**Preparing dental graduates to provide care for frail and care-dependent older patients: An educational intervention**

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Background: Australia’s population is living longer and retaining more of their dentition. While the demand for oral health services in residential aged care facilities (RACFs) increases, there is a call to further inclusion of gerodontology in the undergraduate dental curriculum. This qualitative study explored the attitude of dental students to providing oral health care to older people using a pilot gerodontology curriculum as an intervention during a final year clinical placement in Hobart, Tasmania.

Methods: Focus groups with undergraduate dental students on clinical placement were conducted in 2018 prior to and after implementation of a pilot gerodontology curriculum. The qualitative data was thematically analysed.

Results: Two focus groups were conducted with a total of 18 dental students. The main themes included applied practical learning in aged care; unpreparedness for managing frail older patients; lack of confidence for consenting people with dementia; barriers to providing care to older people; and interactions with residents and staff of residential aged care facilities.

Conclusions: This study highlighted the barriers for dental students providing care to older people. There is a need to evaluate how gerodontology is currently taught in the undergraduate dental curriculum to better prepare the dental workforce and growing population of dentate older people in RACFs.

Abbreviations and acronyms

James Cook University JCU

Oral Health Services Tasmania OHST

Residential aged care facilities RACFs

Introduction

Australia’s population is living longer and retaining more of their dentition (Australian Institute of Health and Welfare, 2018; United Nations, 2019, 2020).The prevalence of frailty increases with age and has been recognised as a condition in which a person is at increased risk of poor health outcomes (Morley et al., 2013). While experts have failed to reach a consensus definition on frailty (Rodríguez-Mañas et al., 2013), it has been acknowledged that early stages of frailty are more common in older people living in residential facilities (Gobbens et al., 2010). With a growing population of frail and care-dependent people in residential aged care facilities (RACFs) (Hearn & Slack-Smith, 2015; Hopcraft et al., 2008) it has become an imperative to better prepare dental professionals for managing the oral health care of residents

Gerodontology is the branch of dentistry that deals with the oral health of older people. There are varying definitions of an older person, and there is a need to recognise that individuals who reside in a RACF may be biologically older than the chronological definition by the Australian Institute of Health and Welfare (2018) of sixty-five years old. With the demand for oral health services in RACFs increasing, there is a call globally for further inclusion of gerodontology in the undergraduate dental curriculum with the World Health Organisation (WHO) emphasising a need to strengthen education and training to improve the oral health of older people (Petersen & Yamamoto, 2005). There are content and structural differences in the gerodontology curricula of dental schools, with a wide variation of clinical exposure to older patients(Nilsson et al., 2018). Although most European dental schools teach gerodontology at the undergraduate level, the European College of Gerodontology and the European Geriatric Medicine Society recognise that an educational action plan, involving dental and non-dental professionals, with an emphasis on more training opportunities offered for the care of frail older adults, is still needed (Kossioni et al., 2018).

A greater emphasis on gerodontological learning experiences during clinical placements has the potential to impact positively on future practice. Internationally, graduates who received gerodontology education have been found more likely to consider working with aged care communities (Abbey et al., 2006; Budd et al., 2015). However, Nilsson et al. identified a paucity of research in this area for the undergraduate dental curricula in Australiaand found that clinical exposure to aged care oral health at an undergraduate level could positively influence student learning outcomes (Nilsson et al., 2018).By exploring dental students’ perceptions of a pilot gerodontology curriculum, this research aimed to identify areas where students needed development in knowledge, skills and attitudes with the potential for dental education providers to extend social accountability into aged care oral health. Embedding a gerodontology curriculum into the undergraduate dental school curriculum also addresses standards set as a result of the Royal Commission into Aged Care Quality and Standards including providing a workforce able to perform their roles for older people (Aged Care Quality and Safety Commission, 2020). This is the first study investigating gerodontology curriculum as part of an undergraduate clinical placement for dental students in Australia.

