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Title:

**PERCEPTION OF NEPALESE DENTAL HYGIENE AND DENTISTRY
STUDENTS TOWARDS THE DENTAL HYGIENISTS PROFESSION**

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Nepal, Dental Hygienist, Dental therapist, Oral Health Therapist, Dental students, Dental Hygiene students, Workforce, Human resources for health, Dental professionals, Intradisciplinary education, Oral Health Team, Dentist, Workforce planning

Abstract:

Objectives

This study investigates student and stakeholder perceptions of the role of the dental hygienist in Nepal. The impact of these perceptions on the professionalisation of dental hygienists is described whilst exploring consequences for oral health workforce planning.

Methods

Dentistry and dental hygiene students from one dental college in Nepal were asked to complete an anonymous questionnaire; 171 students returned the questionnaire containing a mix of forced response and open-ended items. Quantitative data were analysed using SPSS® 22. These data were complemented with qualitative

information from survey open questions and from semi-structured interviews with key informants from several relevant organisations. Qualitative data were manually analysed and coded. Data were triangulated to contextualise quantitative data.

Results

A high level of positive regard for the role of the dental hygienist in Nepal was evident amongst dentistry and dental hygiene students in this college. Both groups believe that the dental hygienist can play a major role in raising oral health awareness in Nepal. The scope of practice of the dental hygienist was unclear with issues surrounding the scope of practice and reports of illegal practice by dental hygienists. Significant differences ($p < .001$) were noted between dental hygiene and dentistry students in relation to their opinion regarding independent practice and the need of supervision by a dentist.

Discussion and conclusion

Supervision of the dental hygienist by dentists and issues surrounding the scope of practice are polarising the relationship between dentists, dental hygienists and the relevant professional organisations. This could hinder cooperation between these oral health professionals and might lead to underutilisation of the dental hygienist. To improve understanding about the roles of each oral health professional, establishing functional relationships and intra-professional education involving dentistry- and dental hygiene students need to be introduced. This will benefit the introduction of preventative oral health services in Nepal. Government jobs and incentives to increase the retention and distribution of oral health professionals should be created. The government and professional organisations need to consider professionalising the dental hygiene workforce and formalise the scope of practice. The unique demographic details of Nepal require a paradigm shift in oral health workforce management in Nepal.

INTRODUCTION

In 1997, B. Shrestha established the Kantipur School of Dentistry and Dental Hospital (KSDH), and planned to establish the first course in dental hygiene (DH) in Nepal (1). At that time the political climate within Nepal prevented the recognition of this new

profession. To bridge the gap Shrestha started an educational program to educate dental chair side assistants in oral health promotion. In 2000 the Council for Technical Education and Vocational Training approved the curriculum for a two-year dental hygiene program in Nepal enabling the start of the dental hygienist training at Shrestha's private (nonprofit) college (1). Since this time, the number of colleges educating students to become dental hygienists has increased to six (in 2014) while simultaneously, the number of dentistry (DEN) programs increased from two to 12. The intake of dentistry students in 2012 was 520 (2). In 2008 Dixit et al (3) described the rapid expansion of Nepalese medical and dental schools as "coming up literally like mushrooms growing in a dark environment". Nepal opened up higher education to the private sector (3-6) as a result of the increasing demand for higher and professional education after the 'people's movement' in 1990. Concurrently, aid agencies became interested in supporting the development of educational reforms, but often under the condition of accepting models with educational philosophy acceptable to the donor organisation. Changes to the training opportunities for health professionals in Nepal attracted private investments. There are now more private medical colleges and technical health training institutions than in the government sector (5). The critical shortage of physical and educational resources as well as a lack of experienced health faculty and basic science teachers (3, 7, 8) can raise questions about the educational quality of these colleges (3). Most, if not all, DH and DEN programmes are run at private colleges affiliated to Nepalese Universities. The new institutions must compete with each other and function as commercial businesses. This can result in less focus on the public good aspects of the institutions in favour of profitability (5).

