including the Chief Executive, Clinical Head, and Dental Lead [21]. Informed written consent was waived because the study was a retrospective data analysis.

RESULTS

Age and dental setting

A total of 55 PSCN were seen over 147 sessions; this was out of all patients seen over 82 days in that period. Their average age was 61.9 years, ranging from 24 to 105 years [Table 1]. The interquartile range is 25. Those under the 25th percentile included mostly individuals from MINDS, ex-prisoners, and substance abusers. Those over 75th percentile were largely seniors in LTCF.

Of all 55 PSCN, 32 were seen in the regular TFC, 8 at MINDS oral health day, and 15 at LTCF [Figure 1]. The PSCN in regular TFC had repeated appointment of up to 12 visits, while those from MINDS or LTCF were seen once.

Medical profiling of patients

Among the seven categories of medical diagnoses, most PSCN (74.5%) fulfilled being medically compromised, while least PSCN (9.1%) had cross-infectivity concerns [Table 2]. Almost all PSCN were grouped into more than one category.

Race and gender

The racial distribution of Chinese, Malay, Indian, and others was 85.5%, 9.09%, 5.45%, and 0%, respectively, roughly proportionate to the national distribution (76.2%, 15.0%, 7.4%, and 1.4%) [2]. Despite being attended mainly by Chinese, race was not a deterrent to utilize TFC dental services. The gender distribution was 67.3% males and 32.7% females [Table 3].

Table 1: Age distribution of patients with special care needs

	Age (years)
Average age	61.9
Median age	62
Age range	24-105
25 th -75 th percentile	51-76
Interquartile range	25

Table 2: Profile of medical diagnoses categories in Tzu Chi Free Clinic's patients with special care needs

Medical diagnoses categories	Number of PSCN (%)
Learning disabilities or neurocognitive impairment	17 (30.9)
Sensory disabilities or physical impairment	29 (52.7)
Geriatric patients, 65 years or older	25 (45.5)
Medically compromised patients ≥American Society of Anesthesiologist Grade III	41 (74.5)
Mental health issues, or substance abuse (excluding alcohol and tobacco)	11 (20.0)
Dental anxiety and hyperactive gag reflexes	8 (14.5)
Cross-infectivity concerns	5 (9.1)

Treatment rendered

Dental treatment at TFC included digital dental X-rays, cleaning, fluoride therapy, periodontal therapy, fillings, extractions, denture repairs, and acrylic partial and full dentures. Services excluded wisdom tooth surgery, root canal treatment, cobalt chrome dentures, fixed prosthodontics, implants, and esthetic procedures. Treatment rendered is summarized in Table 4, and the average unit of treatment rendered for one patient was calculated.

Since 10 PSCN were fully edentulous, every dentate PSCN (45) on average would require one extraction and 1.09 fillings. Scaling was carried out for most dentate patients (41/45), and some required more than one session of periodontal therapy. Edentulous patients received mucosal chlorhexidine swabs instead. Dental panoramic tomogram or periapical X-rays were done in TFC, not for those from MINDS or LTCF.

British Dental Association case mix complexity

Every single patient was evaluated on their BDA case mix complexity, and the summary is illustrated in Table 5. Barriers for “communication” included speaking a different dialect, learning disabilities, dementia, sensory impairment or vegetative state, while barriers for “cooperation” centered largely on dental anxieties, learning disabilities, and dementia. Most patients had notable “medical statuses” and were either controlled or uncontrolled illnesses requiring treatment modifications. The 12.7% in Category “C” were largely compromised patients in LTCF. “Oral risk factor” was high as many had neglected oral health, had poorly controlled cariogenic diet, or were heavy smokers. The most severe were those requiring tube feeding or dependent on assistance to oral hygiene in LTCF. For “access to oral care” criteria, many PSCN (36.4%) were under Category “A,” due to physical disabilities and need for escorts. A secondary peak in Category “C” signified bedridden patients in LTCF. For “legal and ethical barriers,” Category “A” consisted of straightforward “best interest” decision for consent to extraction, while the couple in Category “B” required consensual best interest consent with LTCF managers or families to execute physical restraint [22].

With banded total scores, the average score was found to be 21.6 [Table 6]. This illustrates that the average PSCN seen had “severe complexity” [18].