Aim

The aims of this study were to: (1) identify curricular areas in current aged care dentistry education where students perceive they need more development; (2) create and pilot an aged care oral health curriculum framework that supports social accountability by students; and (3) highlight future educational research opportunities in aged care for dental students.

**Methods and Analysis**

***Study design***

A pilot aged care curriculum for final year dental students was designed using Kern’s six-step curriculum design (Kern, 1998) (Fig. 1) (Table 2). This was an appropriate method of design for health professional education, helping to foster the development of a dental graduate who has the ability to continue their learning through self-directed, reflective practice (Bordage & Harris, 2011; Oliver et al., 2008). Insights into the previous knowledge and experience of undergraduate students was gained from the James Cook University (JCU) gerodontology subject co-ordinator who also identified areas where dental students required further development. Focus groups were conducted in 2018 with an average time for discussion of thirty minutes, exploring final year student perceptions of gerodontology education, barriers and enablers to providing oral health care to older people, and attitudes to frail and care-dependent older people. The first focus group included nine dental students who were not exposed to the pilot curriculum, with the second group of participants also consisting of nine dental students and having completed the pilot curriculum prior to the focus group discussion. The interviewer acknowledged her positional reflexivity as a practising dentist and post-graduate student, to allow the focus group participants to guide the discussion and to enable her to listen from the perspective of a researcher.

The project was broken down into five phases with the narrative literature review forming the first phase. The remaining phases were structured around the curricular development model as outlined by Kern (Kern, 1998) . As shown in Figure 1 Kern’s model (Kern, 1998) was used to design the aged care curriculum, with data being collected in phases 2 and 5 during the focus groups (Table 1). The data taken from the focus group interviews form phase 5 of the project (Table 1) and uses the thematic analysis framework as described by Clarke and Braun (Clarke & Braun, 2017). Focus groups were audio-recorded for both the pre-curriculum and post-curriculum group as part of the final phase. Triangulation of analysis was achieved for all interviews through data checks of the coding, theme definitions and thematic analysis by two qualitative researchers and any opposing opinions on coding discussed using an iterative approach (Carter et al., 2014).

***Curriculum Design***

The pilot gerodontology curriculum included seven sessions with nine students in a group. The first six sessions were 30-45 minutes long and delivered weekly by the supervisor (interviewer) during the students’ clinical placement and the final RACF half day visit. Sessions took place at the end of the clinical day, other than the RACF visit which took place on the fifth day of the week when students did not have clinical sessions. The first session in the curriculum was based on the gerodontology content the students had received in the foundation years of their degree. This allowed all the students to align their current theoretical knowledge in preparing for the remaining sessions. The second and third sessions incorporated case discussion and brainstorming sessions to allow the students more active participation in their learning. People living with dementia have an increased risk of complex oral diseases (Chalmers & Pearson, 2005; Wright, 2015) therefore planning for session four included video content of communication techniques with patients living with dementia in preparation for the fifth role-play session. The surgery was set-up so that students could identify barriers to provision of care such as a loud radio, and an actor was placed in the waiting room to provide an authentic simulation of an older person with dementia. The sixth session was constructed to consolidate the participants’ knowledge from the previous sessions as a case-based learning discussion. The final session involved a visit to a RACF with the students providing RACF staff with an oral health presentation which they had designed. The RACF chosen for this applied session was selected for its convenient location and provision of varying levels of care.

***Setting***

The setting for the project was at an Oral Health Services Tasmania (OHST) dental clinic in Hobart where general dental services are provided to members of the public holding healthcare cards. OHST provides extended clinical placements in the north, north-western and southern Tasmania to final year Bachelor of Dental Surgery students from James Cook University (JCU). The undergraduate dental students are primarily school leavers who are in the fifth year of their degree and who have minimal previous experience with frail or medically compromised elderly people. The students attended clinic in two cohorts for a period of 16-18 weeks, seeing on average six patients a day for four days of the week and providing comprehensive dental care to patients of all ages.