A recent analysis of how global oral health priorities are shaped, performed by Benzian et al in 2011 (9) revealed that the traditional divide between the developed and the developing world is not helpful and that health and oral health inequities are associated with population social and economic circumstances, i.e. factors determined outside of the oral health sector. These relationships are seen between countries and within countries. Major stakeholders in oral health have failed to raise the political priority of oral diseases due to their limited resources, approaches, philosophies and, importantly, different or competing values (9, 10). In Nepal emerging non-infectious diseases represent more than half of the burden of disease and are largely due to

lifestyle and environment change (11). Oral health needs tend to be underserved when competing with high priority areas defined by governments, such as basic health care and clean water (12-14).

Human resources are the foundation of health systems and important contributors to accessible, high quality health services. Several factors need to be taken into account for an ideal oral health workforce plan. These include factors such as numbers of dentists, specialists and auxiliaries or mid-level providers, practice patterns, undergraduate and continuing dental education, laws/ regulations, the attitudes of oral health-care providers and the general trends affecting the practice patterns, work conditions and preferences of oral health-care providers (14). The main challenges for the health sector in Nepal are inadequately skilled personnel, retention of health workforce, mal-distribution and inadequate financing of health care (11, 15). In the last decade Nepal's population has increased by 45%, however the growth of the health workforce over the same period was only 3.4% (11). Rural areas in Nepal remain under-staffed and absenteeism is a major problem (11); 28% of health care workers are "unskilled support staff" (13). This problem is recognised by the Nepalese government and the Human Resource for Health Strategy (HRH) was developed to address this. However inadequate projection, poor implementation, lack of funding, political instability and lack of ownership by stakeholders has made the HRH strategy ineffective (16). There is now a need for careful planning of workforce requirements through understanding population needs, determining the appropriate skill-mix of workers and alignment with educational models. This study aims to investigate student and stakeholder perceptions of the role of the dental hygienist in Nepal and how this could impact oral health workforce planning. The impact of these perceptions on the professionalisation of dental hygienists is described whilst exploring consequences for oral health workforce planning.

MATERIALS AND METHOD

In this mixed-methods study two data collection approaches were used: a survey (questionnaire) of DEN and DH students and semi-structured interviews with key informants and representatives from relevant organisations.

A group of DEN and DH students at one Dental College (accredited by the Nepal Medical Council) in Kathmandu was asked to participate in this study. This college was selected because students of both programmes share the educational and clinical facilities. Students were informed about the aim of the study and were provided with a participant information sheet and a consent form. Participation was voluntary. The survey-instrument was anonymous. The questionnaire was distributed to students in September 2013. Ethical approval for this study was obtained from the Human Ethics Committee of the La Trobe University (UHEC, 12-119a). An English, pre-tested questionnaire was distributed during class time. The students submitted their survey (completed or not) in a closed box ensuring coercion-free participation. Neither the faculty member nor researcher were able to identify if a student had completed the questions or not when they submitted the survey. There was no reward for completion so submission was inducement-free.

Participants were invited to provide additional comments at the end of the questionnaire. Quantitative data were analysed using SPSS® 22. Descriptive statistics were used to report percentages of respondents on selected variables. For the questionnaire items (Likert scale 1-5,) Mann-Whitney test was used. Qualitative data were concurrently obtained through semi-structured interviews. Five (separate) group interviews were scheduled with key informants and representatives from relevant organisations. Interviewees were provided with a participant informant sheet and a consent form. All interviews were recorded and transcribed ad verbatim by the main researcher. Manual analysis of the interview data was conducted in two iterative phases:

- 1) Identification of frequently occurring categories and emerging themes;
- 2) Re-reading the transcripts to compare the perspectives of the interviewees and to identify specific illustrative quotes.

Conclusions were drawn across the full range of available data to build arguments following a multilevel triangulation design (figure 1) (17). Illustrative quotes were added for interest, to clarify and explain themes (18). The different types of data were intended to inform and supplement each other. The research paradigm guiding the study can be described as pragmatism, reviewing all the data from multiple

perspectives to provide an enriched understanding of issues. The use of a concurrent mixed methods approach for data collection (19, 20) allowed broader contextualisation of study themes (Figure 1). In this way the qualitative data extended understanding of the quantitative survey findings (21, 22).