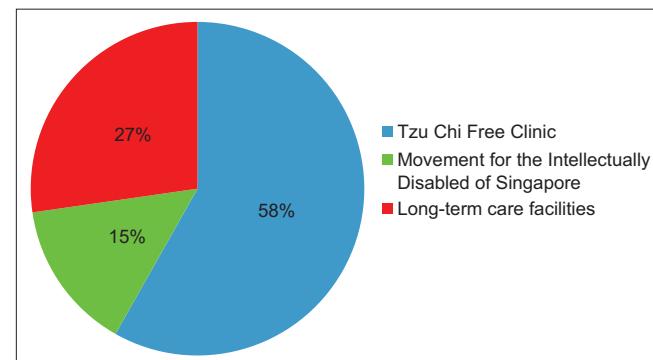


Figure 1: Distribution of different dental settings for patients with special care needs

DISCUSSION

Specialist dental service and charity dental service

Although TFC provided an incomplete spectrum of dental services, it was well attended by a faction of Singaporeans. The GSD center at the National Dental Centre Singapore, on the other hand, provides a complete range of dental specialist services with subsidized fees. A log of PSCN in the GSD center (seen by the same author within same period) was collated, and a comparison of both clinics is presented in Table 7.

The GSD center is an established specialist department seeing complex PSCN since 2015 [9]. The weighted scores of each criterion in their PSCN exceed that of TFC other than in “oral risk factor” and “access to oral care.” Yet, the overall average of total banded score was similar. This suggested that TFC was catering to a group of complex PSCN that might be facing barriers accessing specialist services.

Table 3: Distribution for race and gender of patients with special care needs

	Male	Female	Total (percentage)
Chinese	33	14	47 (85.5)
Malay	2	3	5 (9.09)
Indian	2	1	3 (5.45)
Others	0	0	0 (0)
Gender total (percentage)	37 (67.3)	18 (32.7)	55 (100)

Access and long-term care facilities

In the GSD center, “access” difficulties included being bedridden and PSCN were brought in by the transport team. Wheelchair users had assess to hoist transfers or wheelchairs recliners [9]. In TFC, PSCNs facing most difficulty with “access” were catered for through domiciliary care. Otherwise, many live independently in the elderly residential estate (where TFC is situated). Being situated in the community enabled reaching out to people with mobility difficulties and fall risks. In addition, dental services on Sunday at TFC also provide another avenue of “access” for weekday workers.

In Singapore, it is estimated at least 3% of elderly (compared to 5% in Western societies) use LTCF or home-care services [23]. Projecting this figure in 2030, it will be roughly 30,000 elderly. The shortfall of available beds will force many needy seniors to live independently without adequate assistance for daily care. Even those in LTCF may not all receive oral hygiene aids [24]. In addition, a staggering 6058 out of 13,022 beds in all nursing homes and 149 out of 175 in all inpatient hospices belonged to not-for-profit health organizations in 2016 [2]. These services, unlike their public or private counterparts, can be financially restrained. Therefore, it becomes an uphill task to incorporate oral health routine for seniors in all LTCF, despite being a proviso in the Enhanced Nursing Home Standards [25].

The result of this is depicted as the immense unmet dental needs witnessed [Table 4 and high “oral risk factor” in Table 5].

Table 4: Treatment rendered and average unit(s) provided per patient with special care needs

	Dentures (per unit)	Denture repair/reline	Extraction (per tooth)	Fillings (per unit)	Scale/root plane (per session)	X-rays
Total number of treatment rendered	25	3	45	49	41	24
Average unit(s) of treatment for one patient	0.455	0.0055	0.818	0.891	0.745	0.436

Table 5: Number and percentage of patients in British Dental Association case complexity categories of each criterion

Criteria of barriers	Complexity category of patients				Average weighted score of criteria
	0	A	B	C	
Ability to communicate	Weight: 0	Weight: 2	Weight: 4	Weight: 8	2.62/8
	24 patients (43.6%)	8 patients (14.5%)	14 patients (25.5%)	9 patients (16.4%)	
Ability to cooperate	Weight: 0	Weight: 3	Weight: 6	Weight: 12	2.13/12
	27 patients (49.1%)	17 patients (30.9%)	11 patients (20.0%)	0 patients (0.00%)	
Medical status	Weight: 0	Weight: 2	Weight: 6	Weight: 12	5.56/12
	7 patients (12.7%)	6 patients (10.6%)	35 patients (63.6%)	7 patients (12.7%)	
Oral risk factor	Weight: 0	Weight: 3	Weight: 6	Weight: 12	7.20/12
	2 patients (3.64%)	10 patients (18.2%)	25 patients (45.5%)	18 patients (32.7%)	
Access to oral care	Weight: 0	Weight: 2	Weight: 4	Weight: 8	3.35/8
	9 patients (16.4%)	20 patients (36.4%)	6 patients (10.6%)	15 patients (27.3%)	
Legal and ethical barriers	Weight: 0	Weight: 2	Weight: 4	Weight: 8	0.69/8
	38 patients (69.1%)	15 patients (27.3%)	2 patients (3.64%)	0 patients (0.00%)	