***Ethical considerations***

Ethics approval was obtained by the JCU Human Research Ethics (Ethics approval number H7422). Consideration of the relationship between the principal investigator and students was needed due to the existing power differential as the researcher was also their clinical supervisor. Data collection occurred after the principal investigator ceased to be a clinical supervisor to the students and provided feedback data from the focus group discussions.

***Recruitment***

The participants were purposively sampled according to the following inclusion criteria (Patton, 2015). The sample consisted of all of the cohort of 18 final year dental students who attended clinical placement in Hobart in 2018. The first semester group of nine students consisted of five female and four males and formed the pre-curriculum focus group. The second semester group of nine students also consisted of five female and four males. All participated voluntarily in the aged care curriculum designed for this project. The post-curriculum focus group was carried out at the end of the clinical placement and after all sessions of the curriculum were delivered.

All of the final year JCU dental students at the Hobart clinical placement were invited to take part in interviews and focus groups during their clinical placement in 2018. Each focus group was recorded using a digital recording device and transcribed by hand. The principal investigator conducted the education sessions and the interviews at the end of the day when the clinical sessions had ended (Table 2). The students were informed this project was being undertaken by the researcher for her Master of Health Professional Education qualification. Recruitment was by an administrative member of staff at OHST and focus groups were conducted after completion of all the clinical placements and assessments. This was necessary as the interviewer was also the students’ clinical supervisor, so the power differential of educator-student was removed.

The participants were given an informed consent form and information sheet and advised that taking part in the study was completely voluntary and participants were able to stop taking part at any time without explanation or prejudice. Their decision to participate or not in the study in no way influenced their current or future employment nor their academic status or enrolment in their Bachelor of Dental Surgery. The students’ responses and contact details were treated with strict confidentiality and all information was de-identified.

***Data Collection and Analysis***

Data was obtained via focus groups with the students before and after delivery of the gerodontology curriculum. Transcriptions were made available for participants to cross-check to ensure trustworthiness and representation of data (Carter et al., 2014). The data from the transcriptions were analysed by hand using indexing, management and interpretation before identifying key themes for a summary report using thematic analysis (Clarke & Braun, 2017) (Table 3). The Clarke and Braun method for thematic analysis (Clarke & Braun, 2017) uses a six-step approach with an emphasis on themes being developed across the content of what participants say rather than questions they have been asked. The analysis involved an inductive process with coding and theme development guided by the content of the data using constant comparison. All three authors involved in the data analysis were experienced in health profession education and two of the coders also were involved in the training of dental students. Thematic analysis is a method of qualitative data analysis allowing insight into patterned meaning across a data set. This method was used as it would allow interpretation of collective and shared experiences. The results were used to drive the design of the curriculum.

**Results**

The data obtained through the focus groups revealed that an aged care curriculum delivered during a clinical placement can influence dental students’ perceived barriers to providing care for older patients and enabled them to develop a sense of capability. The main themes arising from the pre- and post-curriculum groups are displayed in Table 3 and included a preference for practical learning, unpreparedness for managing older patients, barriers to providing care to older people, a lack of confidence for gaining consent from people living with dementia, and interactions with residents and staff of RACFs.

***Pre-curriculum Thematic Analysis***

This focus group was conducted at the end of the students’ clinical placement at OHST. These participants did not have an aged care curriculum during their placement. The three main themes that emerged from the discussion included a preference for practical learning; unpreparedness for managing older patients; and a lack of confidence for consenting people with dementia.

Theme 1: Situated learning in aged care

Theme 1 highlights the students’ desire for more hands-on experiential learning and observing clinicians in real clinical scenarios. They thought they were able to retain information better than didactic forms of teaching.

