Asia-Pacific Journal of Health Management

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'Asia Pacific Perspectives on Health' - Special Issue

Special Issue Features:
Integrated model
Aging and diversity
Medical needs
Service gap
……….and much more

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CONTENTS

IN THIS ISSUE

David Briggs

This issue is a Special Issue in that it predominantly features a series of articles that have arisen from the CPCE Health Conference 2019. The special issue commences with an editorial where Professor Yuen emphasises the ongoing collaboration with this Journal, the ACHSM and the Hong College of health Services Executives and with the CPCE. His leadership and contribution are appreciated.

The first article of the Special Issue is by Hasegawa, Matsumoto, and Hirata of Toho University Tokyo Japan who present an article entitled 'Aging and Diversity of Medical Needs: Cost of Illness of Cerebrovascular Disease in Each Prefecture of Japan. This is followed by the contribution from Ng, Fong and Kwong of Hong Kong on the 'Transition of hospital acute-centric to long term care in an ageing population in Hong Kong - is it an issue of service gap'. In the next article, Chu and Chong of Hong Kong address the 'Oncology Pharmacist's role and the impact on multidisciplinary patient-centred practice of oncology clinic in public hospitals in Hong Kong. Two interesting articles follow from Kwan, Yick and Wong of the Institute of Textiles and Clothing, Hong Kong Polytechnic University of Hong Kong who provide a research article on the 'Impact of Co- creation Footwear Workshops on Older Women in Elderly Centres in Hong Kong' and the following article from Yick, Yip and Ng, again from the Institute of Textiles and Clothing and from the Division of Science and Technology of the Hong Kong College of the same University. The latter article examines the importance of thermal comfort in foot wear design for the elderly and is entitled 'Thermal equations for predicting foot skin temperature'. In conclusion, Kwong and Fong provide a review article on a contemporary issue of 'promotion of appropriate use of electronic devices among Hong Kong adolescents.

We thank Professor Yuen and his authors for this important contribution to our understanding of humane, wholistic and integrated care from diverse international health systems.

In support of this effort of our colleagues above, we have added some more articles ready for publication. This includes an editorial on Health Reform that was prompted by my plenary session contribution at the CPCE Hong Kong Conference. We also continue the international emphasis of this issue with a contribution from Sharma of Maharishi Markandeshwar University, Northern India with a research article on the 'Extrinsic Rewards, Occupational Commitment, Career Entrenchment and Career Satisfaction of Dentists'. Our next article is by Mak and colleagues in a research article entitled 'What is the Professional Identity of Allied Health Managers?' Isouard and Martin provide a further contribution about the Australian workforce in an article entitled 'Managers of aged care residential services: 2006-2016.' Way and colleagues conclude this issue with an analysis of management practice in one local health district in Australia entitled 'The pursuit of purposeful partnerships-making a health matrix successful'.

EDITORIAL

AN ASIAN-PACIFIC PERSPECTIVE ON SOLUTIONS FOR A MORE HUMANISTIC, HOLISTIC AND INTEGRATED MODEL OF CARE

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This Special Issue selects papers from the CPCE Health Conference 2019 held at the College of Professional & Continuing Education (CPCE) of The Hong Kong Polytechnic University on 14 January 2019. CPCE is delighted to contribute to this Special Issue of APJHM. CPCE, together with the Hong Kong College of Health Services Executives, have been working together on many fronts with the Australian College of Health Services Management, and this Special Issue is an example of another fruitful collaboration.

"Towards a More Humanistic, Holistic and Integrated Model of Care" was chosen to be the theme of this year's conference. Health care systems often tend to deliver services that are fragmented, acute-centric, highly specialized, expensive, but not necessarily in line with the values of the patient. This conference seeks to explore studies, good practices and policies from different territories in the Asia-Pacific region that could potentially facilitate the transformation of the model of care to one that is more humanistic, holistic and integrated.

Over 200 academics and health care leaders from the Asia-Pacific region attended the conference. Speakers from Hong Kong, the Chinese mainland, Japan, South Korea, Singapore, Australia, Thailand etc. presented research findings and case studies in their respective territory and explored new ways to achieve a care model that promotes patient empowerment and enhances patients' value, choice, and dignity, in the Asia-Pacific context, in which all are experiencing rapid population ageing and the resultant pressure on their health and long term care systems.

The six articles selected for this Special Issue represent a variety of approaches to tackle the problem. To facilitate better planning, the article by Hasegawa et al. presents a method to estimate the burden of major chronic diseases

to demonstrate the diversity in the pattern of diseases among different regions in Japan. Ng et al. 's article identifies the service gap in the Hong Kong system that needs to be addressed. Benefits from the use of different health care professionals to provide better care is illustrated by Chu et al.'s case study on the role and impact of oncology pharmacists in optimizing anti-cancer treatment for cancer patients in Hong Kong. From the prevention angle, Yick et al 's study attempts to facilitate better footwear design process to prevent undesirable future foot conditions; Kwan et al.'s article presents the use of workshops to improve the functionality of geriatric footwear for older women; and Kwong et al.'s article discusses practical plans in the promotion of appropriate use of electronic devices among adolescents. In summary, this Special Issue recommends a multidisciplinary approach in tackling the problem of the health care system that could certainly benefit from more innovations and realignment.

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Special Issue Editor and
Dean of the College of Professional & Continuing Education, The Hong Kong Polytechnic University

RESEARCH ARTICLE

AGING AND DIVERSITY OF MEDICAL NEEDS: COST OF ILLNESS OF CEREBROVASCULAR DISEASE IN EACH PREFECTURE OF JAPAN

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ABSTRACT

BACKGROUND:

Aging in Japan is advancing most rapidly in the world and is expected to increase demand for medical services in the near future. Aging is uneven and progress of aging varies from regions resulting in great differences in medical needs. In order to supply the needs for medical services, theJapanese government developed the "Regional Medical Vision", which estimates the near future requirements for medical resources. However, this is a plan for redistribution of medical resources taking into account future changes of a population composition based on the current situation. In fact, each region has a diversity of medical needs, and it is difficult to use average medical needs even if they are adjusted by population structures.

In consideration of such situation, we tried to estimate the social burden of major diseases of each region in order to estimate the medical needs. We picked up cerebrovascular diseases (CVD, ICD10 code: I60 - I69) and dementia (ICD10 code: F01, F03, G30), and calculated their social burden of all 47 prefectures in Japan that have authority for health policy.

METHOD:

Modifying the COI method developed by Rice D, we newly defined and estimated C-COI of CVD (ICD10 code: I60 - I69) and dementia (ICD10code: F01, F03, G30). C-COI consists of five parts; direct cost (medical), morbidity cost, mortality cost, direct cost (long term care (LTC)) and informal care cost (family's burden). Direct cost (medical) is medical cost of each disease. Morbidity cost is opportunity cost for inpatient care and outpatient care. Mortality cost is measured as the loss of human capital

(human capital method). These three costs are known as components of original cost of illness by Rice D. Direct cost (LTC) is long term care insurance benefits. Family's burden is "unpaid care cost" by family, relatives and friends in-home and in-community (opportunity cost). We calculated such costs at 2013/2014 prices using Japanese official statistics.

RESULTS:

The total C-COI of CVD in Japan was about 6,177 billion JPY, the maximum was 621 billion JPY in Tokyo and the minimum was 33 billion JPY in Tottori (Tokyo/Tottori=18.8), whereas the total C-COI of dementia was 3,778 billion JPY, the maximum was 341 billion JPY in Tokyo and the minimum was 22 billion JPY in Tottori (Tokyo/Tottori=15.5). The C-COI per capita of CVD in Japan was about 48 thousand JPY, the maximum was 66 thousand JPY in Kagoshima and the minimum was 38 billion JPY in Saitama (Kagoshima/Saitama=1.7), whereas the total C-COI of dementia was 3,778 billion JPY, the maximum was 46 thousand JPY in Shimane and the minimum was 22 thousand JPY in Chiba (Shimane/Chiba=2.1).