RESULTS

Response and demographics

Two hundred surveys were distributed (to students present during specific lectures or practical sessions). The response rate was 86% (171 questionnaires returned). The response rate in both groups was very similar: DH students 89% and DEN students 83%. Each year level in both courses was represented, however first year DH students and second year DEN students formed the largest proportion of participants. At the time of study, 478 students were enrolled at the dental college: 97 males (20%) and 381 females (80%). Table 1 summarises respondent's demographic characteristics. The reliability of the survey tool was tested using a cronbach Alpha, with the test revealing Alpha = .83 presenting acceptable reliability ($\alpha \geq .70$). Table 2 summarises the quantitative analysis of the questionnaire items related to the opinion about the dental hygienist profession, roles, cooperation and team concept. Additional comments were provided by a large majority in both groups: 96% DH, 68% DEN.

The key informants (N=17) represented DH instructors from 3 dental hygiene colleges in Kathmandu and Pokhara (n=5), board members of the Nepal Dental Science Association (NDSA: representing graduates of a 3-year dental hygiene course, n=5) and Nepal Dental Hygienist Association (NDHA: representing graduates of a 2-year dental hygiene course, n=4); and a single representative from the Council of Technical and Vocational Education and Training (CTVET)¹, the committee writing the most recent National Oral Health Policy (also a qualified dentist) and from the management of Kantipur School of Dentistry (KSD)/Kantipur Dental College Teaching Hospital and Research Center (KDCH).

¹ The Council for Technical Education and Vocational Training was established in 1989. The CTEVT is the policy formulation and coordination body in Nepal and is committed to the development of human resources for Nepal, in particular for basic and middle level technical education and vocational training.

Analysis of the additional open-ended comments provided by students, together with key informants' interview data produced recurrent thematic categories (see table 3). The most frequently discussed themes were identified through simple frequency analysis: professional role of a dental hygienist, team-work, scope of practice, illegal practice, professional conflict, education and job opportunities. As the qualitative data were analysed at the statement level, some comments pertain to more than one identified theme.

The dental hygienist role

Of students, 93% said the dental hygienist plays an important role in the prevention of oral diseases and 96% agreed that the dental hygienist is a valuable service provider. The role of the dental hygienist in improving oral health awareness in Nepal is supported by 92% of the students, while 87% report an appreciation of dental hygienist work. Almost all students (99%) agreed with the statement that dental hygienists and dentists should work together to improve oral health of the Nepalese people and that dental hygienists play a role in assisting dentists (92%).

DH students were more supportive of the importance of the role of the dental hygienist in prevention than the DEN students ($p < .001$). These quantitative findings are illustrated by quotes from DEN students. The most frequent categories in the additional comments were about the role of dental hygienists in promoting oral health awareness, importance of the team concept and the role of the dental hygienist in assisting or supporting the dentist. For example:

“Dental hygienists play a role in spreading awareness and helping dentists in Nepal. They are as important as the dentists themselves.” (DEN121)

“Dental hygienists play an important role to improving oral health in Nepal. Most of dentists stay in urban areas like Kathmandu. Therefore in the rural areas there is a lack of dental professionals and health education.” (DH50)

Teamwork, scope of practice and illegal practice

Dental hygienists' scope of practice was clear to 59.9%. However 33.1% responded the scope of practice was neither clear nor unclear, while 7.2% do not think the scope of practice is clear. The lack of clarity in the scope of practice and the lack of an appropriate Code of Ethics (in the Nepalese context this is the legally prescribed professional role) for the dental hygienist were themes frequently raised in key informant interviews and comments of DH students:

"I think the dental hygienist profession is very much appreciated abroad. But in Nepal we are still confused what we can do as a dental hygienist." (DH23)

"It looks like the dental hygienist job in Nepal is not very much appreciated. We are very confused about what we are allowed to do." (DH28)