*“If I see it first-hand with experience, I learn more than from lectures”* (Student U)

Theme 2: Academic preparation

Theme 2 outlines the way students felt about managing older patients. There was uncertainty behind how they managed communication; access; and treatment with older patients, particularly in a domiciliary setting. They gravitated to discussions around a need to gain more knowledge and experience in restorative treatment of older patients with an acknowledgement that although they had received didactic lectures on the subject and lacked confidence to translate the theory into practice. They felt confronted by the barriers faced in communication with older patients and were unsure if they could remember their didactic teaching of techniques for improving access to non-communicative patients.

*“We haven’t had a lot of exposure in aged care and into nursing homes as well”* (Student U)

Theme 3: Confidence. A lack in confidence with the consenting process of people living with dementia.

Theme 3 focuses on the students lack in confidence with the consenting process of people living with dementia. There was agreement amongst the students that there was a need for greater emphasis on teaching of the consenting processes. They recognised that although didactic lectures were delivered at the dental school, they were unable to accurately recall information.

*“We do have lectures on it, but we memorise a list and then you forget it”* (Student A)

***Summary of pre-curriculum themes***

The students had a strong preference for learning through experience with hands-on approaches with active, authentic learning perceived as the more effective way to retain knowledge. Although the students acknowledged the comprehensive lectures delivered to them in their foundation studies, they felt unprepared for managing older patients in a domiciliary setting during their senior clinical program. This was reflected in the discussion surrounding gaining consent from people living with dementia. There was an understanding that consent can be complex to obtain from older patients and there was a sense of confusion and wariness when discussing past experiences with cases where there was impaired decision-making capacity.

***Post-curriculum Thematic Analysis***

The participants of this focus group engaged in the aged care curriculum designed for the project which took place during their clinical placement at OHST. The major themes emerging from this group included a preference for practical learning; barriers to providing care to older people; and interactions with residents and staff of RACFs.

Theme 1: Learning

Theme 1 focuses on the students’ preference for active learning, especially when there is the opportunity to participate in clinical scenarios. The students believed that observing other clinicians working with older patients would lead to retention in information and greater preparedness for management of an older patient. Having information given to them in short segments was preferable and there was a perception that the information was better retained.

*“I’m a “doer” learner instead of reading something”* (Student Y)

Theme 2: Barriers to provision of care

The second theme discovers that, as well as having insight to the difficulties they would face themselves as clinicians, the students had awareness of the other barriers being faced to provision of care, including issues with dental assistants, RACF staff, and the residents. They had been confronted with negative attitudes of RACF staff and assistants which led them to concerns over the success of being able to provide care for residents.

*“I would love to do it, but it just seems so difficult”* (Student Q)

Theme 3: Interactions with residents and staff

Theme 3 focuses on the experience of going into an aged care facility and that this gave context to the information given to the students. There was an awareness of a need to spend time with the staff and residents to build relationships. Being able to visit the facilities and have contact with the staff and residents embedded knowledge and allowed more fluidity in their interactions as there was awkwardness with communicating with the staff as Student L stated: “the carers there I felt like sort of had the attitude like, oh you don’t really understand what it’s like for us”.

*“Just going there gave it a bit of context and you could see”* (Student Q)

***Summary of post-curriculum themes***

The students expressed a strong interest in gaining more experience in aged care dentistry and thought that service-based learning with mentoring capabilities would be beneficial. They were aware of multiple barriers in providing care to older people and acknowledged a need to build relationships with staff and residents to decrease these barriers. The ability to learn through role-play and active learning sessions rather than traditional didactic methods allowed the students to feel less awkward when providing care in real-life clinical scenarios. The inclusion of an aged care curriculum as part of the final year placement impacted on one student’s decision about job searches. These findings have implications for teaching students gerodontology as is considered in the Discussion.