CONCLUSION:

We substantiated a method to calculate the social burden of medical care and LTC care for each prefecture using C-COI methods. In both diseases, a large difference was found in total costs per capita and components ratio between prefectures. The situations of social burden of diseases has diversity among prefectures. When estimating the future medical needs of each region, it is necessary to take each regional condition into account.

INTRODUCTION

There are several definitions of the elderly, and 60 and over or 65 and over are commonly used. Recently, based upon the findings about the prevalence of disability and fragility, and the change of industry, where specialist and management skills are becoming predominant, the new definition of the elderly is defined as aged 75 and over, is gradually becoming popular.

In Japan 65 years old and over people already occupies 27.7% of the population, and 75 and over elderly occupies 13.8% of the population. Moreover, percentage of 75 and over elderly is predicted to become 25% in 2060. This increase of the elderly population will result in expansion of demand for medical and long-term care (LTC) services.

However, the ageing rate of society is unequal among regions, and speed of ageing is also unequal. Japanese government structure has 3 tiers, 1 central government, 47 prefectures, and about 1900 municipalities. In Japan prefectures are commonly used as units of regional analysis, because prefectures have not changed their administrative divisions for 130 years, and they have responsibility for health services and public health administration. Ageing speed is unequal among such prefectures.[1] In the near future the speed of ageing within prefectures which already have high aging rate will be low, however, the speed of metropolitan suburban prefectures will be quite high and the demand for medical services and LTC services is predicted to increase (Fig. 1). About 60 % of increasing numbers of elderly from 2015 to 2025 are estimated to be concentrated in the top 10 prefectures with big cities (Fig. 2).

The Japanese government has carried out 2 regional plans for medical services with estimated medical demand in each region. The first plan is a "regional medical care plan," which started in 1985.[2] This plan determines the target number of beds which is calculated by current number of beds, discharge rate, population by sex and age, average length of stay in hospital, and so on. In 1985 Japan was still in the situation of population increase, and the ageing of society had increased the demand for medical services. The regional medical plan restricted new hospitals to under-serviced areas, however, there were no impact on existing hospital beds.

The second plan was "regional medical vision" which was formulated in 2015.[2] The regional medical vision was the plan for preparing medical delivery system in the near future where the population and the demand for acute care will be shrinking. The vision estimates medical care demand in 2025 using 2025 population structure and inpatients/outpatients rates of 2013. For promoting specialization and cooperation among hospitals, the vision estimated required number of beds classified by 4 bed types, that is, advanced acute care, acute care, recovery care, and chronic care beds. In 2015 Japan was already in the situation of population decrease, and the situation was estimated to shrink the demand for medical services in near future. In this vision, prefectures are expected to facilitate cooperation with financial incentives.

This regional medical vision adopted the estimation of required number of beds classified by their functions; however, it was based on nation-wide inpatients/outpatients' rates of 2013. Regional diversity of medical needs was not taken into account. So, it can be said that this is limited to the estimation from the point of view of the supply side. There is diversity of structure of diseases as well as structure of population among regions, and we need the estimation from the point of view of the demand side. In this study we tried to develop the method to estimate the burden of diseases, which shows diversity of structure of diseases among prefectures. We calculated the comprehensive cost of illness (C-COI) of cerebrovascular disease and dementia among prefectures. Incidence of the two diseases is high among elderly people and the cost structure seems to differ; both acute care and LTC care are needed for cerebrovascular disease, and mainly LTC care will be needed for dementia.

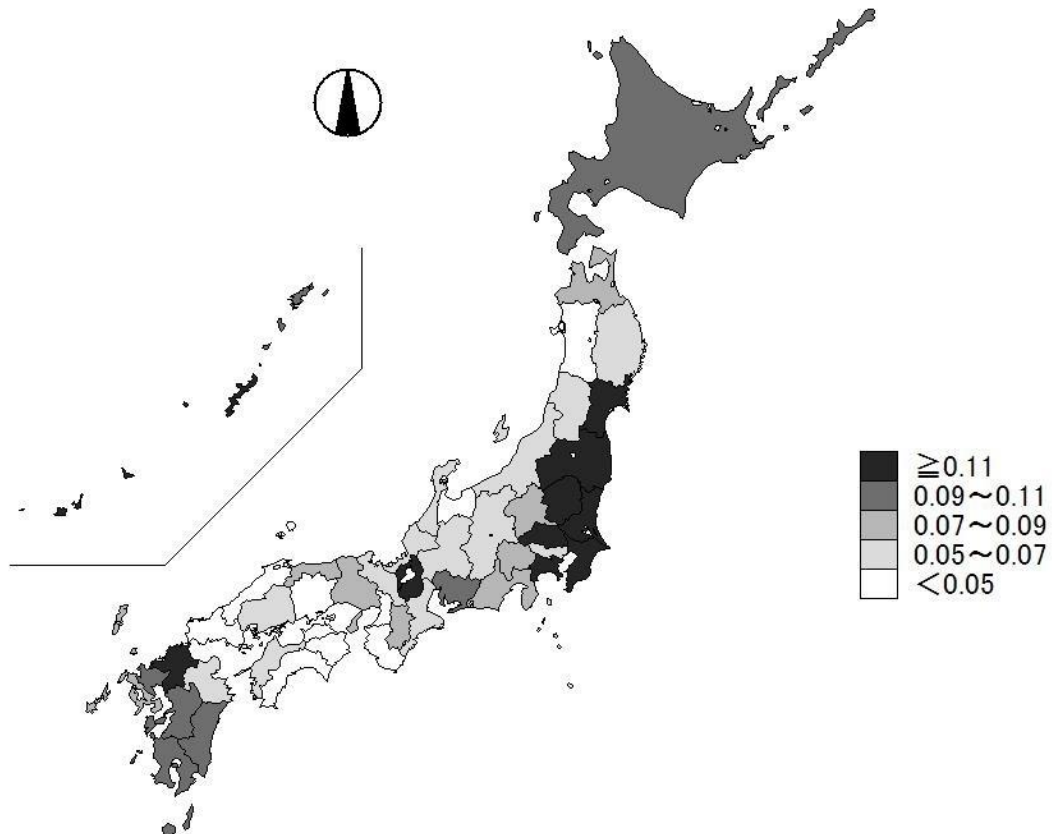**FIGURE 1. INCREASE OF 65 AND OVER POPULATION (2015-2025)**

