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Senior dentists' perceptions of dental therapists' roles and education needs in Malaysia

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Nor NAM, Murat NA, Yusof ZYM, Gamboa ABO. Senior dentists' perceptions of dental therapists' roles and education needs in Malaysia.

Abstract: To describe the perceptions of senior dental officers (SDOs) on the roles of dental therapists (DTs) and their education needs in Malaysia. *Methods:* A cross-sectional survey was conducted using a self-administered postal questionnaire targeting all 112 SDOs in the Malaysian Ministry of Health. The SDOs were asked about their perceptions of DT's roles in relation to clinical tasks, oral health promotion, administration and the dental team and their perceptions of DT's future education needs. Data were analysed using SPSS software, version 17 (SPSS Inc., Chicago, IL, USA). *Results:* The response rate was 60%. A majority of SDOs were women (68%) with a mean age of 44.9 (SD: 8.04). Generally, the majority of SDOs perceived the current roles of DT in non-complex clinical tasks such as examination and diagnosis, preventive treatment, extraction of deciduous teeth and oral health promotion as very important. Fewer than half of SDOs perceived DT's role in the extraction of permanent teeth as important. Most SDOs perceived the need to train DT in 'scaling and polishing for adults' (80.5%), 'delivering inferior alveolar nerve block' (57.3%) and 'pulp therapy' (59.2%). They also had positive perceptions of providing education for DT up to degree level (70.8%). *Conclusion:* This study suggests that Malaysian SDOs have positive perceptions of the current roles of DT and of the expansion of some of their clinical tasks to include broader client groups through further training and education. These findings indicate a need to revise the current curriculum and legislation pertaining to DT's education and scope of practice in Malaysia.

Key words: dental therapists; Malaysia; perceptions; planners

Introduction

Dental workers whose activity complements that of dentists vary internationally in terms of their training, scope of practice, career development and the terminology used to describe them. In many industrialized countries such as the UK, Finland and Canada, operating auxiliaries are called dental hygienists or dental therapists, and they have a very similar operating function to dental nurses in New Zealand, Thailand and Malaysia (1). To ensure consistency in this article, the term dental therapists (DTs) will be used to refer to operating auxiliaries who are qualified to perform clinical procedures on patients. The term 'dental therapist' will be used in the future Malaysian oral health system as proposed in the new Dental Act (2).

Since 1906, DTs have been introduced into the dental workforce with the aim to support or complement the work of dentists (3). Initially,

dentists tended to have negative perceptions towards DT but these changed over time mainly due to the oral health planners' perseverance in supporting the profession and the DT's emerging role in the practice setting (1, 3). It was intended that DT would be a cost-effective way to tackle the unmet oral health needs of the communities, especially in rural areas (4). Nowadays, the evidence to support the value of work provided by DT is well established. Both dentists and patients perceive that DT can add value to the dental team and that they are able to deliver high-quality care (5). The evidence for other aspects, such as cost-effectiveness, is somewhat less clear (5, 6).

The profession of DT has evolved over the years. Significant changes in the profession have been seen in many developed countries, particularly in terms of DT's expanded roles, training, practice settings and academic opportunities. In the UK, DTs were initially employed in the public sector. However, since 2002, they have been permitted to work in general practice and their duties have been extended to include the treatment of both children and adults (7, 8). In 2000, the Australian state of Victoria amended the DT's regulation to allow them to treat patients between the ages of 17 and 25 under a dentist's prescription and to work in a variety of practice settings (9). In terms of training and education, DT in Australia, New Zealand and the UK are trained in university-based three-year course leading to a degree qualification (1, 9).

The service of DT was introduced in Malaysia since 1949 to provide a non-complex dental care under dentist's supervision to children aged 12 years and below (10). In 1977, age restriction had been lifted to allow DT to treat patients up to 17 years of age (10). The first DT's training was a one-year programme. Since 1996, a new three-year programme was introduced and the qualification was upgraded from certificate to diploma (11, 12). The new curriculum has allowed DT to use high-speed hand-piece and ultrasonic scalers. In 1998, the expanded duties of DT in specialized oral health service were introduced after completion of another 6 months post-basic training (11). Although Malaysia is known as an early adopter of DT in the workforce, it has been slower to develop the DT's profession as a whole. In terms of their work scope, DTs in Malaysia are only allowed to provide diagnostic, restorative, preventive and health promotion services in the public sector (1, 13).