Table 6: Distribution of patient complexity with banded total score

Some complexity (score: 1-9)	Distribution of patient complexity			Average banded total score
	Moderate complexity (score: 10-19)	Severe complexity (score: 20-29)	Extreme complexity (score: 30+)	
6	18	21	10	21.6

Table 7: Comparison of patient demographics in two Singapore dental centers for patients with special care needs

	Tzu Chi Free Clinic	Geriatric and special care dental center
Average case mix weighted and average banded total score		
Ability to communicate	2.62/8	2.95/8
Ability to cooperate	2.13/12	3.09/12
Medical status	5.56/12	6.09/12
Oral risk factor	7.20/12	6.61/12
Access to oral care	3.35/8	2.00/8
Legal and ethical barriers	0.69/8	1.93/8
Total banded score	21.62	22.67
Other demographics		
Racial distribution: CMIO	85.5%, 9.09%, 5.45%, 0%	75.6%, 11.9%, 11.3%, 1.25%
Average age (median)	61.9 (62)	50.2 (54)
25 th -75 th percentile (range)	51-76 (24-105)	28.3-68 (11-94)
Male:female ratio (approximate)	2:1	1:1
Number of patients recorded	55	160

CMIO: Chinese, Malay, Indian, and others

Indeed, frail and dependent residents were found to have a higher prevalence of root surface caries, root stumps, and poor oral hygiene [23]. Denture fabrication, fillings, or thorough periodontal therapy on site was not always possible, however. Hence, the reported average 0.455 unit of denture provided per PSCN only underestimates the needs in LTCF. This concurred with other Singaporean studies of nursing homes where 56.2% of seniors in LTCF were reported to be fully edentulous, of which 78% did not have dentures and 20% had defective dentures [26]. On top of this, the dental health education of LTCF management staff still awaits improvement [24]. This then requires implemented actions to follow through, including making alterations to current obstacles (e.g., oral hygiene at 7 pm and cariogenic supper at 9 pm).

Oral risk factors and financial constraints

Patients that TFC provided treatment for were selected from the low socioeconomic niche. They displayed a higher level of complexity in "oral risk factors" than GSD center's and poorer overall healthcare status and usage, which was delineated by a systematic review of lower socioeconomic status and healthcare in Singapore [27].

When specialist dental services are required by individuals with lower socioeconomic status, two problems arise. First, subsidized specialist dental services are restricted to three centers, including the National Dental Centre [28]. This has created a bottleneck effect, resulting in long waiting times (over 220 days for root canal treatment, crowns, or dentures) despite extending clinic hours and recruiting new dentists [28]. Second, subsidies for specialist services may still be insufficient. Recent subsidies for the lower socioeconomic and elderly population aimed to direct patient flow to private health services were argued to be meager in offsetting financial difficulties of pricey specialist services [29]. In addition, only 685,000 applied for the subsidy out of 1.3 million eligible, instigating the query if the targeted beneficiaries have been embraced by this policy [30]. Complex

health conditions coupled with financial constraints can thus be synergic in PSCN. As such, these patients become marginalized or face a delay in getting treatment.

State versus charity free healthcare

To service providers, free healthcare is costly. A (generally) state-funded universal health coverage such as in Norway, Japan, and the UK report has reported overuse, increased spending, longer waits, more workers' fatigue, etc. [31]. Charity clinics, on the other hand, differ in scale. The smaller organizational structure provides adaptability and efficiency.

Two concerns, however, remain: sustainability and avoidance of abuse. Indeed, the "buffet syndrome" (indiscriminate and wasteful overuse of services and products) has been raised as a pertinent issue by prominent policy makers advocating for co-payment in Singapore healthcare [32]. Co-payment reinstates a portion of health responsibility back to patients. The "zero-cost effect," discussed in consumer psychology, indicates that demand of a free item will be disproportionately higher than the same thing at one cent [33]. Another Singapore charity dental clinic for migrant workers overcomes this by minimally charging 10 Singapore dollars per session [34].

In reality, this seldom occurs. In a "buffet" where a sunk cost was incurred, consumers become compelled to value-add and consume more, often wastefully. However, when a "zero-cost" item is offered, a transactional mentality (market exchange) is transformed to one of social etiquette [35]. The consumer perceives this as a social exchange now and becomes less likely to abuse goodwill [35,36]. These nuances might have explained why TFC has been largely spared from buffeting. In this intangible transformation of the transactional mentality, the patients can relinquish the win-lose paradigm prevalent in consumerism, appreciate goodwill of others, and improve trustworthiness of advices via a professional (or rather a friendly) standpoint.