Fig. 1 Increase of 65 and over population (2015→2025)
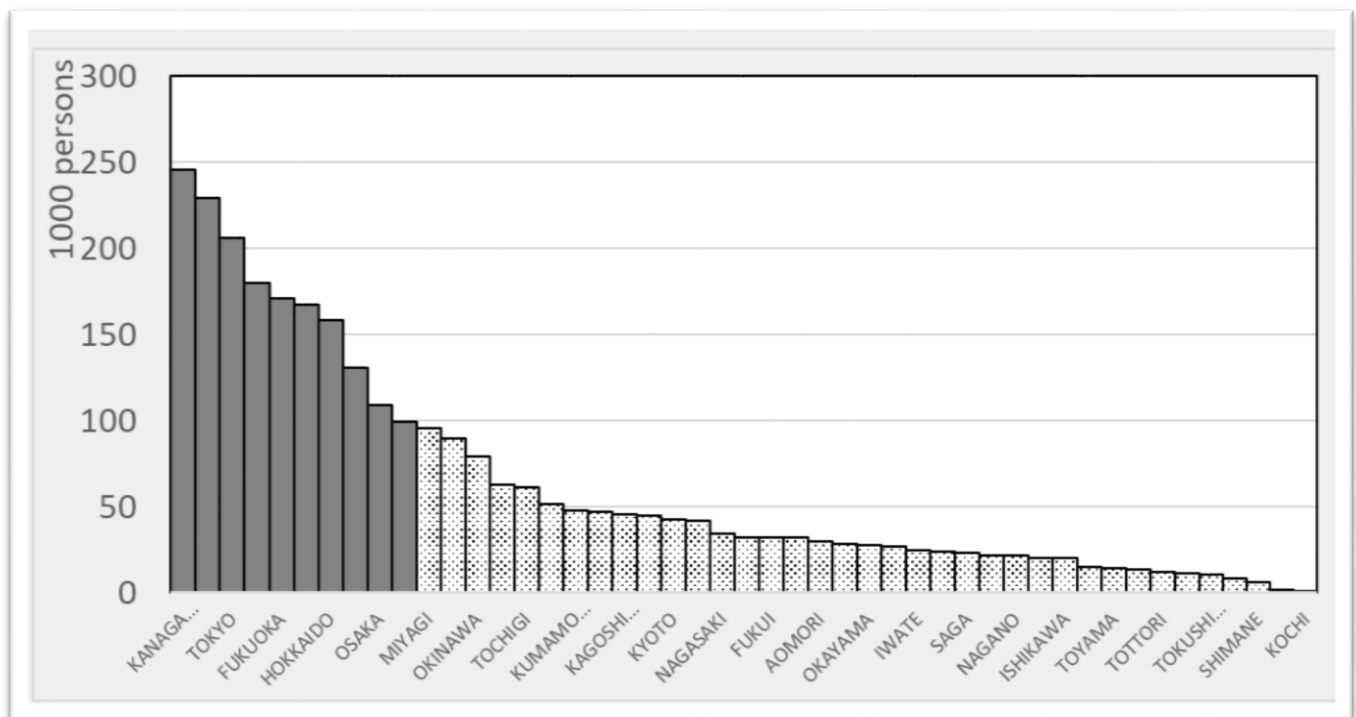
FIGURE 2. INCREASE OF 65+ POPULATION (2015→2025)

FIGURE. 3 C-COI PER CAPITA OF CVD (2014)
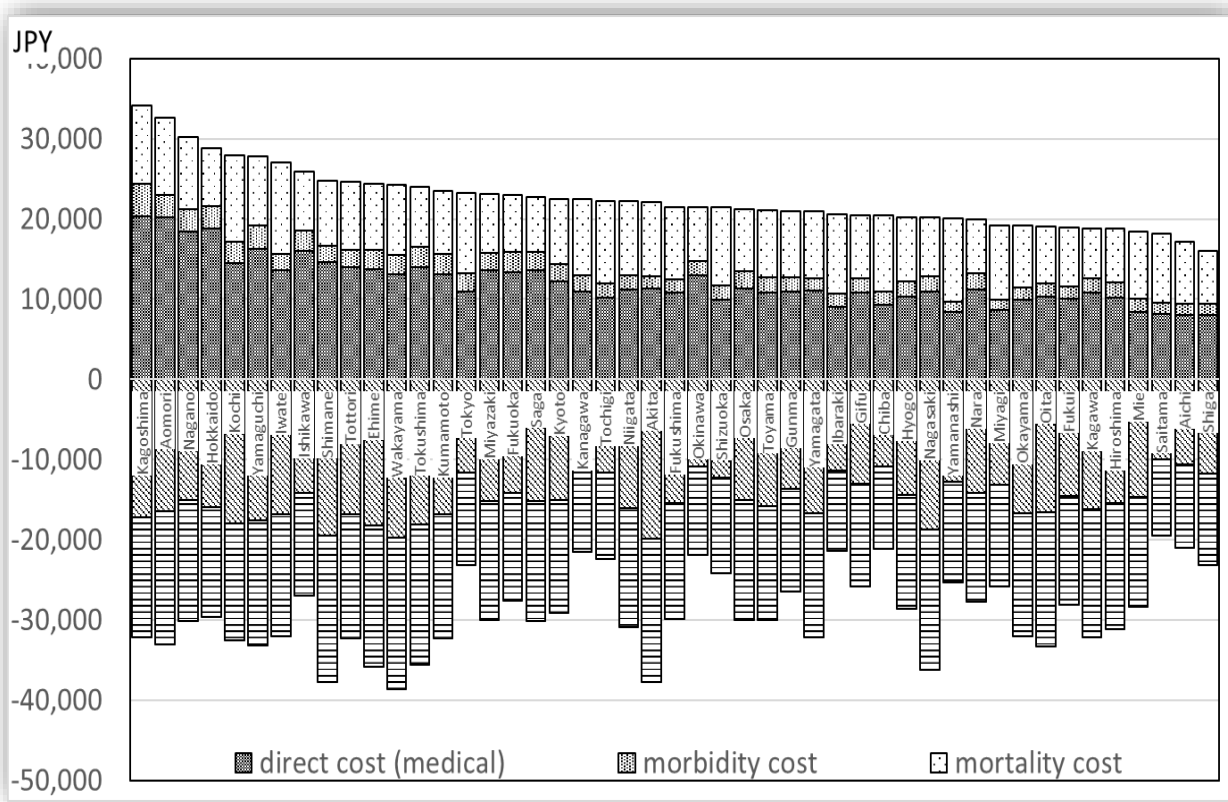
FIGURE. 4 C-COI PER CAPITA OF DEMENTIA (2014)
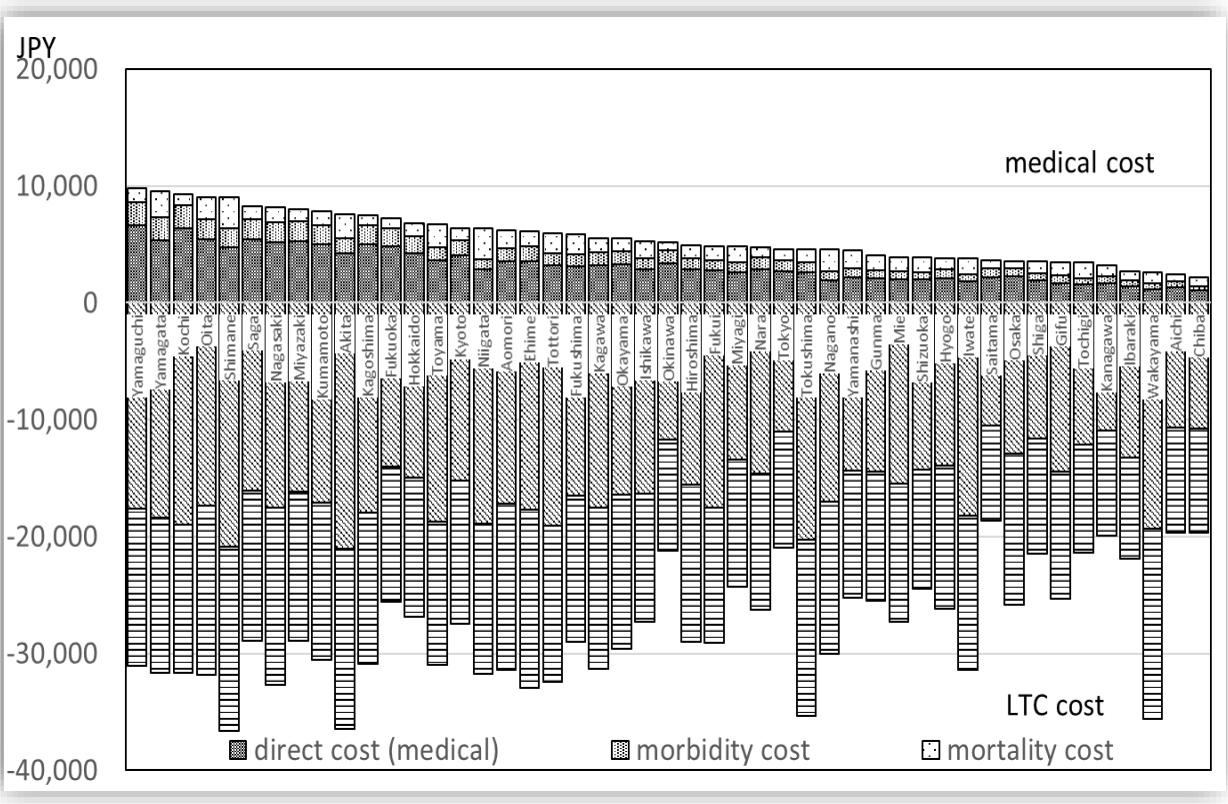
FIGURE. 5 C-COI PER CAPITA OF CVD AND DEMENTIA (2014)
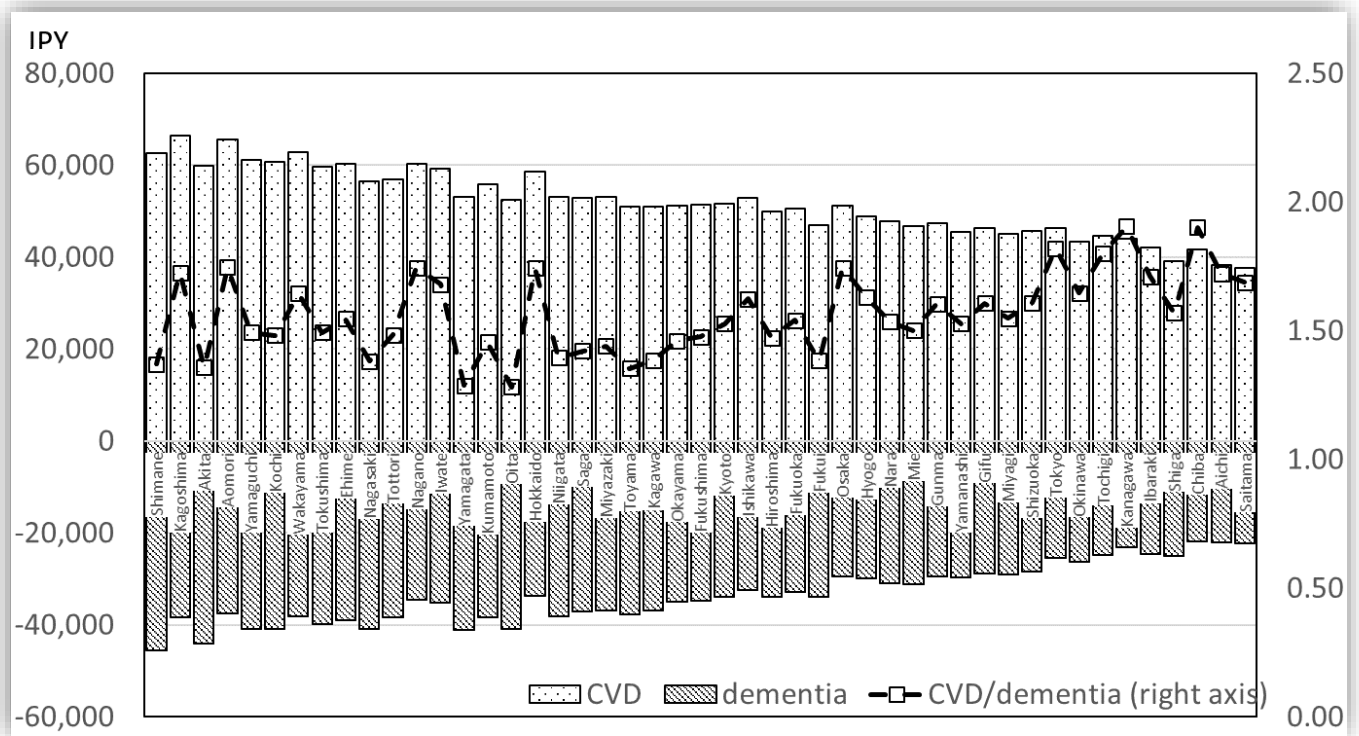
METHOD