In response to positive advances in DT's profession globally, the possibility of improving and expanding the DT's profession was discussed in the recent Malaysian dental manpower review (14). Issues concerning the extension of DT's roles, qualifications, training and practice settings were put forward for future consideration in the planning of the dental workforce (14). Changes in DT's roles and training might have an impact on the wider dental workforce, and the proposals were strongly influenced by the perspectives of different stakeholders (3). Current literature on the different stakeholders' perceptions of DT mainly focuses on the views of patients, dentists and DT themselves. However, an oral health planners' perception that is important in oral health resource planning is seldom investigated.

Therefore, this study aimed to collect national data on senior dental officers' (SDOs') perceptions of DT's roles and training needs in Malaysia. Senior dental officers were chosen because they are key oral health planners at district and state level in Malaysian Oral Health Division and hence are in a position to influence or oppose changes in the DT's profession (3). The findings of this study can be used to improve DT's education and training, facilitate evidence-based workforce planning and offer a better understanding of DT's practice in Malaysia.

Study population and methods

A cross-sectional survey was conducted using a self-administered anonymous questionnaire involving all SDOs in Malaysia ($n = 112$). The questionnaire was adapted from a local study that evaluated the DT's perceptions of their own roles and training needs (15). Written permission to use the questionnaire was obtained from its author.

The questionnaire was organized into three parts and used a 10-point rating scale ranging from 'not important' (scale 1) to 'very important' (scale 10). Part A consisted of four questions on demographic profile, which included gender, age, work experience and postgraduate qualification. Part B consisted of 34 items on DT's roles, which were divided into four categories namely clinical skills, oral health promotion, administration and the dental team (Tables 1 and 2). Items in Part B covered a mixture of tasks that DTs are and are not currently permitted to perform. Part C consisted of 33 items on training needs, which were also divided into four categories namely academic study, training in clinical skills, oral health promotion and administration (Tables 3 and 4). Items in Part C covered a mixture of basic and complex training for DT.

The questionnaire was face validated by three dental public health experts, two from University of London and one from University of Malaya. They were asked to provide feedback independently on the overall content and structure of the questionnaire. The feedback received from the experts only involved minor structural adjustments. The questionnaire was pretested in one of the states in Malaysia, which involved all the SDOs ($n = 7$). After answering the questionnaire, they were invited to give comments on the purpose, instruction, general layout, relevance and language of the adapted questionnaire. Following the pretest, the questionnaire was found to be clear and relevant to the SDO with no changes required.

The questionnaire was administered in English together with a research information sheet, a consent form and a self-addressed postage-paid envelope. Participants were asked to respond within 2 weeks of receiving the questionnaire. A follow-up mail was sent 1 month after the date of the questionnaire distribution for non-responders.

Ethical approval for the study was obtained from the Research Ethics Committee of University of London. Permission to conduct the study on Malaysian dentists was granted by Senior Director of the Malaysian Oral Health Division. State Director of Health (Dental Division) in all the 15 states

Table 1. **Senior Dental Officers' perceptions of Malaysian DT's clinical roles (*n* = 77)**

	Not important		Neither important nor unimportant		Very important		Total	
Clinical roles of DT	*n*	%	*n*	%	*n*	%	*n*	%
Clinical roles								
Non-complex clinical roles								
Examination and diagnosis*	0	0	2	2.6	75	97.4	77	100
Extraction of deciduous teeth*	0	0	4	5.2	73	94.8	77	100
Preventive treatment (fissure sealant, fluoride application)*	0	0	3	3.9	74	96.1	77	100
Basic periodontal treatment*	3	3.9	19	24.7	55	71.4	77	100
Restorations of primary and permanent teeth in children* and adults (all amalgam and composite restorations)	2	2.6	7	9.2	62	88.2	71	100
Placement of preformed crowns on deciduous teeth	14	18.4	35	46.1	27	35.5	76	100
Complex clinical roles								
Pulp therapy	12	15.8	31	40.8	33	43.4	76	100
Aesthetic dentistry (i.e. veneer, crown)	22	28.9	39	51.4	15	19.7	76	100
Extraction of anterior permanent teeth in children below 17 years	18	24.0	26	34.7	31	41.3	75	100
Extraction of posterior permanent teeth in children below 17 years	20	26.7	33	44.0	22	29.3	75	100
Suture sockets, management of post-extraction bleeding and minor wounds	16	21.1	29	38.1	31	40.8	76	100
Incision and drainage	21	26.7	34	46.6	18	24.7	73	100
Treatment of patients under conscious sedation (under dentist supervision)	20	27.4	33	45.2	20	27.4	73	100
Give sedation to identified patient (under dentist supervision)	24	32.4	39	52.7	11	14.9	74	100