This code of ethics needs to change. We already discussed this with Health Professional Council. The code of ethics should follow the curriculum. Currently the code of ethics is not related to the curriculum." (KI5-1, interview)

Both students and key informants raised the issue of illegal dental practice (they commonly referred to this as "quackery"). All wanted this to be addressed, but currently insufficient organisational structures are in place to enforce legal practice, although attempts to close surgeries of illegally practicing individuals was reported:

"Looking at the trend in the country at the moment very few people are into preventive dentistry or oral health promotion... If a patient in a rural area suffers from toothache, there is no one to take care of him. So we taught whoever is posted within the primary health care centres or health posts the procedure, to give local anaesthetic and to remove a loose tooth... We should have controlled it. We teach them to think and retrain themselves. But they are not... They are going beyond their capacity and beyond their limits, and opening up a clinic... This year we are planning to reduce the numbers for this type of training for health post workers, because we should try to employ dental surgeons and dental hygienists." (KI2-1, interview)

DEN students more frequently cited illegal practice or not adhering to scope of practice:

“Dental hygienists play an important role in improving the oral health of Nepalese people... But in few parts/regions of Nepal they fool people and say they are dentists.” (DEN117)

“Most of the dental hygienists in Nepal are doing illegal services, which are beyond their qualification. Dentists are having issues to solve this malpractice. Such practices need to be stopped immediately. Dentists and dental hygienist must work hand in hand for better oral health of our nation.” (DEN143)

“They are working independently. And practice dentistry, beyond what they have been trained for. A strict rule should be formed for them to practice only within their limits.” (DEN170)

Significant differences between the groups were found in relation to the statements about dental hygienists treating patients independently and the related statement that dental hygienist should work under supervision of the dentist.

Unsurprisingly it was found that DH students were more likely to support the statement that dental hygienists can treat patients independently when compared to DEN students ($p < .001$).

Findings were similar with regard to the statement that dental hygienists should work under dentists' supervision. DH students were more likely to disagree with this, compared to DEN students ($p < .001$).

Issues about supervision of dental hygienists were frequently cited in students' comments:

“They might be helpful to raise dental hygiene awareness, since the people from the rural part of Nepal don't care much about dental hygiene. The dental hygienist can play an important role in providing awareness, but still they should work under dentist's supervision.” (DEN113)

“Dental hygienists can provide proper preventive education and must work under dental surgeon.” (DEN125)

Education

Stakeholder interviews revealed that, since the introduction of three-year courses and discontinuation of the two-year program, dental hygienists with a Technical Certificate in Dental Hygiene (graduates from the two-year course) have difficulties finding employment. Preference is now given to graduates of three-year programs, leaving many two-year qualified workers to find employment as dental assistants or to leave the profession all together.

“We haven’t done any scientific research related to human resources need. That is why we are phasing out 2-years dental hygiene course. They are not getting jobs according to the previous graduates and there are no particular government positions for them. I don't think the supply exceeds demand. Awareness is lacking. We still need them.” (KI5-1, interview)

To maintain their income, DH’s commonly provide additional services to the public beyond their original scope of practice. The NDHA reported that a majority of their members expressed interest in a bridging course to allow them to gain the Certificate in Dental Science and thus be better able to compete for employment. The NDSA also wants easier access to the Bachelor of Dentistry. The bridging course has become a point of conflict between the two organisations representing the different DH graduates. The CTVET is currently exploring opportunities to develop a bridging course.

“We are analysing the gaps between the DH and CDS course. Should the course be one year, or two year, we don't know yet. The experts will tell us. They will show us the content we have to teach. The colleges that currently run a CDS course should provide the bridge course.” (KI5-1, interview)

All key informants discussed the likely demand for a four-year DH course (Bachelor in Dental Hygiene). They believed that further study pathways for DH students should be created.

Job opportunities

A majority of students agreed that there is need for more dental professionals in Nepal. This contrasts with the finding that a majority of students fears not being able to find a job (23) ; 81.7% of all students agree that Nepal needs more dentists and most also agree that Nepal needs more dental hygienists (83.1%) or dentists and dental hygienists (83.6%). DH students were more likely to agree with increasing the number of dental hygienists only in Nepal, than DEN students ($p < .001$).