Modifying the cost of illness (COI) method developed by Rice D3-6), was used to define and estimate comprehensive cost of illness (C-COI) of cerebrovascular disease (CVD) (ICD10 code: I60 - I69) and dementia (ICD10 code: F01, F03, G30). The comprehensive cost of illness (C-COI) was defined as follows;

C-COI = medical direst cost (MDC) + formal care cost (FCC)

+ morbidity cost (MbC) + mortality cost (MtC) + informal care cost (ICC)

MDC is the medical cost directly related to the disease, and includes costs associated with treatment, hospitalization, testing and drugs. In Japan almost all medical expenses are covered by the national medical insurance, and so we can calculate MDC by the data collected in the Survey of National Medical Care Insurance Services. MbC is the opportunity cost lost resulting from hospitalization and outpatient visits. MtC is measured as the loss of human capital (human capital method), which we got by multiplying the number of deaths from the disease by the

lifetime labor value per person. These three costs are known as components of original cost of illness. [7-11]

Original COI method has been well described as a way to measure the social burden of disease, however, it has the disadvantage that it cannot adequately measure the burden of chronic diseases whose LTC costs account for a significant portion of the social burden. C-COI method includes such LTC costs. LTC costs can be divided into 2 parts; formal care cost (FCC) and informal care cost (ICC). FCC is the LTC cost covered by public LTC insurance which was introduced in 2000. ICC is the cost to the family resulting from LTC. ICC can be estimated by 2 different methods; opportunity cost approach (OCA) and replacement approach (RA). OCA uses family member's opportunity cost lost resulting from giving care, whereas RA uses market price of care worker's wage. Generally, the cost measured by OCA is lower than the cost measured by RA, because family caregivers are sometimes old whose labor value at market is low. In this study we used OCA. [12,13]

The detailed calculation method is shown in Table 1. All calculation was done using governmental data.

RESULT

Figure 3 showed C-COI per capita of CVD of all prefectures. Vertical axis meant C-COI per capita; above 0-line bars were medical costs and below 0 bars were LTC costs. The bars were arranged in descending order of medical costs. The highest was 66,315 JPY (Japanese Yen) of Kagoshima prefecture and was 1.8 times of the lowest prefecture (Saitama prefecture, 377,706 JPY). Average percentage of LTC costs to C-COI was about 56%. There was no correlation between medical costs and LTC costs, and breakdowns of C-COI were different among prefectures (Table 2).

Figure 4 showed C-COI per capita of dementia of all prefectures. The highest was 45,634 JPY of Shimane prefecture and was 2.1 times of the lowest prefecture (Chiba prefecture, 21,853 JPY). As same as CVD there was no correlation between medical costs and LTC costs, and breakdowns of C-COI were also different among prefectures (Table 3).

Figure 5 showed summation of C-COI of both diseases arranged in descending order. The line graph showed the ratio of C-COI of CVD to that of dementia. The highest was 1.91 of Kanagawa prefecture, whereas the lowest is 1.28 of Oita prefecture. There was diversion in not only the level of C-COI but also the ratio of each disease among prefectures.

