An investigation into clinical preventive care provided to adolescents accessing Public Oral Health Services New South Wales, Australia

Angela Vaetoefaga Talamaivao Masoe

Dip DT, MCom & Hlth Dev.

Submitted for the degree of

Doctor of Philosophy

Oral Health

School of Health Sciences
Faculty of Health and Medicine
The University of Newcastle

June 2015
Statement of originality

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

___________________________  Date 23/06/2015

Angela Vaetoe Faga Talamaivao Masoe
Acknowledgment of authorship

I hereby certify that this thesis is in the form of a series of published and submitted papers of which I am the first author. The co-authors of the papers were supervisors of the thesis and provided direction and support for each of the publications.

Fiona A Blinkhorn

Anthony S Blinkhorn

Jane Taylor

Date

Faculty of Health Assistant Dean
(Research and Training)
Acknowledgements

I would like to pay my respects, and express my heartfelt gratitude to my academic supervisors Associate Professors Fiona A. Blinkhorn and Jane Taylor, and Professor Anthony S. Blinkhorn OBE. Your wisdom, excellence in clinical research, diplomacy, and guidance throughout this research journey has been an honour and privilege I will infinitely value, and shall share the learnings for the good of others.

Many individuals have contributed generously in numerous exceptional ways towards the success of this research and thesis, which I am greatly appreciative of:

- Dr Neville Heer clinical director, Southern NSW and Murrumbidgee Local Health Districts Oral Health Network for your expert advice and sanctioning submissions to fund this research; and Sue Winders health service manager for your professional and Local Health District sponsorship;
- John Skinner director, NSW Centre for Oral Health Strategy for funding and support of this research; and Michael Jacobi manager, Information System for Oral Health (ISOH) for State health research data management and professional advice;
- To all NSW Public Oral Health Services clinical directors, health service managers for approval of the research activities; NSW Oral Health Promotion Network members, NSW Public Oral Health Services dental therapists, oral health therapists, dental assistants, ISOH coordinators, Call Centre managers, and Australian Capital Territory dental therapists and hygienists for willing to participate despite your full work schedules;
- Kim Colyvas and Fran Baker School of Mathematics and Physical Sciences University of Newcastle for your professional statistics guidance;
- Rachael Moir research project assistant University of Newcastle, your willingness to assist with the research activities is sincerely and greatly appreciated;
Acknowledgements

I would like to pay my respects, and express my heartfelt gratitude to my academic supervisors Associate Professors Fiona A. Blinkhorn and Jane Taylor, and Professor Anthony S. Blinkhorn OBE. Your wisdom, excellence in clinical research, diplomacy, and guidance throughout this research journey has been an honour and privilege I will infinitely value, and shall share the learnings for the good of others.

Many individuals have contributed generously in numerous exceptional ways towards the success of this research and thesis, which I am greatly appreciative of:

- Dr Neville Heer clinical director, Southern NSW and Murrumbidgee Local Health Districts Oral Health Network for your expert advice and sanctioning submissions to fund this research; and Sue Winders health service manager for your professional and Local Health District sponsorship;
- John Skinner director, NSW Centre for Oral Health Strategy for funding and support of this research; and Michael Jacobi manager, Information System for Oral Health (ISOH) for State health research data management and professional advice;
- To all NSW Public Oral Health Services clinical directors, health service managers for approval of the research activities; NSW Oral Health Promotion Network members, NSW Public Oral Health Services dental therapists, oral health therapists, dental assistants, ISOH coordinators, Call Centre managers, and Australian Capital Territory dental therapists and hygienists for willing to participate despite your full work schedules;
- Kim Colyvas and Fran Baker School of Mathematics and Physical Sciences University of Newcastle for your professional statistics guidance;
- Rachael Moir research project assistant University of Newcastle, your willingness to assist with the research activities is sincerely and greatly appreciated;
- Suzanne Hannan Southern NSW LHD Library manager and assistant Ann Grant for your professionalism and prompt response to the numerous requests;
- Kim Bradshaw Queanbeyan Health Services manager and allied health manager Ruth Wedd for your management support and providing the resources to write the thesis.