**Discussion**

This research project sought to provide insight into the need for greater inclusion of gerodontology content in the Australian dental curriculum, and to investigate attitudes of selected dental students on clinical placements before and after delivery of an innovative aged care curriculum. The main outcome revealed that inclusion of an aged care curriculum as part of a clinical placement may help students feel more prepared and may reduce the perceived barriers to provision of oral health care to older people. The results from the pilot curriculum indicated that a clinical placement setting is a suitable learning environment for the delivery of an aged care curriculum as the group size is smaller and there is the capability to provide authentic real-life scenarios for better learning outcomes. This situated learning has been recognised as an important process in gaining professional skills (Lave & Wenger, 1991) with evidence that it may positively enhance student attitudes and knowledge (Annear et al., 2016; Nochajski et al., 2011). Including pre-placement programmes may better prepare students for the RACF environment (Wallace et al., 2014).

As this is the first study of Australian dental students and gerodontology, it was not possible to directly compare any previous findings. A common theme in both pre- and post-focus groups was a clear preference for experiential learning and the capacity to involve service-based learning for management of the oral health of frail older people. Students acknowledged that while comprehensive didactic lectures were given during the undergraduate curriculum, retention of information was difficult, and they were more likely to achieve deep learning if there was an active component to the sessions. Deep learning relates to the capability for a learner to relate to a topic and think critically about newly learned information while understanding the meaning behind the material (Biggs & Tang, 2011). The preference for active learning is reflected in findings by Annear et al. (2016), whofound that experiential learning aided retention of knowledge and the value of service-learning in RACFs was found to be beneficial for preparing students (Wallace et al., 2014).

Modern pedagogy indicates that it is useful for academic material to be set with tasks requiring higher order skills and applying previous knowledge therefore ensuring constructive alignment of the dental curriculum (Biggs & Tang, 2011). This means the learner is not simply memorizing but understanding information and is able to use the knowledge to problem-solve, create and analyse. This was taken into account during the development of the pilot gerodontology curriculum and the use of Kern’s method of curriculum development to ensure appropriate educational strategies (Kern, 1998). The logistics of teaching large groups will inevitably form challenges for the undergraduate dental curriculum, however, the ability to use traditional forms of teaching, such as the large group didactic lectures, may support the scaffolding of knowledge (Clapper, 2010; Knowles, 1980) while building on more complex cognitive processes (Biggs & Collis, 1982). This is reflected in the first session of the pilot curriculum where information was used from the second-year lectures received at JCU. The ability to deliver the curriculum to a small group allowed incorporation of discussion and brain-storming during the early lectures, enabling for a more student-centred and active approach to learning.

All components of the pilot curriculum were designed to be no more than thirty-minute PowerPoint presentations, with the remaining portion of the sessions incorporating participatory learning elements. These included role play, case study discussion, and visiting a RACF. The group of students participating in the pilot appreciated shorter sessions and felt that it was easier to understand the information given. This is consistent with findings recognizing the benefit of learning in smaller segments (Exeter et al., 2010).

Both focus groups identified barriers in providing care to older people with the intervention group showing awareness of the problems faced with developing relationships with RACF staff and residents. Health professional education has a clear need for building on communities of practice (Lave & Wenger, 1991) and in order to develop knowledge of gerodontology for graduates, involvement of experienced dentists needs to be incorporated to decrease the gap between academic knowledge and management of the older patient in practice.

The pre-curriculum group focused on the uncertainty they felt around management of older people, with a gap between the transition from knowledge to practical provision of care. This was reflected as a barrier in the post-curriculum group, with concerns around the logistics of being able to provide domiciliary services. The significance of both groups feeling the difficulties of providing care to older people and the findings from a previously published literature review (Nilsson et al., 2018) show a clear need to support undergraduate learning so as to bridge the gap between theoretical knowledge of gerodontology to competent clinician. Comparing the two focus groups, the pilot curriculum may have influenced the group who were able to visit the RACF as there was positive discussion surrounding the need to build relationships with staff and residents thereby reducing the awkwardness of communication by practicing interactions with RACF staff.