TABLE 1 COST CALCULATION

	Calculation　Method
Direct cost	
Medical DC	Annual medical expenses based on reimbursement data＊.
Formal Care Cost	LTC cost covered by public LTC insurance
Indirect cost	
Morbidity cost	(Total person-days of hospitalization× One day labor-value) +(Total person-days of outpatient× One day labor-
Informal Care Cost	number of family caregivers× average time for care a day × 1-hour labor value per person × 365
Mortality cost	Number of death× Life time labor-value per person

1.Benchmark discount rate was 3%.

2. One day labor-value was referred from the national survey of 2014.

3.Life time labor-value was calculated summing up the income which patient could have earned in the future if they had not died.

TABLE 2 C-COI PER CAPITA OF CVD: AVERAGE, MAX AND MIN

	C-COI	direct (Med)	morbidity	mortality	direct (LTC)	family`s burden
AVG (JPY)	51,664	12,090	2,025	8,388	14,998	14,164
SD (JPY)	7,223	3,032	518	1,217	2,557	2,329
MAX (JPY)	66,315	20,363	3,965	11,487	19,844	18,941
	Kagoshima	Kagoshima	Kagoshima	Iwate	Akita	Wakayama
MIN (JPY)	37,706	8,045	1,335	6,310	10,035	9,507
	Saitama	Shiga	Yamanashi	Kagawa	Saitama	Saitama
MAX/MIN	1.8	2.5	3.0	1.8	2.0	2.0

TABLE 3 C-COI PER CAPITA OF DEMENTIA: AVERAGE, MAX AND MIN

	C-COI	direct (Med)	morbidity	mortality	direct (LTC)	family`s burden
AVG (JPY)	33,493	3,216	1,062	1,264	15,745	12,207
SD (JPY)	6,219	1,451	455	475	2,869	2,027
MAX (JPY)	45,634	6,589	1,991	2,623	21,068	16,308
	Shimane	Yamaguchi	Yamaguchi	Niigata	Akita	Wakayama
MIN (JPY)	21,853	1,079	348	616	10,490	8,194
	Chiba	Chiba	Chiba	Osaka	Saitama	Saitama
MAX/MIN	2.1	6.1	5.7	4.3	2.0	2.0

DISCUSSION

The results of the study would intensify the diversity of ageing and corresponding burden of major diseases among prefectures. In an ageing society, local level health policy will become more important using detailed data of each prefecture.

In this study we could estimate regional burden of diseases using C-COI method. C-COI of both CVD and dementia varied widely, moreover the breakdowns of costs also varied widely among prefectures. In addition to these, the ratio of C-COI of CVD to that of dementia also showed difference, and there was no correlation between C-COIs of two diseases. It was suggested that the structures of the burden of diseases differ with regions.

Our study had several limitations. First, the data we used were governmental aggregated data, so we could not get the information about number of persons requiring care classified by major causes. In this study we used proportion of persons requiring care whose major cause was CVD or dementia to whole persons requiring care and multiplied the proportion by the number of persons requiring care of each prefecture. Second, persons requiring care were classified by only major causes, we could not consider the burden of comorbidities. Elderly people commonly have several diseases, and two diseases could contribute to lower ADLs. Our C-COI might be under-estimated since the contribution of two diseases as comorbidities were not taken into account. Finally, our C-COIs were calculated for only 2014 year. Time series analysis and future projection should be next issues.

Despite such limitations, we expect that our measurement of burden of diseases in prefectures using C-COI method helps to estimate regional medical demand. More detailed analysis using governmental individual data is needed.

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RESEARCH ARTICLE

TRANSITION OF HOSPITAL ACUTE-CENTRIC TO LONG TERM CARE IN AN AGEING POPULATION IN HONG KONG - IS IT AN ISSUE OF SERVICE GAP?

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ABSTRACT

Health expenditure at around 5.7% of GDP is low for a developed society like Hong Kong, where a dual track of public and private services in its health care system is unique. The low level of expenditure has been steady over the last three decades, apparently not affected at all by a major change in the Government in 1997. The public and private sections have equal share of the total health dollars consistently over the years, despite the increase of Government's annual spending from 11% to 17% since 1990, implying a similar trend in the private sector, which is funded predominantly by out of the pocket expenses with some insurance contribution. However, Hong Kong has the longest life expectancy in the world. This has resulted in the increase in the demand for health and long-term care, casting doubt on whether the traditional model of financing and delivery of care will be sustainable. The Government has pledged that that no one is denied adequate medical treatment due to lack of means, a stance in existence for decades and being reflected by the steady state of public and private share of health expenditure. Apart from two major re-structuring of the governance system, there has been little change in the service provision organisations. The system is often criticized for being heavily hospital based and acute-centric, particularly in the public services. Primary care is taken up predominantly by the private sector, mostly in clinical services, not focusing on prevention. It is apparent that there is a significant service gap, that needs to be examined and addressed systematically before a practical solution can be formulated. A more holistic, humanistic and better integrated system of care, with innovative care patterns, shall be the way forward.

KEYWORDS

A DUAL-TRACK SYSTEM OF HEALTH CARE

The health care system of Hong Kong runs on a dual-track basis encompassing the public and the private sectors that operate independently. Public health services have been playing a very important role in acting as the safety net for the entire community as health systems with higher public expenditure on health care provide better financial protection for individuals. [1] The private health care sector provides the alternative choices and more easily accessible services to individuals who are willing and can financially afford, either out of pocket or through insurance, to pay for the expensive cost-recovery private health services. The health care system of Hong Kong is thus unique in having a mixed welfare and free market subsystems operating in parallel but "independently" in the public and private sectors respectively. [2]

ACHIEVEMENTS AND THREATS

Health expenditure in Hong Kong has been fairly steady over the last three decades at around 5.7% GDP and this is low for such an economically developed society. Both the public and private sections have equal share of the total health dollars consistently over the years, despite the increase of Government's annual spending from 11% to 17% since 1990, or in terms of money, from 10 to 60 billion

Hong Kong dollars (HK$), implying an equally similar trend in the private sector, which is funded predominantly by out of the pocket expenses with some insurance contribution, mostly through employee benefits.

However, Hong Kong has achieved unexpected health statistics in having low infant and maternity mortality rates, and a rather surprising result of achieving the longest life expectancy in the world among its residents in this tiny and crowded city, that is full of stressful urban life and "unhealthy" daily activities. Life expectancies for male and female Hong Kong citizens were 81.9 years and 87.6 years respectively in 2017 while the corresponding projected figures would be raised to 87.0 and 92.5 in 2064. [3] Its population of 7.5 million will age rapidly, more than most industrialized countries and much faster than previously expected. [4] The proportion of over the age of 65 is projected to rise markedly from 15% in 2014 to 33% in 2064. [3] People aged 80 years or above will surge from the current 4.6% to 15.9% in 2064. [5]

The ageing population will have important repercussions on the financing and delivery systems of health and long-term care (LTC), because about one third of them have one or more life-style related non-communicable conditions requiring LTC services. Furthermore, escalating medical costs are expected because of the advances in technology, particularly in the diagnostic methods and resource-intensive treatment of diseases such as cancers.

The situation is complicated by a very low birth rate, being one of the lowest in the world and will make the predominantly tax-based public funding for health and community services unsustainable in future. [6] The health system is very hospital based and acute-centric. The public hospital system provides over 90% of all inpatient services at a very high subsidisation rate and hence nominal charges to the users, stretching the public hospitals to the limits with long waiting lists of patients and unrealistic waiting period for emergency and specialist services. [2]

THE CHALLENGES

The Hong Kong Government has been able to meet the increase in health expenditure, including a number of development and re-development projects of public hospitals in recent years. The private sector has been growing to meet the local demand as well as the increasing number of users from across the border. There

are more medical groups and a new private hospital was opened in 2017. Some of them are listed companies.