Student comments provide insights into the issues about need for numbers of oral health professionals and student perceptions about suitable job availability:

“It is out of control. Help is needed. Maximum number of hygienists is reached. They do whatever they want. It is not good.” (DEN170)

“There are many dentists in our country, who are perfect, but still jobless.” (DEN77)

“It is a long process to create posts for dentists. The government has neglected oral health. They are focussing on other health issues... I think at present there are enough schools in Nepal... The government needs to think about this. A strong oral health policy is needed. Jobs need to be created... Ministry of Finance, National Planning Commission, Ministry of General Administration, Ministry of Health and Ministry of Education should come together and work together. To discuss policies and to decide how many schools are needed... Now there is no position in the government sector; only in private sector, NGO sector or INGO sector.” (KI5-2, interview)

Previous research has shown there is interest among Nepalese DEN and DH graduates to seek work abroad (23). Most key informants of the relevant organisations are concerned that many students want to go overseas and the possible impact of this on oral health workforce supply:

“Our job is to produce human resources according to the need of the country and on advice of the Ministry of Health. But they don’t have exact data. In developed countries they can forecast the numbers very easy. But in our case it is difficult. The problem is they are not staying, regardless if we knew the requirements. We are investing and producing for developed countries... We can’t stop globalisation. But we have to make a plan considering the country's requirement, not the international requirements. If we are able to provide job opportunities for our graduates, they might stay. Right now they are frustrated and they want to go abroad... They don't like to work in Nepal. They want to work in a foreign country.” (KI5-1, interview)

DISCUSSION

Role dental hygienist

This study shows a strong appreciation for the role of the dental hygienist in Nepal amongst dentistry and dental hygiene students and there is sense of pride among students that Nepal educates its own oral health workers. Both student groups support the role of the dental hygienist for delivering rural preventive oral health services. The survey results show that there is a high awareness amongst all participants that Nepal needs more oral care. Nepalese DEN students support the importance of the dental hygienist, but seem to want strictly established practice boundaries. Preconceptions and stereotyping about other oral health professionals prove to be a barrier for cooperation (24). Mid-level health workers are often restricted in scope of practice and encounter resistance from the more established professional groups (25). The dental hygiene profession is relatively new to Nepal and a professional identity is not yet established. DH students in this study expressed confusion about their future career and indicated a lack of public support or appreciation for prevention. This lack of recognition of the professional status of the dental hygiene profession might have influenced the student’s attitudes.

Educational strategies to positively influence students’ perceptions about the dental hygienist profession are necessary (26). It is important to have role models for future oral health professionals (27) and facilitate the development of team identity and team leadership skills (24) to establish effective collaborative practice. Improved

understanding about the scope of practice of the dental hygienist by all oral health professionals in Nepal could be achieved by introducing intraprofessional education.

It is important to explore the effects of professional status and group identity (24).

The belief of trainees that they are undervalued by the health care system and/or by its leadership could lead to demotivation and a loss of desire to work as a dental hygienist (28). Organisations representing the different oral health professionals agree about the potential role of the DH in Nepal. However relationships between the organisations are complex and reflect polarising differences between the professions, due to reports of illegal practice, lack of career pathways, the ambition of DH and CDS graduates for career progression opportunities and issues about adequately defining the scope of practice. The competition between the two types of dental hygienists in Nepal, represented by different professional organisations, dilutes the group's identity.

Nepalese people are not aware of the possible benefits of the dental hygienist and there is no "consumer pressure" to gain access to their services. This is similar to other countries where it has been shown that the public is not familiar with this emerging profession (29). The NDHA and NDSA should consider merging into one professional organisation and improving the relationship with the Nepal Dental Association (NDA). Competing interests of the professional organisations may contribute to the failure of raising the political priority of oral diseases. Dental hygiene leaders should work together with the government to promote the profile of the Nepalese dental hygienist.