Data did not equal to *n* = 77 due to missing values.
*Clinical roles that are currently permitted to the Malaysian dental therapists (2, 11, 12).

in Malaysia assisted in distributing the questionnaire to all SDOs.

Statistical methods

Data were entered into and analysed using SPSS software, version 17 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was used to address the study objectives. The questionnaire was analysed using a ten-point rating scale. When analysing the results, the scale was reduced to three categories: scale 1–3 as 'not important', 4–7 as 'neither important nor unimportant' and 8–10 as 'very important'.

Results

Of the 112 questionnaires distributed, 77 participants responded, but only 67 completed the questionnaire yielding a response rate of 60%. A majority of the participants were female (68%) with age ranged from 27 to 57 and a mean age of 44.9 (SD: 8.04). More than one-third (36%) hold a Masters degree in dental public health (DPH), while the rest hold a dental degree. Almost two-thirds (64.1%) had < 5 years of working experience.

Table 1 shows the SDO's perceptions of DT's clinical roles. The items indicating the clinical roles currently performed by DT in Malaysia were perceived by the majority of SDOs as 'very important'. These were examination and diagnosis (97.4%), extraction of deciduous teeth (94.8%), preventive treatment (96.1%) and basic periodontal treatment (71.4%). The clinical roles not currently permitted to DT were mostly perceived as 'neither important nor unimportant' or 'not important' except for the item 'amalgam and composite restoration of primary and permanent teeth in children and adults' which the majority of SDOs (88.2%) perceived as 'very important'. The item 'give sedation to identified patient, under dentist supervision' had the highest proportion of SDO who perceived it as 'not important' (32.4%).

Table 2 shows the SDO's perceptions of DT's roles in oral health promotion, administration and the dental team. The proportion of SDO who gave 'very important' ratings to the oral health promotion items was directly related to the complexity of the oral health promotion activities in question. The majority of SDOs perceived DT as having a 'very important' role in basic oral health promotion activities such as delivering oral health education to different age groups including toddlers (100%), preschoolers (100%), primary school children (100%), secondary school children (93.5%), antenatal mothers (81.8%) and adults (75.3%). Fewer SDOs (69.3%) perceived DT's roles in relation to complex health promotion activities such as being a 'mediator and facilitator between different agencies' as 'very important'.

Similarly, the proportion of SDO who gave 'very important' ratings to DT's roles in administration and on the dental team was directly related to the complexity of the roles in question. A lower percentage of SDO gave 'very important' ratings to complex roles such as 'being an administrator/manager'

Table 2. **Senior dental officers' perceptions of Malaysian dental therapist's roles in oral health promotion, administration and the dental team (*n* = 77)**

Roles of DT	Not important		Neither important nor unimportant		Very important		Total	
	n	%	*n*	%	*n*	%	*n*	%
Oral health promotion								
Deliver oral health education to								
Toddlers*	0	0	0	0	77	100	77	100
Preschoolers*	0	0	0	0	77	100	77	100
Primary school children*	0	0	0	0	77	100	77	100
Secondary school children*	0	0	5	6.5	72	93.5	77	100
Antenatal mothers*	1	1.3	13	16.9	63	81.8	77	100
Adults*	3	3.9	16	20.8	58	75.3	77	100
Motivate children, parents and teachers in oral health care*	0	0	2	2.6	75	97.4	77	100
Conduct seminar to carers, preschoolers and teachers*	2	2.6	15	19.5	60	77.9	77	100
As a diet and nutrition counsellor*	1	1.3	9	11.7	67	87.0	77	100
To act as a mediator and facilitator between different agencies	5	6.7	18	24.0	52	69.3	75	100
Administration								
Involved in preparation and reporting of health management Information system/oral health service data*	0	0	2	2.6	75	97.4	77	100
Involved in inspectorate system to ensure quality assurance*	1	1.3	9	11.7	67	87.0	77	100
As an administrator/manager	14	18.1	28	36.4	35	45.5	77	100
Involved in planning of service development	8	10.5	24	31.6	44	57.9	76	100
Involved in research or surveys	4	5.2	21	27.3	52	67.5	77	100
Registration of all DTs under one professional organization	5	6.6	15	19.7	56	73.7	76	100
As a team leader								
As a clinical/oral health promotion trainer*	0	0	13	16.9	64	83.1	77	100
As a clinical supervisor	5	6.5	21	27.3	51	66.2	77	100
As a leader	4	5.3	17	22.3	55	72.4	76	100