The rising health expenditure appears to grow at a rate faster than that of the economy. [1] The important question of sustainability of the local health care system in the long run has been on the public agenda. Thus, effective measures in the financing and service delivery of health services in the community and LTC are paramount to ensure accessibility and quality of services by the people at large.

The existing health service model is highly "acute care-centric" and hospital-based because of the lack of a well-developed primary care system in Hong Kong. The traditional model of financing and delivery of care has created huge problems in terms of sustainability, patient's best interests, and equity, while a stronger primary health care will lead to better health of the population at lower cost and resulting in greater user satisfaction. [7]

The current funding pattern creates incentives for the general public, especially the elderly, to over-rely on public hospitals for care, as the services provided by public hospitals are heavily subsidized, while those provided by private practitioners in the community are not. The Government has pledged that policies are carried out effectively to protect and promote public health, provide lifelong holistic health care to every citizen of Hong Kong, and ensure that no one is denied adequate medical treatment due to lack of means, a stance in existence for decades and being reflected by the steady state of public and private share of health expenditure in the health system. [8]

The Government has promoted public-private partnership to relieve the burden from the public to private sector. The Elderly Health Care Voucher Scheme was launched in 2009 to offer to elderly aged above 65 an annual voucher amount of HK$2,000 for making good use of primary care, including curative and preventive service. [9] However, it is found that many elders would not consider going to the private services because of concern about the affordability after having used the voucher. Those elderly with higher level of education would be more willing to pay. [10] Hence, the Government needs to find a solution to reduce the high demand in the public sector. [11]

HEALTH REFORM

Health care systems in every country or region undergo changes on the delivery and management of health care services according to meet the needs of modern society. The factors include increasing ageing populations, limited resources, technological advancements and higher patient anticipations. [12] Apart from two major re-structuring of the governance systems, i.e. management of all public, heavily funded hospital services under the statutory Hospital Authority in 1991 and reshuffling of policy secretariats in 2000, there has been little, if any at all, change in the service provision organisations. General outpatient services of the Hospital Authority and public campaigns and targeted preventive services by the Department of Health are available to the public, whereas primary care is predominantly, 80%, provided by the private sector, mostly in clinical services, not focusing on prevention or education.

IMPACTS OF AGEING POPULATION

Among all persons aged 60 or above, 48.8% had one or more chronic and degenerative conditions in 2000, including stroke and cancers, and the percentage has risen 61.8% in 2013. Likewise, about a third suffer from one or more disabilities such as restriction in body movement and seeing difficulty. These phenomena have resulted in rising demand for LTC services for the elderly, that are equally important to the clinical health services. Most elderly people prefer to remain living in their own home. [5] Community elderly care and support services allow the older population to live in the community they are familiar with, or in the age-friendly environment that is conducive to active ageing where they can stay healthy, active and independent as advocated by the Government, for as long as possible. [13]

There are increasing demand for residential care services and community care services by the frail elderly, and the need for a comprehensive active ageing policy catering to the well or able-bodied elderly. [5] There are also services supporting the family and carers. With increasing diversity of community elderly care and support services, an integrated approach is adopted by the Social Welfare Department to facilitate access to the three types of community support services for the elders, including elderly centre services, community care services and other support services. [14]

There were 26,325 subsidized residential care places in 2014 to 2015, while the number of elderly applicants on the Central Waiting List was 31,349. The average waiting time was 37 months for admission to these homes. 5,568 applicants on the waiting list passed away before being offered a place, an all-time high in the last decade. The average waiting time for purchased residential home places provided by the private sector was shorter at just eight months. [5]

COMMUNITY ELDERLY CARE

Primary care service is widely recognized as the central to health and social services acting as a first point of contact and a 'gateway' to the following secondary, tertiary and specialized health care services, with aims at detecting health risks early and thus improving general health conditions as well as preventing hospitalization and unnecessary institutional residential care. However, spending in primary care by the public often accounts for less than 40% of the total health dollars. [1] This is very much the case in Hong Kong. Community health service is one of the components of primary care providing community nursing services, geriatric assessment, psychiatric nursing services, and other allied health services by family doctors or general practitioners, community-allied health practitioners and also trained home caregivers, available in day care centres or at the elderly's homes. [5,15] It helps reducing the reliability on acute hospital services and thus the demands on inpatient services, while at the same time maximizing the efficiency and effectiveness on primary care services and facilitating patients' rehabilitation. [16]

The Government's Department of Health has established the Elderly Health Service of Elderly Health Centres and Visiting Health Teams in all eighteen administrative districts since 1988 for people over 65 years of age at very low charge, but with a membership system. Over the years, 45,094 members have benefited by the scheme as in 2017, an equivalent to only 4% of the entire elderly population. Officially 21,800 elderly people are on the waiting list with a waiting time for first enrolment at 6.8 months. This is unrealistic, and the service gap is huge as there are 1.25 million elderly people in our population. 96% of them are not in the service network. [15]

Insufficient medical and social resources of the elderly are revealed from a study in Hong Kong. [17] The lack of regular

source of care might be one the reasons for the elderly perceived poor health. Furthermore, the inadequate accessibility and availability of primary care service has led to overreliance on the public hospital accident and emergency departments. Although the private sector can provide opportunities for the elderly to consult the doctors, the high costs of the private services and long waiting time in the public sector are the main barriers for the elderly to manage their chronic diseases.

Appropriate care patterns and the application of innovation and technology in home or community-based elderly care services are essential in a continuous and integrated health care system. At the community level, a more holistic, humanistic and better integrated system of care should be the way forward. This approach must be supported by political commitment and appropriate governance frameworks. [18] Services should be tailored to the needs of individuals and the Government policy should be steered to allocating the needy additional resources to community elderly care, in order to address inadequacies in the system. [19]

LTC planning is important in allowing the elderly and their family to tackle their health and social needs better. Similarly, understanding the utilization patterns is essential in shaping the policy for the development of LTC services. There are few studies on the plans and expected utilization of LTC services in Hong Kong, resulting in a research gap. [20]

PATH TO IMPACT

It is apparent that there is a significant service gap, that needs to be examined and addressed systematically before a practical solution can be formulated. A better understanding of the needs in community elderly health services will help to formulate the appropriate strategic plan to provide community elderly services in the appropriate and effective way, and to reduce the demand for the expensive hospital and residential care services. The gap in the service and practice of community elderly care should be analysed. The elderly has contributed so much to our society throughout their life and it is a return they legitimately deserve and logically expect. Until the society, particularly the Government, the community, the professionals and providers, takes an interest in community elderly care and ensures the care is

provided to the needs, the entire society still owe our senior citizens a service in their last leg of life. We subscribe to the notion of "respect our elderly, love our elderly, and protect our elderly".

The path to impact includes the identification of opportunities for improvement in terms of service delivery, accessibility and quality and for formulation of practical solutions in policy, funding and innovative care patterns in services to the elderly population in our society, with the aim to promote a more holistic, humanistic and better integrated system of care, which has to be fully supported by political commitment and appropriate governance frameworks. Elderly in our community will benefit from the needy services, resulting not only in healthy ageing but also happy life. Ultimately Hong Kong becomes an age-respect society, with the most appropriate approach to elderly care.