A limitation of the study was the sample size which was dictated by the number of students attending the clinical placement. It would have been beneficial to have provided the curriculum to both groups and obtain data from before and after the curriculum. However, to ameliorate ethical concerns, the interviews were conducted after placement as the investigator was also the clinical supervisor for the students. In contrast, concerns about

the investigator being the clinical supervisor, and the need to obtain data at the end of the nine week placement, was also a strength of the study, with the students and supervisor able to build positive relationships during the placement enabling rich exploration of their attitudes to gerodontology and managing older patients.

Further research, including longitudinal studies, is needed to explore the relationship between inclusion of a gerodontology curriculum and workplace decisions after graduation. A comparison of attitudes and knowledge of dental students from different institutions with relation to the gerodontology content would be useful to discern varying pedagogical methods and the success of these educational approaches.

**Conclusion**

This is the first study to assess a gerodontology curriculum in Australia for final year dental students, and also the first qualitative study of Australian dental students’ attitudes to aged care oral health.The current literature and results from implementation of the pilot aged care curriculum indicate that clinical exposure to aged care oral health at an undergraduate level may positively influence student learning outcomes. Educational interventions may help decrease the barriers to provision of care and help students feel more prepared for providing oral health care to older patients, however, there is no consistent inclusion of a gerodontology curriculum in dental schools and there is a wide range of clinical exposure to older patients among dental schools.

The pilot curriculum influenced the students’ knowledge, attitudes, and preparedness, with evidence from the focus groups showing that inclusion of this curriculum affected workplace decisions on graduation. There was a clear preference for active learning components in the curriculum with acknowledgment that traditional didactic learning is not conducive to deep retention of information. To enable current evidence-based practice and quality pedagogical methods, a regular action cycle of design, development, implementation and evaluation should be incorporated into any curriculum.

With the Royal Commission into Aged Care Quality and Safety currently in progress (Nilsson, 2019), it is timely to review how Australian dental schools educate the future workforce. Social accountability in health profession education to improve health equity for older people necessitates an evaluation of how gerodontology is taught in the undergraduate curriculum of dental schools. If we are to prepare the dental workforce to adequately support the needs of frail and care-dependent people, there is a clear need to bridge the gap between theoretical knowledge and the propensity to provide care to older people.

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**References**

Abbey, J., Liddle, J., Bridges, P., Thornton, R., Lemcke, P., Elder, R., & Abbey, B. (2006). Clinical placements in residential aged care facilities: the impact on nursing students' perception of aged care and the effect on career plans. *Australian Journal of Advanced Nursing, The, 23*(4), 14-19.

Aged Care Quality and Safety Commission. (2020). *Guidance and Resources-Standard 7*. https://www.agedcarequality.gov.au/sites/default/files/media/Guidance%20and%20resources\_Standard%207.pdf

Annear, M. J., Lea, E., Lo, A., Tierney, L., & Robinson, A. (2016). Encountering aged care: a mixed methods investigation of medical students' clinical placement experiences. *BMC geriatrics, 16*, 38. https://doi.org/10.1186/s12877-016-0211-8

Australian Institute of Health and Welfare. (2018). *Older People*.

Biggs, J. B., & Collis, K. F. (1982). *Evaluating the quality of learning: the SOLO taxonomy (structure of the observed learning outcome)*. Academic Press.

Biggs, J. B., & Tang, C. (2011). *Teaching For Quality Learning At University*. McGraw-Hill Education.