Data did not equal to *n* = 77 due to missing values.
*Roles that are currently permitted to the Malaysian dental therapists (2, 11, 12).
DT, dental therapist.

Table 3. **Senior dental officers' perceptions of Malaysian dental therapist's training needs in clinical skills (*n* = 77)**

What do you perceive DT's training needs to be?	Not important		Neither important nor unimportant		Very important		Total	
	n	%	*n*	%	*n*	%	*n*	%
Training in clinical skills								
Non-complex clinical training								
Skills in examination and diagnosis*	1	1.3	4	5.2	72	93.5	77	100
Complex amalgam and composite restorations*	4	5.2	13	16.9	60	77.9	77	100
Fissure sealant*	1	1.3	2	2.6	73	96.1	76	100
Application of topical fluoride*	1	1.3	2	2.6	74	96.1	77	100
Complex clinical training								
Scaling and polishing to adults	4	5.2	11	14.3	62	80.5	77	100
Root planning*	5	6.4	22	28.6	50	65.0	77	100
Orthodontic treatment (i.e. impression taking*)	23	29.9	30	39.0	24	31.2	77	100
Pulp therapy	3	3.9	28	36.9	45	59.2	76	100
Aesthetic dentistry (i.e. veneer, crown)	15	19.7	34	44.8	27	35.5	76	100
Extraction of permanent teeth	16	21.0	25	32.9	35	46.1	76	100
Suturing of sockets and minor wounds	19	25.0	23	30.3	34	44.7	76	100
Incision and drainage	20	26.3	33	43.4	23	30.3	76	100
Delivering inferior dental block injection	10	13.3	22	29.4	43	57.3	75	100
Delivering light sedation to children	29	38.2	35	46.0	12	15.8	76	100

Data did not equal to *n* = 77 due to missing values.
*Training already incorporated in the dental therapist curriculum in Malaysia (2, 11, 12).
DT, dental therapist.

Table 4. **Senior dental officers' perceptions of Malaysian dental therapist's education needs in academic study, oral health promotion and administration (*n* = 77)**

What do you perceive DT's education and training needs to be?	Not important		Neither important nor unimportant		Very important		Total	
	n	%	*n*	%	*n*	%	*n*	%
Academic study in								
Post-basic*	0	0	7	9.1	70	90.9	77	100
Degree	5	6.9	16	22.3	51	70.8	72	100
Masters	21	30.4	35	50.7	13	18.9	69	100
PhD	27	39.7	33	48.5	8	11.8	68	100
Training in oral health promotion								
Communication skills*	0	0	1	1.3	75	98.7	76	100
Preparation of oral health education materials*	0	0	2	2.7	72	97.3	74	100
Organization of seminars and conferences*	1	1.3	15	20.0	59	78.7	75	100
Diet counselling*	0	0	4	5.3	71	94.7	75	100
Nutrition counselling*	0	0	5	6.7	70	93.3	75	100
Sign language	1	1.3	13	17.3	61	81.4	75	100
Networking, decision-making and political lobbying skills	5	6.9	19	26.0	49	67.1	73	100
Training in administration								
Leadership training	1	1.4	10	13.5	63	85.1	74	100
Management training	1	1.3	15	20.0	59	78.7	75	100
Self-improvement training (i.e. continuous professional education)*	0	0	7	9.2	69	90.8	76	100
Information technology	0	0	6	7.9	70	92.1	76	100
Health service planning	1	1.3	13	17.6	60	81.1	74	100
Research methodology	2	2.6	21	27.7	53	69.7	76	100

Data did not equal to *n* = 77 due to missing values.
*Training incorporated in current dental therapist curriculum in Malaysia (2, 11, 12).
DT, dental therapist.