ACKNOWLEDGEMENTS

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ONCOLOGY PHARMACIST'S ROLE AND IMPACT ON THE MULTIDISCIPLINARY PATIENT-CENTRE PRACTICE OF ONCOLOGY CLINIC IN PUBLIC HOSPITALS IN HONG KONG

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ABSTRACT

Oncology pharmacy service was developed and integrated into the multidisciplinary team of oncology clinic in 2013 at the United Christian Hospital aiming to enhance the holistic patient-centre practice of the clinic through the optimization of the safety and efficacy of anti-cancer treatment. This review aims to describe the role and impact of oncology pharmacists (OPs) in clinical setting to optimize anti-cancer treatment for cancer patients in a multidisciplinary care approach. From selection, prescribing, procurement to monitoring and patient education, OPs significantly contribute to the safety and effective use of anti-neoplastics in any circumstances. OPs provide professional advices to oncologists in choosing the appropriate anti-cancer agents for specific cancer and designing personalized anti-cancer treatment according to patients' fitness and appropriateness for chemotherapy. Parenteral and oral chemotherapeutic agents carry heightened risk of causing significant patient harm when they are used in errors. Thus, OPs also develop standardized chemotherapy orders and ensure the final dose is appropriate in terms of both haematological and non-haematological responses and tolerability. Moreover, OPs play an important role in procuring anti-cancer drugs and sourcing alternative drug choices that will deliver similar clinical outcomes. In addition, OPs also assure the clinical integrity of anti-cancer drugs for full anti-neoplastic activity and safe administration of these drugs by nursing staff to minimize potential occupational risk. Most importantly, OPs play a vital role in providing direct patient care functions such as drug therapy monitoring and management (e.g. ensure that patients receive sufficient pre-medications for administration of anti-cancer drugs), and medication counselling for patients and their carers to better understand their anti-cancer treatment. The positive impact of integrating OPs into the multidisciplinary patient-centre practice of oncology clinic includes (1) reduction in potentially life-threatening medication incidents and cancer drug administration errors in public hospitals; (2) collaboration with oncologists to select the most suitable cancer drug regimens for patients; (3) prevention of potential occupational risk to the healthcare professionals who handle cancer drugs; and (4) provision of optimal therapy treatment, monitoring and counselling to patients to reduce side effects and hospital readmission. The professional drug knowledge of OPs adds value to the multidisciplinary team in oncology clinics and the growth of OPs into effective direct patient care in oncology clinics should be encouraged to optimize medication-related outcomes.

KEYWORDS

INTRODUCTION

In Hong Kong, anti-cancer agents including both parenteral and oral agents are classified as high-alert medication in public sector, meaning they bear heightened risk of causing significant patient harm when they are used in errors. [1] Endeavour had therefore been made to avoid potential life-threatening incidents involving the anti-cancer agents. Since the role of clinical pharmacists has been well established and described in overseas setting in reducing medication errors [2-6],

oncology clinical pharmacy service was developed to optimize the use of chemotherapy in Hong Kong.

This descriptive review paper focuses on the oncology pharmacists' (OPs) role from a viewpoint of clinical practice in an oncology centre of a public hospital in Hong Kong in various components of medication management, outlined by the Joint Commission (the accreditation body for health care facilities in the US): 1) selection; 2) procurement; 3) prescribing, dosing and transcribing; 4) storage; 5) preparing and dispensing; 6) administering; and 7) monitoring and evaluation, and 8) patient education. [7]

SELECTION

Oncology pharmacists can aid in selecting the appropriate anti-cancer agents for the specific cancer through providing up-to-date medical information. Oncologists often consult OPs for adverse effect profiles and contraindications. For instance, renal patients on renal replacement therapy such as peritoneal dialysis who are going to receive chemotherapy, OPs would discuss with oncologists to select the most appropriate regimen that are less renally excreted and recommend an appropriate dose based on the renal function. [8] More importantly, OPs would assist oncologists to design the administration schedule according to the dialysability of the prescribed regimen to optimize the treatment outcome. OPs perform drug information and literature search to provide recommendation of combination of drugs in certain diseases based on efficacy and safety concerns. OPs may also provide information on adverse effects of drugs once the oncologists suspect drug-induced problems, which aid oncologists to change and select the appropriate alternative anti-cancer agents.

During clinical screening for patients on fitness and appropriateness for chemotherapy, OPs often take into account the previous history of chemotherapy, if any, and the concurrent medication that the patient is taking. In particular, OPs calculate the cumulative anthracycline dose that the patient has taken and inform oncologists when the cumulative dose would be exceeded. [9-10] OPs collaborate with oncologists to select the appropriate medication in cancer treatment to reduce adverse effects that could happen.

Since the introduction of targeted therapy, efforts have been made to further identify the potential molecular targets for drug development. Response to targeted therapy also depends on the existence of specific gene mutation. OPs can aid in selecting the appropriate targeted therapy by screening the existence of the mutated genes and ensure the appropriate therapy is prescribed. For example, OPs would advise against the use of erlotinib or gefitinib in non-small cell lung cancer patients who acquire T790M mutation of the epidermal growth factor receptor (EGFR). [11] OPs also ensure that metastatic colorectal cancer patients receiving cetuximab, a recombinant human/mouse chimeric monoclonal antibody that binds specifically to the epidermal growth factor receptor (EGFR, HER1, c-ErbB-1), are K/N-RAS wild type for the optimal treatment outcome.

PROCUREMENT

Making a drug available to the patient is certainly an essential step of pharmaceutical care. In case of drug shortages, OPs in Hong Kong play an important role in looking for alternatives of anti-cancer treatment. This may include the same drug entity with alternative drug sources or a completely different drug entity. When looking for drugs of an intrathecal treatment with different drug sources, OPs would pay particular attention to the formulation if it contains preservatives. Besides, drugs from different drug sources may require different reconstitution methods and have different volumes after reconstitution. This may affect the volume to be injected intrathecally and require careful clinical assessment. OPs would hence communicate closely with oncologists to avoid unintentional clinical incidents. If an alternative drug entity is required, OPs may need to perform dosage conversion involving anthracyclines to assess the cumulative dose administered. To enhance patient adherence and clinical outcome, OPs are also responsible for identifying drugs with suitable dosage form for medical conditions that could complicate anti-cancer treatment. Magnesium trisilicate had once been used for oral magnesium supplementation in patients experiencing hypomagnesemia in our hospital. OPs have worked to look for magnesium tablets which aid better absorption of magnesium to improve supplementation needs. Besides, folic acid solution had been used for low-dose supplementation in patients receiving pemetrexed until OPs sought out folic acid tablet with a smaller strength. This also improves patient convenience in administering the medication.

Not only newer anti-cancer drugs are increasingly available, but also are newer chemotherapy supportive medications. Newer anti-emetics are developed to improve patient adherence through combining more than one class of medications in one pill and simplifying the regimen into single dose instead of short courses of multiple doses. OPs may work with oncologists for the availability of newer chemotherapy supportive medication in local hospitals to enhance patient convenience and hence treatment outcome.

PRESCRIBING, DOSING, AND TRANSCRIBING

Prescribing chemotherapy is a complex process involving not only the appropriate combination of drug entities but also the appropriate scheduling, dosing and route of administration. Error rates in chemotherapy have been reported at 3%–16%. [12-13] Standardized medication administration records (MARs) can reduce transcribing and interpretation errors and hence minimize medication errors that could be potentially life-threatening. [14] These standardized order components include diagnosis, height and weight and with the calculated body surface area (BSA), drug allergy status, dosage (mg/m2 or mg/kg) with final calculated dose, start date and day of therapy, diluent solution and volume, infusion rate, route (intravenous [IV] bolus, IV infusion, subcutaneous, intramuscular or intrathecal) and the total number of scheduled doses. In our institution, standardized orders are designed by OPs which also consist of preventive anti-emetic medications, hydration protocols and other essential pre-medications required. Standardized drug set in the electronic prescribing system is also designed to facilitate prescribing chemotherapy and supportive care medications by oncologists.