Bordage, G., & Harris, I. (2011). Making a difference in curriculum reform and decision‐making processes. *Medical Education, 45*(1), 87-94. https://doi.org/10.1111/j.1365-2923.2010.03727.x

Budd, G. M., Wolf, A., & Haas, R. E. (2015). Addressing the Primary Care Workforce: A Study of Nurse Practitioner Students’ Plans After Graduation. *Journal of Nursing Education, 54*(3), 130-136. https://doi.org/10.3928/01484834-20150218-21

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology nursing forum, 41*(5), 545-547. https://doi.org/10.1188/14.ONF.545-547

Chalmers, J., & Pearson, A. (2005). Oral hygiene care for residents with dementia: a literature review. *Journal of advanced nursing, 52*(4), 410-419. https://doi.org/10.1111/j.1365-2648.2005.03605.x

Clapper, T. C. (2010, 1//). Beyond Knowles: What Those Conducting Simulation Need to Know About Adult Learning Theory. *Clinical Simulation in Nursing, 6*(1), e7-e14. http://www.sciencedirect.com/science/article/pii/S1876139909005015

Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology, 12*(3), 297-298. https://doi.org/10.1080/17439760.2016.1262613

Exeter, D. J., Ameratunga, S., Ratima, M., Morton, S., Dickson, M., Hsu, D., & Jackson, R. (2010). Student engagement in very large classes: the teachers' perspective. *Studies in Higher Education, 35*(7), 761-775. https://doi.org/10.1080/03075070903545058

Gobbens, R. J. J., van Assen, M. A. L. M., Luijkx, K. G., & Wijnen-Sponselee, M. T. (2010). Determinants of Frailty. *Journal of the American Medical Directors Association, 11*(5), 356-364. https://doi.org/10.1016/j.jamda.2009.11.008

Hearn, L., & Slack-Smith, L. (2015). Oral health care in residential aged care services: barriers to engaging health-care providers. *Australian Journal of Primary Health, 21*(2), 148. https://doi.org/10.1071/PY14029

Hopcraft, M. S., Morgan, M. V., Satur, J. G., & Wright, F. A. C. (2008). Dental service provision in Victorian residential aged care facilities. *Australian Dental Journal, 53*(3), 239-245. https://doi.org/10.1111/j.1834-7819.2008.00055.x

Kern, D. E. (1998). *Curriculum development for medical education: a six-step approach*. JHU Press.

Knowles, M. S. (1980). *The modern practice of adult education: from pedagogy to andragogy*. Association Press. http://books.google.com.au/books?id=\_gifAAAAMAAJ

Kossioni, A. E., Hajto‐Bryk, J., Maggi, S., McKenna, G., Petrovic, M., Roller‐Wirnsberger, R. E., Schimmel, M., Tamulaitienè, M., Vanobbergen, J., & Müller, F. (2018). An Expert Opinion from the European College of Gerodontology and the European Geriatric Medicine Society: European Policy Recommendations on Oral Health in Older Adults. *Journal of the American Geriatrics Society, 66*(3), 609-613. https://doi.org/10.1111/jgs.15191

Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press. http://books.google.com.au/books?id=CAVIOrW3vYAC

Morley, J. E., Vellas, B., van Kan, G. A., Anker, S. D., Bauer, J. M., Bernabei, R., Cesari, M., Chumlea, W. C., Doehner, W., Evans, J., Fried, L. P., Guralnik, J. M., Katz, P. R., Malmstrom, T. K., McCarter, R. J., Gutierrez Robledo, L. M., Rockwood, K., von Haehling, S., Vandewoude, M. F., & Walston, J. (2013). Frailty consensus: a call to action. *Journal of the American Medical Directors Association, 14*(6), 392-397. https://doi.org/10.1016/j.jamda.2013.03.022

Nilsson, A. (2019). Submission to the Royal Commission into Aged Care Quality and Safety. *Australian Dental Association Tasmanian Branch*.

Nilsson, A., Young, L., & Croker, F. (2018). A call for greater inclusion of gerodontology in the dental curriculum: a narrative review. *Australian Dental Journal*. https://doi.org/10.1111/adj.12663

Nochajski, T. H., Davis, E. L., Waldrop, D. P., Fabiano, J. A., & Goldberg, L. J. (2011). Dental students' attitudes about older adults: do type and amount of contact make a difference? *Journal of dental education, 75*(10), 1329.