Teamwork, scope of practice and illegal practice

The DH students in this study tend to see themselves as partners in care and feel that they have a role beyond merely supporting or assisting dentists. DEN students believe that the dental hygienist should only work under the supervision of a dentist and independent practice should not be permitted. This is consistent with the authors of the FDI Vision 2020 report (30) who suggest that although there is an important role for dental auxiliaries (dental hygienists, dental therapists), they should work under direct supervision of dentists. Arguably, this thinking prevents the development of innovative delivery in which dental hygienists or therapists (or other oral health promoting practitioners) can work independently but within a well-defined scope of

practice. Direct supervision of all other oral health workers by dentists impacts the number of oral health professionals needed. It limits the employability of auxiliaries and flexibility of health services, leading to higher costs. Depending on the activities and the training of the auxiliary, direct supervision may be unnecessary, especially in models of care aimed at prevention rather than treatment. It is important to have the “right people with the right skills in the right place at the right time” (14). The education of specific auxiliaries, who are less internationally mobile but provide comparable quality of service, are likely to serve and remain in the rural areas (25). Training rural women to be oral health advocates in Nepal could be a cost-effective means of increasing oral health awareness in different rural areas in Nepal (31).

The need to *distribute* tasks between different professional groups in order to make health care services available and more cost-effective for patients was raised by the World Health Organisation (WHO) in the 1970’s (29). The fear of delegation of certain tasks for providing basic oral health care services or prevention is often motivated by perceived or real risks that less trained allied professionals move outside their skill sets or prescribed boundaries (32), an idea that was identified in the interview data. This issue has also been identified in developing countries, largely driven by national dental associations, mainly focusing on the issue of professional competition and protectionism rather than on protection of patients (32, 33). In general there appears to be fear on the part of dentists that the employment of dental hygienists and other dental clinicians will affect their income (29).

Illegal provision of oral care is a complex problem and according to Benzian et al (2010) should be seen as “a symptom of underlying health system and social deficits, ranging from lack of access to care and health inequities to problems of governance and law-enforcement” (32), all of which apply to Nepal. The lack of a Code of Ethics for the DH graduates in Nepal, the discussion related to the Code of Ethics for the CDS graduates (23) and reports of illegal practice by dental hygienists are a major source of professional frustration, dissatisfaction and conflict between professional organisations representing Nepalese oral health professionals. This dilemma could be addressed firstly through clearly defining a nationally agreed scope of practice for DHs and regulating practice. Secondly it is important that the government recognizes and promotes the professional status of all classes of health workers (28) and that professional identity and its development are considered throughout the education of oral health professionals (34). Key informants reported that opportunities for up-

skilling DH graduates from the discontinued diploma course to the CDS-certificate level are being explored. However this process is currently hindered by entrenched positions of professional organisations, the current educational systems and the issues surrounding illegal oral care.

Education

Only two colleges in Nepal educate DEN and DH students in the same institution, however traditionally the education is focussed on the separate disciplines (3) and the education of DH and DEN is still conducted in isolation. Increased cooperation between the two programs could support an improvement in the working relationship, which is vital to allow both professions to work in an effective team setting (34) and to improve the understanding of the scope of practice of the dental hygienist.

Pathways of cooperation and health workforce strategies or innovative models of care should be further explored (14). The WHO placed emphasis on interprofessional and intraprofessional education (IPE) and collaborative practice. It has been recognised as a strategy in reducing the global health workforce crisis (35). Traditionally the education of health care professionals, including oral health, has been conducted in separate professional groups (36). Health services depend on team effort and there is much rhetoric around the team concept, but most institutions seem to focus on disciplines only (5). IPE can improve the understanding of roles and responsibilities of the different members of the oral health team (37), the ability to work more effectively in a team and to communicate more effectively with colleagues and patients (34). The model of teaching at the different dental/dental hygiene programs in Nepal can be further examined to see if the type of practice is supported by WHO recommendations.