I am very grateful for the funding received from the NSW Health Rural and Remote Allied Health Postgraduate Scholarship and the Centre for Oral Health Strategy which supported the research projects.

My deepest gratitude to family and friends both past and present, for your spiritual and moral support.

Finally, to my daughters Saini Marita and Natania Louise Hope Copp, your unconditional love inspire and sustain me always.

This completed thesis is my humble token of appreciation to you all.
Abstract

**Background**

Despite water fluoridation and well established media promotion of the use of fluoride toothpaste twice a day, many adolescents are still at risk of dental caries and periodontal disease due to poor dietary and toothbrushing behaviours. However, these oral health problems can be moderated by providing individuals with preventive care and advice. In New South Wales (NSW) dental therapists and oral health therapists (Therapists) working in the public health system can help this vulnerable group by providing free dental care including advice on preventing dental caries and periodontal disease. This study used both quantitative and qualitative methodology to investigate the provision of preventive care by Therapists to adolescents who chose to attend NSW Public Oral Health Services.

**Methods/Methodology**

The quantitative studies undertaken included: (i) obtaining clinical and preventive data from the NSW Health Information System of Oral Health database for all Therapists across all the Local Health Districts (LHDs) for interrogation and analysis; (ii) a reliability study of Therapists clinical and preventive care data as recorded in the electronic health record and paper record; and (iii) two cross-sectional postal questionnaire surveys; with one survey using three clinical vignettes to ascertain how Therapists structure their preventive care health plans for adolescents. The questionnaire survey also included items which explored Therapists’ patterns of participation in continuing professional development on clinical preventive care for adolescents.

The qualitative studies included: (i) three two hour structured focus group sessions with 16 Therapists; and (ii) two separate studies using in-depth face to face interviews with clinical directors and health service managers; and Senior Therapists. The qualitative studies
explored the participants’ perceptions and views on the influencing factors that enable or inhibit Therapists offering clinical preventive care to adolescents; and what strategies they used to enhance Therapists’ ability to facilitate preventive care in their day to day care for patients.

Results

Preventive care provided for adolescents accessing NSW Public Oral Health Services across all the Local Health Districts varied considerably from approximately 32% to 55% of Therapists clinical activity over a one year period.

The reliability study demonstrated that the current dual system using the electronic health record and paper records to record and account for Therapists’ clinical and preventive care activities for adolescents had deficiencies, indicating an area for infrastructure improvement.

The cross-sectional surveys using the clinical vignettes demonstrated that there were considerable variations noted in Therapists recommendations for stabilising and managing dental disease for their adolescent patients, suggesting a need for Clinical Directors to improve models of preventive care delivery based on scientific evidence.

Therapists responded to the continuing professional development items in the survey and noted that they received most of their education from the Local Health District, suggesting opportunities for interprofessional learning from visiting dental paediatric specialists, dentists and supported by health service managers.

The qualitative studies provided common themes at multiple levels of the oral health organisation, highlighting the factors that can enhance and assist Therapists operationalise scientific based preventive care into their day to day clinical practice. These include resourcing efficient clinical access pathways to preventive care; adequate workforce mix; efficient and effective administrative processes to support preventive clinical care activities;
provision of oral health products and age appropriate information to support adolescents’ homecare regimes.

**Conclusion**

Therapists in this study stated it was their professional clinical ethos to embed scientific based preventive care into day to day clinical practice to improve adolescents’ long term oral health outcomes. To improve preventive models of care for adolescents requires the overarching administrative authority, NSW Health to accept that the scientific evidence relating to dental care has changed, and that management monitoring information should be incorporated into health reforms; thus assisting clinical directors, Therapist clinical leaders and health service managers to collaborate more effectively with sponsored support ‘pillars’ in the redesign of sustainable, cost effective evidenced based care pathways for all adolescents.
Table of contents