Provision of geriatric and special care dental services in future Singapore

The World Health Organization recommends a dentist-population ratio of 1:7500 (or 1.33:10,000) [37]. This equates to every single dentist seeing 28.8 patients a day, 5 days a week, seeing each patient only once all year round. Indeed, there are numerous workforce considerations in the projection of dentist-population ratio that will not be discussed [38].

Taiwan appears to be undergoing a similar aging profile as Singapore [Table 8] and has projected to raise their dentist-population ratio to 6.0:10,000 [39,40]. While this ratio provides some reference, Singapore operates differently in health policies and economics. With a dentist population of 2293 in 2017 and an annual increase of roughly 100, the stipulated target by ministers is a ratio of 1:2220 (4.55:10,000) [28,29,41]. This can be reached by 2021. The figures did not consider the 416 oral health therapists, who are advocates of oral prevention, more mobile in their nature of work, and more economical than dentists from the public health perspective [41,43]. Meanwhile, nine scholarships have been disseminated for specialist training in the GSD fields [2,9].

It is still difficult to prognosticate the number of working dentist in 2030 and how the GSD expertise will suffice

Table 8: Table of dentist-population ratio, aging proportions, and median ages of selected countries

Country	Ratio of dentist to 10,000 of population	Year	Percentage of population aged ≥60		Median age of population (years)	
			2015	2030	2015	2030
China	0.12	2013	15.2	25.3	37.0	43.2
European Union	3.3-12.3 (Poland-Greece)	2015	23.9	29.6	41.7	45.1
Singapore	3.92	2017	17.9	30.7	40.0	47.0
	4.55	(proposed target)				
Taiwan	5.0	2010	18.6	31.3	39.7	48.1
	6.0	2020 (projected)				
United Kingdom	5.3	2015	23.0	27.8	40.0	41.9
United States	6.09	2015	20.7	26.1	38.0	40.0
	6.57	2035 (projected)				
Japan	7.7	2013	33.1	37.3	46.5	51.5
WHO suggested	1.33	NA	12.3	16.5	29.6	33.1

WHO: World Health Organization, NA: Not applicable. WHO provided the figure of 1.33 as a target regardless of time [28,29,38-42]

overall. Assuming workforce sufficiency, this ultimately raises a few questions. As the 1960s, baby boomers rapidly age in Singapore:

- How can the structure and logistics of the dental healthcare better encompass marginalized patients who have the greatest needs?
- How does the GSD training translate to meet the genuine needs of PSCN?
- How can Singaporean policies be ample for health economic concerns in dentistry for now and the future?

Limitations

Despite validation and known benefits, the BDA case mix model has a variable level of inter-assessor reliability [20]. Considering this is the only established model available to grade dental-related patient complexity, it is hoped that despite the variability, the situation can still be authentically reflected.

The diverse settings where the PSCN were seen determined the type of treatment available and what was rendered. This made it difficult to compare treatment rendered, especially at GSD center, where treatment was shared with other specialties.

The presented logbook of PSCN is not reflective of every patient seen in TFC or GSD center. They represent all PSCN attending these clinics seen by the author but do not also include patients seen by other clinicians. A more precise and accurate analysis could be possible if all clinicians contribute to logged cases although this takes significant effort. The Ministry of Health and Health Promotion Board can benefit from these data to understand health-seeking behaviors of PSCN and various barriers to overcome for better outreach. However, conclusions from this small heterogeneous sample should be used cautiously.

CONCLUSIONS

Following this argument and the results presented, TFC can be an avenue to encompass another dimension of PSCN not captured by the mainstream public healthcare. These PSCN have significant unmet needs; the author presents a few preliminary suggestions:

- Inculcate the importance of prevention via seminars and training courses for volunteers for LTCF staff. A portion of LTCF have yet to meet the stipulated standards, and oral health therapists will be strong advocates for this [25,43]
- Establish care pathways with medical social workers, allied health professionals, and government clinics, emphasizing integrated and seamless inter-referrals
- Encourage volunteering in charitable clinics. Charity efforts need to be upscaled to make a significant impact on the oral health within our small red dot.

Public healthcare should never be modeled as a charity. This demographic analysis and discussed topics provide the intention to investigate possibilities to manage the growing GSD landscape and hopefully garner support for charity initiatives. This is aptly expressed in the Jing Si Aphorism. “If one does not do small things, one will not be able to accomplish greater things [44].”

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Conflicts of interests

There are no conflicts of interests.

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