To enable appropriate oral health workforce management, prevention is important and need to be augmented for cost effective care. Prevention and health promotion training is still not a large component of many dental programs (12, 38, 39). Often the (restorative focused) curriculum is modeled to countries with different oral health needs and little priority is given to preventive care (12, 13, 40). The training of oral health professionals needs to match the specific requirements and infrastructure of the country (41) with sufficient flexibility to meet local or regional variation in need. Educating students to treat people from all parts of society to prepare them for provision of care to these groups is important as well as incorporating traditional care

practices to prevent distrust of regular care and to open the way to make small changes in rural communities (13). Funding along with a change in government policy is needed, to integrate the oral health services within primary care (13, 14). All types of oral health care professionals should be considered in the planning of oral health services to provide specific high quality care to address the issues (42). Creative solutions are necessary to deliver education, both at undergraduate and postgraduate levels, in such areas that ensure expensively trained staff are retained in the areas of need (43).

Job opportunities

The first (and only) Nepal National Oral Health survey was conducted in 2004 (44). The lack of data on the oral health population needs in Nepal make it complex to adjust the structure of existing oral health manpower to changing patterns of oral disease and socio-demographic factors (13). Reports also indicate that the Nepal Government until now has been unable to keep accurate account of the number of dentists or dental hygienists that are working in Nepal or where they are working. Systematically collected data regarding migration of health professionals and its possible impact on health care are missing (45). This is not only a problem of Nepal; inappropriate types and numbers of oral health professionals remain an issue in other countries as well (41).

The participants in this study support an increase in the numbers of dental hygienists and dentists in Nepal to provide the care that is needed. Conversely, they report concern about finding a job due to the perceived increased competition between graduates, the lack of government jobs and the increasing number of oral health programmes in Nepal (23). For example, scholarship candidates supported by the government, who commit to 2 years government services, are not offered employment for various reasons (2). Increasing the number of dentists alone might increase inequities in access and affordability of care (10).

The rapid growth in the number of dental and dental hygiene programs raised concerns amongst students and graduates about finding a job and they fear that increased competition will limit their income. The decision to increase the DH course from two to three years (with limited changes to the scope of practice) was largely

driven by the demand for higher levels of education in dental hygiene by graduated DH students.

In Nepal the level of education and the prestige of the school are an important marker of social status or economic class (46). Parents will provide the best schooling they can afford for their children (6) but also expect a return for the financial investment in higher studies (3). Higher education therefore comes with a higher expectation by graduates for financial recompense that could in turn drive up the costs of (preventive) care. The expectations of students and parents are often not met (6) because the education system seems detached from the local labour market. The factors that encourage labour wastage should be examined and data needs to be collected about the number of graduates that find useful employment in areas for which they have been trained and those who are lost to the oral health workforce (12). To avoid labour wastage students from the Diploma course need the opportunity to up-skill themselves to a Certificate level. The lack of economic opportunities to correspond with the expansion of educational opportunities can contribute to dissatisfaction or professional conflict. This could encourage graduates to consider emigrating to find a suitable job and to acquire a higher standard of living whilst supporting the family at home (figure 2).

CONCLUSION

The professional role of the dental hygienist in Nepal is highly appreciated amongst all professional stakeholders however; the relationship between dentists, dental hygienists and their professional organisations is polarised. The successful cooperation between oral health professionals in the future could be hindered by a perceived increased competition between the professionals and the lack of government funded positions. This study shows high awareness amongst all

participants that Nepal has unmet needs. Increasing the number of oral health professionals could help to meet this need, but jobs need to be created and the lack of health care infrastructure and planning, which is obstructing a successful implementation of a preventative oral care model, needs attention.

Graduates and dental hygiene students from the Diploma course (discontinued in 2014) report that the lack of a career pathway or 'bridging course' to up-skill prevents them from finding a job. The perceived reason for this is that preference is now given to graduates from the 3-years course, leading to labour wastage. The disconnection between education and workforce requirements needs to be addressed if more effective oral health service structures are to be developed.