Statement of originality 2
Acknowledgment of authorship 3
Acknowledgements 4
Abstract 6
Table of contents 9
List of Tables 12
List of Figures 13
List of Appendices 14
List of Abbreviations 15
Chapter 1 17
Introduction 17
1.1 Overview 18
1.2 Background 24
Chapter 2 29
Literature Review 29
Literature Review 30
2.1 Literature review methodology 30
2.2 The role of therapists in prevention 31
2.3 Adolescents’ oral health 39
  2.3.1 Epidemiology of dental caries among adolescents in NSW 40
  2.3.2 Diet, dental caries, white spot lesions (WSL) & tooth erosion 47
  2.3.3 Oral hygiene practices, gingivitis & periodontal disease 50
  2.3.4 Tobacco use 51
  2.3.5 Access to care 51
2.4 Clinical preventive oral health care for adolescents 54
  2.4.1 Clinical diagnosis and preventive management care 55
  2.4.2 Radiographs 59
  2.4.3 Role of bacteria 60
  2.4.4 Role of saliva 63
2.5 Oral health education strategies

2.5.1 Oral health education
2.5.2 Dietary Advice
2.5.3 Oral Hygiene Advice
2.5.4 Smoking cessation advice

2.6 Clinical preventive treatment

2.6.1 Fluoride toothpaste
2.6.2 Topical fluoride application
2.6.3 Fluoride Mouthrinses
2.6.4 Chlorhexidine mouth rinse
2.6.5 Pit and fissure sealants
2.6.6 Remineralising agents
2.6.7 Chewing gum
2.6.8 Patient self-care home regime

2.7 Barriers and facilitators for provision of clinical preventive care

2.8 Literature review conclusion
2.9 Objectives of the research
2.10 Outline of the thesis
2.11 Peer reviewed publications

**Chapter 3**

Preventive and clinical care provided to adolescents attending Public Oral Health Service New South Wales, Australia: a retrospective study.

Chapter 4

Reliability study of clinical electronic records with paper records in the NSW Public Oral Health Service.

Chapter 5

Factors influencing provision of preventive oral health care to adolescents attending Public Oral Health Services in New South Wales.

Chapter 6

Assessment of the management factors that influence the development of preventive care in the New South Wales Public Dental Service.
List of Tables

1.1 Publications associated with key research objectives  
   Page 22

2.1 NSW Centre for Oral Health Strategy reported teenagers’ 
   significant caries indices by age  
   Page 45

2.2 Time requirements for US Preventive Services Task Force 
   required for preventive care  
   Page 66
## List of Figures

1.1 Overview of the research design and strategies in this thesis  Page 21

2.1 Dental Therapist employed in NSW Public Oral Health Service  Page 34

2.2 Oral Health Therapist employed in NSW Public Oral Health Service  Page 35

2.3 Average number of decayed, missing and filled teeth (DMFT) for 12 to 15 year old children  Page 42

2.4 Brostek and Walsh’s recommendation for use of Tri-Plaque ID three tone disclosing gel  Page 58

2.5 Featherstone’s oral health management factors of the dental caries process.  Page 62

2.6 Stillman-Lowe suggestions of practical advice on oral health education  Page 68

2.7 Reported Australian oral health preventive behaviours  Page 78
List of Appendices

Appendix 1  Ethics approval forms and NSW Chief Medical Officer’s approval data release

Appendix 2  Reliability study protocol and template

Appendix 3  Participant information sheet and consent form

Appendix 4  Qualitative study questionnaire

Appendix 5  Participant questionnaire: Part A

Appendix 6  Participant questionnaire: Part B

Appendix 7  Abstract of presentation: International Association of Paediatric Dentistry Congress, 2015
List of Abbreviations

CAMBRA Caries Management by Risk Assessment
CMS Caries Management System
COHS Centre for Oral Health Strategy
CPD Continuing Professional Development
CPP-ACP Casein phosphopeptide-amorphous calcium phosphates
DMFT Decayed, Missing and Filled Teeth
DT Dental therapist
EHR Electronic health record
ICDAS International Caries Detection and Assessment System
ISOH Information System for Oral Health
LHD Local Health District
MID Minimal intervention dentistry
NSW New South Wales
OHPC Oral health promotion coordinator
OHT Oral health therapist
POHP Priority Oral Health Program
UK United Kingdom
USA United States of America
WSL White spot lesion