(45.5%) or 'clinical supervisor' (66.2%) compared with simpler roles such as being 'involved in the preparation and reporting of oral health service data' (97.4%) or acting 'as a clinical/oral health promotion trainer' (83.1%).

When the SDOs were asked about DT's education needs, the majority (97.4%) perceived that DT needed relevant education to fulfil their previously identified roles. Table 3 shows that the SDOs perceived the training items related to clinical skills that are already included in the DT's curriculum as 'very important' compared with items that are not in the current curriculum. However, more than two-thirds (80.5%) of SDOs were in favour of training DT in 'scaling and polishing to adults' and more than half perceived 'root planning' (65.0%), 'pulp therapy' (59.2%) and 'delivering inferior alveolar nerve block injection' (57.3%) as 'very important'.

Table 4 shows SDO's various perceptions of DT's education needs in relation to their academic studies, oral health promotion and administration. A majority of SDOs felt that DT needed training in '6 months post-basic study' (90.9%) followed by 'degree' level (70.8%).

The majority of SDOs also perceived all items related to DT's training needs in oral health promotion and administration as 'very important'. These included items that are not part of the DT's current curriculum such as training in information technology (92.1%), health service planning (81.1%), sign language (81.4%), leadership (85.1%) and management (78.7%). More than two-thirds of SDOs perceived that DT should also be trained in networking, decision-making and political lobbying skills (67.1%) as well as training in research methodology (69.7%).

Discussion

This study has presented an overview of the SDO's perceptions of DT's roles and education needs in Malaysia. The SDOs are heavily involved in oral health planning and developing DT's roles and education needs in Malaysia. Generally, Malaysian DT's scope of work includes treating children aged 17 and below. Routine clinical duties include examination and diagnosis; the provision of preventive services such as fluoride therapy, fissure sealants, and dietary counselling; the provision of curative services such as restoration of primary and permanent teeth and scaling and polishing; and extraction of primary teeth (12).

In relation to DT's roles in the clinic, their current clinical job descriptions tended to be seen more positively by the SDO than the complex clinical roles that are not currently permitted to DT in Malaysia. For example, almost all SDOs perceived the DT's roles in examination and diagnosis, the extraction of deciduous teeth and the application of fissure sealants and fluoride, which currently are their main tasks as 'very important'. The majority of the SDOs also perceived the

roles of DT in oral health promotion as 'very important'. In contrast, fewer than 25% of SDOs perceived complex tasks such as fitting crowns and veneers, giving treatment for infections or administering sedation as 'very important' roles for DT.

Although DTs are responsible for children's oral health care, fewer than half of the SDOs perceived DT's role in the extraction of children's permanent teeth as 'very important'. Currently, cases involving the extraction of children's permanent teeth are referred to a dentist. This might indicate a preference on the part of SDO for DT to focus on duties currently permitted to them rather than for an expansion of their roles into complex clinical skills. On the other hand, it might also indicate dentists' unwillingness to delegate some of their dental tasks to DT or their reservation towards DT's ability in providing such tasks. Previous studies have shown that not all dentists are in favour of DT's clinical roles. Negative perceptions of DT still exist especially among dentists (3, 8).

On a positive note, the majority of SDOs had positive perceptions of the DT's roles in 'amalgam and composite restoration of primary and permanent teeth in children and adults' and perceived there was a need to train DT in 'scaling and polishing for adults'. This perception might have been influenced by recent developments in the UK, where the age restriction has been lifted to allow DT to perform basic treatment such as scaling and polishing and restoration on adults (7, 8). Likewise, in Australia, DTs are permitted to treat patients between 17 and 25 years of age under the prescription of a dentist (9). The SDO also perceived a need for DT to be further trained in 'pulp therapy' and 'delivering alveolar nerve block injection'. Several countries such as the UK (16) and New Zealand (17) have allowed their DTs to undertake such clinical procedures, and these expanded roles for DT have been well supported by the public (18). Since 2008, the Malaysian Ministry of Health has provided in-house training for DT to undertake pulpotomy on deciduous teeth (19). This might explain the SDO's perception that DT needed more training in pulp therapy. In addition, as most pulp therapy procedures are preceded by a nerve block injection, the SDO might perceive it as more effective to delegate this task to DT, rather than the dentist having to be present in the clinic just to provide the injection.