Oliver, R., Kersten, H., Vinkka-Puhakka, H., Alpaslan, G., Bearn, D., Cema, I., Delap, E., Dummer, P., Goulet, J. P., Gugushe, T., Jeniati, E., Jerolimov, V., Kotsanos, N., Krifka, S., Levy, G., Neway, M., Ogawa, T., Saag, M., Sidlauskas, A., Skaleric, U., Vervoorn, M., & White, D. (2008). Curriculum structure: principles and strategy. *European Journal of Dental Education, 12*(S1), 74-84. https://doi.org/10.1111/j.1600-0579.2007.00482.x

Patton, M. Q. (2015). *Qualitative research & evaluation methods: integrating theory and practice* (Fourth ed.). SAGE.

Petersen, P. E., & Yamamoto, T. (2005). Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. *Community Dentistry and Oral Epidemiology, 33*(2), 81-92. https://doi.org/10.1111/j.1600-0528.2004.00219.x

Rodríguez-Mañas, L., Féart, C., Mann, G., & Viña, J. (2013). Searching for an Operational Definition of Frailty: A Delphi Method Based Consensus Statement. The Frailty Operative Definition-Consensus Conference Project. *The journals of gerontology. Series A, Biological sciences and medical sciences, 68*(1), 62-67. https://doi.org/10.1093/gerona/gls119

United Nations. (2019). *World Population Ageing 2019: Highlights*. https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf.

Wallace, J., Blinkhorn, A., & Blinkhorn, F. (2014). An assessment of the educational value of service‐learning community placements in residential aged care facilities. *International Journal of Dental Hygiene, 12*(4), 298-304. https://doi.org/10.1111/idh.12080

Wright, F. A. C. (2015). Social implications and workforce issues in the oral health of an ageing population. *Australian Dental Journal, 60*(1), 114-124. https://doi.org/10.1111/adj.12290

**Table 1. Phases of the project**

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| Phase 1 | Narrative literature review performed. Findings from the review used to inform Phase 2 and identify areas for development in a pilot gerodontology curriculum.  The first stages of Kern’s six-step curriculum design were carried out: general needs assessment (Kern’s step 1), targeted learner needs assessment (Kern’s step 2). |
| Phase 2 | Focus groups were held with dental students to explore attitudes to aged care curriculum and brainstorm development of new curriculum ideas for gerodontology. |
| Phase 3 | Goals and outcomes outlined as part of Kern’s six-step curriculum design (Kern’s step 3). |
| Phase 4 | Educational strategies were developed and completion of curriculum design (Kern’s step 4). |
| Phase 5 | The pilot aged care curriculum was implemented with JCU final year dental students on clinical placement (Kern’s step 5).  Focus groups explored dental students’ attitudes towards aged care dentistry after the implementation of curriculum (Kern’s step 6). |

**Table 2. Kern’s six-step curriculum design (Kern, 1998)**

|  |  |
| --- | --- |
| Kern’s six steps | Description of the step |
| Step 1: Problem identification and general needs assessment | Identification of the problem; the current approach; and ideal approach |
| Step 2: Needs assessment for targeted learners | Identification of the needs of the learners and assessment of the learning environment |
| Step 3: Goals and objectives | Identification of broad goals of the curriculum and measurable objectives |
| Step 4: Educational strategies | What strategies are used for the content and method of education |
| Step 5: Implementation | Gain political support and resources, address barriers, introduce and deliver the curriculum |
| Step 6: Assessment and evaluation | Individual learner feedback and feedback of the program |

**Table 3. Themes from Pre- and Post-curriculum groups**

|  |  |
| --- | --- |
| Pre-curriculum group | Post-curriculum group |
| Preference for practical learning in aged care | Preference for practical learning |
| Unpreparedness for managing older patients | Barriers to providing care to older people |
| Lack of confidence for consenting people living with dementia | Interactions with residents and staff of RACFs. |

**Figure 1. Kern’s curriculum cycle** (Kern, 1998)