Dental schools need to move away from the Western focussed approach to treatment. Introducing functional relationships and intraprofessional education between dentistry- and dental hygiene programmes may create better understanding about specific roles of (oral) health professionals amongst students and graduates. The professionalisation of the dental hygienist profession in Nepal seems to be following a similar pattern to other (developed) countries. This includes professional organisations protecting their established authority or striving for more professional recognition with less thought for increasing access to care and improvement of quality. The government has a responsibility to ensure that statistics of the oral health workforce are updated annually and should consider professionalising the dental hygiene workforce. The unique demographic details of Nepal require a paradigm shift in oral health workforce management in Nepal.

CLINICAL RELEVANCE

Scientific rationale for study: Human resources are the foundation of health systems and important contributors to accessible health services. Careful planning of workforce requirements is needed through understanding population needs, determining the appropriate skill-mix of workers and alignment with educational models. Principal findings: This study shows a high appreciation for the role of the dental hygienist in Nepal, however polarising views about independent practice, supervision of the dental hygienist by dentists and lack of career opportunities cause labour wastage. Practical implications: Professionalisation of the dental hygienist and educational changes impact on oral health workforce planning in Nepal.

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	Dental Hygiene students	Dentistry students	Total
N = 171†			
Number of distributed surveys	96	104	200
Number of students per year	1 st 48 (56%)	1 st 3 (4%)	
	2 nd 23 (27%)	2 nd 45 (52%)	
	3 rd 14 (17%)	3 rd 11 (12%)	
		4 th 2 (2%)	
		5 th + 24 (30%)	
Response rate - N = 200	85 (89%)	86 (83%)	171 (86%)
Gender	♂ 16 (19%) ♀ 69 (81%)	♂ 8 (9%) ♀ 77 (90%)	♂ 24 (14%) ♀ 147 (86%)
Age (mean, years)	18.86	20.68	19.77

† Valid cases range from 163 to 171 (due to missing cases i.e. unanswered constructs)

Table 1: Demographic details participants

Questionnaire item	DH/CDS students		DEN students			
N = 171†	N	Mean rank	N	Mean rank	Z	P
I am proud Nepal educates dentists and dental hygienists.	84	81.83	84	87.17	-.805	.421
Dental hygienists play an important role in prevention.	84	70.12	82	97.21	-4.24	< .001 *
Dental hygienists are valuable service providers.	82	77.60	84	89.06	-1.87	.062
I appreciate the work of the dental hygienist.	80	72.96	84	91.59	-2.80	.005 *
Dental hygienists play an important role in improving oral health awareness Nepalese people.	83	70.68	83	96.32	-3.84	< .001 *
Dental hygienists and dentists should work together to improve the oral health of Nepalese people.	83	80.74	85	88.17	-1.34	.180
Dental hygienists play a role in assisting the dentist.	84	81.83	84	87.17	-.791	.429
Dental hygienists can treat patients independently.	83	62.16	84	105.58	-5.98	< .001 *
Dental hygienists should work under supervision of dentists.	80	100.98	83	63.70	-5.24	< .001 *
I know what dental hygienists are allowed to do after graduation.	84	79.95	82	87.13	-1.04	.300

Nepal needs more dentists.	84	80.99	85	88.96	-1.17	.243
Nepal needs more dental hygienists.	82	68.62	84	98.03	-4.29	< .001 *
Nepal needs more dental hygienists and dentists.	84	75.45	82	90.83	-2.27	.023 *
† Valid cases range from 163 to 171 (due to missing cases i.e. unanswered constructs) Mann Whitney Ranked Test * Statistically significant						

Table 2: Opinions about dental hygienist profession, roles, cooperation and team concept

Themes emerging from additional comments and interviews

Professional role dental hygienist

Team work

Scope of practice, illegal practice, professional conflict

Education

Job opportunities

Table 3: Most commonly cited themes identified from qualitative data

Figure 1: Research Design Decisions: triangulation design using a multilevel model with concurrent data collection and equal priority and integration at data collection (based on: Tashakkori and Teddlie, 1998, Cresswell et al 2011 and Morgan 2007).

Figure 2: Alternatives to reduce professional conflict and improve retention of qualified oral health professionals after graduation

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