Changes in global trends in dental disease which show a dual pattern, with a need for minimal intervention among younger generations and complex dental treatment among the older cohorts (20, 21), should serve as a catalyst for dentists to start delegating some of their work to DT. The SDO's positive perceptions on expanding the breadth and depth of some of DT's roles would allow Malaysian dentists the time to manage the more demanding and complex types of clinical work. This is in line with and appropriate to the complex training that dentists have received in dental schools. It is now recommended that dentists be trained as oral physicians to enable them to cope with the increasing number of patients with special needs or as oral health advocates to tackle the underlying determinants of oral health (4, 6). These changes in the dentist's roles should be complemented with an expansion of DT's clinical and health promotion roles.

The majority of the SDOs had positive perceptions of DT's needs for further education up to 'post-basic' and 'degree' levels. However, education up to Masters and PhD levels was perceived negatively. These findings were in contrast to a previous study on DT whose findings indicated a need for DT to be trained up to Masters and PhD levels (15). In Malaysia, qualified DT are awarded a diploma after 3 years of training. The highest level of further training is 6 months post-basic, which allows DT to carry out expanded duties in the paediatric and orthodontic clinics (12). Malaysian DT's opportunities for higher academic qualifications and career development are limited compared with other countries. In countries such as the UK, USA, Sweden and Australia, dental therapists are offered training up to degree, Masters and PhD levels (22). This allows DT to follow a more advanced academic pathway, which subsequently gives them the opportunities to enter the upper levels of management in the oral health service or academic institutions (22). In Malaysia, the SDO's experience with the upskilled DT is very limited as very few DTs have further training higher than the diploma level and no DTs have received education up to degree level. Thus, the SDO's views of DT's abilities and potential for upper level management and education have not been gauged. There are arguments that longer academic training may be outweighed by the benefits of having shorter and lower cost education for DT (3). However, results from the present study suggest that higher academic opportunities up to degree level should be given to DT to promote the advancement of knowledge and technology in dentistry. Therefore, it is recommended for Malaysian DT to have similar opportunities for higher qualification and be provided the necessary support. This has already been established in the medical counterparts whereby Malaysian medical nurses who are interested in pursuing a higher degree are given the opportunity to do so for their career and professional development (23). In addition, evidence from one nursing study reported that a mixture of qualified personnel and specialist qualifications in a profession often adds value for better service outcomes (24).

A majority of the SDOs also felt that DT should be trained in related skills in oral health promotion and administration. For example, learning sign language would allow DT to communicate effectively with special needs groups. Skills in networking, decision-making and political lobbying skills would provide DT with intersectoral and intercultural communication competence to deal with Malaysian multi-ethnic societies in health promotion and empowerment. Knowledge in self-improvement and health service planning would be vital for the dental team and not least for facilitating the human capital needs management of the dental workforce particularly in relation to DT. Knowledge in information technology and research methodology would equip DT with the necessary skills to evaluate research evidence and translate this into best practice. It is recommended that training in the various skills

be provided for DT in stages as part of continuing professional development after graduation.

One could argue the validity of the questionnaire used in this study. However, due to wide variations between roles and training of DT worldwide, there is no published validated questionnaire available in this area. To fit with the Malaysian health system, a set of questionnaire from a local study was used. It was developed from a literature review and focus groups discussion and was relevant to answer our research questions. As there have been lack of studies on oral health planners' perceptions towards DT, further studies on the perceptions of different groups of planners and policy makers using qualitative or mixed methods are recommended. A systematic review on different stakeholders' perceptions towards DT is also recommended.

Conclusion

The majority of the SDOs had positive perceptions of the DT's current roles. They also had positive views on the expansion of some of the DT's current clinical tasks to include adults. The SDO also considered it important for DT to receive higher education opportunities up to degree level. The overall findings indicate a need to revise the current curriculum and employment legislation for DT in Malaysia.

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Authors' contributions

NA and AG designed the study. NA conducted the research, collected the data and together with AG analysed and interpreted the data. AG oversaw and gives input to all aspects of methodology, data analysis, interpretation and report writing. NA wrote the first draft of the manuscript and NM and ZY reviewed the draft critically and contributed substantially to all redrafts. All authors read and approved the final manuscript.

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