At the prescribing level, oncology pharmacists also screen for concurrent medical conditions that require pharmacological therapy. One particular concern in patients receiving chemotherapy is the reactivation of hepatitis B infection. In Hong Kong, the prevalence of hepatitis B carrier is around 5-10%. [15] OPs would screen for HBsAg and anti-HBc to identify patients at high risk of hepatitis B reactivation and ensure pre-emptive anti-viral treatment is given prior to initiation of chemotherapy if necessary. [16-17] To prevent herpes zoster reactivation, OPs would also recommend initiating antiviral prophylaxis such as acyclovir before starting bortezomib or daratumumab for multiple myeloma patients and throughout the treatment.

Drug-drug and drug-disease interactions influence the choice of anti-cancer drugs and the interacting drugs as well. Certain selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine and paroxetine are well known CYP2D6 inhibitors which reduce the activation of tamoxifen to a more active metabolite, diminishing the anti-cancer effect. This may require modification of either the anti-cancer therapy or anti-depressants. OPs also exercise caution on prescribing injectable anti-androgens in prostate cancer patients who are concurrently taking anticoagulants as some injectable anti-androgens require intramuscular administration which is not preferred in patients on anticoagulants. Besides, OPs advise on the possibility of vaccination before and after the initiation of chemotherapy especially the administration of live attenuated vaccines.

Immunotherapy which triggers the immune system to attack tumour cells is a major advance in anti-cancer treatment in recent years. [18] Although it gives promising results in terms of disease progression and survival benefit [19-25], some patients may experience rare but potentially life-threatening immune-related adverse effects such as pneumonitis, thyroiditis and hepatitis. [26] Therefore, OPs would assure baseline monitoring of thyroid function, chest X-ray (CXR), liver function and other related parameters to be done before prescribing immunotherapy.

Dosing in chemotherapy requires careful calculation since some drugs such as cisplatin and pemetrexed may utilize the body surface area while some others such as trastuzumab may utilize the body weight. In calculating the dose for carboplatin, Calvert formula composing of the prescribed AUC and the creatinine clearance based on the Cockcroft-Gault Equation is used. [27] OPs play a major role in verifying the final dose given to the patients and ensure the dose prescribed does not exceed the capped dose. OPs also ensure the dose to be delivered is appropriate for renal and liver patients. If required, OPs would recommend dosing adjustment according to organ dysfunction. Besides, OPs would assess the dosing appropriateness based on patient's tolerability. Patients who experienced profound haematological toxicities may require dose adjustment in the next cycles. Significant non-haematological toxicities such as dermatological toxicities may also warrant adjustment to improve patient's tolerance.

STORAGE

Proper storage conditions with respect to temperature and lighting are essential in maintaining the chemical integrity of anti-cancer drugs for full anti-neoplastic activity. By taking reference to the manufacturer's recommendation and available drug information, OPs establish the required conditions of the reconstituted anti-cancer drugs for storage and transport. If stability data is not available for certain preparation of anti-cancer drugs, pharmacists may liaise with local laboratory to produce the relevant stability data for consideration. Besides, pharmacists are responsible for tackling look-alike and sound-alike (LASA) issues to avoid potential dispensing errors. For example, rituximab for IV infusion and for subcutaneous injection have similar packaging and require separate physical storage to avoid inadvertently incorrect picking. Tall-man lettering in the drug labels on the shelves and other auxiliary labels are also designed to differentiate between LASA drugs by highlighting the main difference in the drug names.

PREPARATION AND DISPENSING

Cytotoxic nature of anti-cancer drugs does not only cause patient harm if misused but also imposes potential occupational risk to the healthcare professionals who handle these drugs. To minimize systemic exposure to the handling personnel, reconstitution of products is best prepared in aseptic environment with the use of isolators. [28] OPs are responsible for designing standardized compounding worksheets and the effective workflow within the aseptic area that would allow timely preparation of cytotoxic drugs without compromising the quality. In particular, OPs would make sure no reconstitution of LASA drugs to be done simultaneously to avoid incidental preparation of wrong drugs. In our hospital, reconstitution of subcutaneous injection and intravenous infusion of trastuzumab are done in separate sessions, for example, one in the morning session while the other in afternoon session. OPs are also responsible for training competent pharmacy personnel to perform aseptic reconstitution. More importantly, OPs would assure the aseptic facility compliance with relevant regulatory standards and ensure safety to both pharmacists and pharmacy personnel as well as the sterility of finished products.

OPs ensure that the reconstitution of anti-cancer treatment follows manufacturer's recommendation to maintain the sterility and stability in order not to compromise the quality and effectiveness of anti-cancer drugs. Drug compatibility is one of the determinants of the physical and chemical properties of anti-cancer drugs. OPs recommend the proper diluent and material of container for preparation of anti-cancer drugs. For example, paclitaxel and docetaxel are incompatible with PVC and non-PVC bags are required to maintain the anti-neoplastic activity. OPs also ensure that light-sensitive drugs are prepared in light-protected bags. OPs also determine the expiry date on the final products by taking into account the manufacturer's recommendation and the available local laboratory testing results.

To facilitate safe administration of chemotherapy by nursing staff to the patients, OPs ensure the products are properly prepared and packaged. The final products are properly labelled and relevant auxiliary labels are affixed to remind nursing staff. Incidents involving misadministration of intrathecal vinca alkaloids had been reported worldwide. [29-31] Labels with 'For intravenous use only. Fatal if given other route.' are stuck onto the outer package of the products to further alert the use of proper route. Besides, vinca alkaloids must be prepared in at least 100ml infusion bags for adults to avoid intrathecal administration. In our institution, pharmacy personnel is responsible for connecting the infusion set to the infusion bags to minimize the risk of spillage in clinical area. Finished products would be packed in double-bag and properly sealed to reduce over-spillage if leakage happens. Moreover, OPs would ensure transportation of anti-cancer drugs is carried out safely. The anti-cancer drugs are transported in a designated container and must be accompanied by spillage kit to allow timely management of cytotoxic spillage by trained personnel. Cold-chain system is also strictly maintained during transportation by insulated cold packs.

ADMINISTRATION

Oncology pharmacists often receive questions on the injectable drug compatibilities with multiple infusion lines and administration sequencing from nurses. Increased availability of newer treatment has diversified anti-cancer therapy and patients may receive chemotherapy, targeted therapy and immunotherapy in the same

regimen. OPs provide recommendation on the sequencing of drug administration to optimize the outcome of anti-cancer therapy. OPs provide evidence-based information to ensure safe and effective administration of cytotoxic drugs. Besides, extravasation kits and protocols are established to guide nursing staff to the appropriate management of extravasation of different drugs.

Oncology Pharmacists also design standardized medication administration form (MARs) for chemotherapy to aid the administration of the anti-cancer drugs and their supportive medications. Regimen consisting of conventional chemotherapy causes emesis to different extent. Combination of different classes of anti-emetic drugs decreases episodes of nausea and vomiting and hence enhances patients' quality of life and tolerability to cycles of anti-cancer treatment. OPs assess the emetogenicity of the anti-cancer treatment and standardize the use of anti-emetics for different regimens in the standardized MARs. This facilitates the administration of chemotherapy by reducing acute and delayed episodes of emesis. Besides, hydration protocols and pre-medications required are also included in the standardized MARs. For example, in the regimen consist of pemetrexed and cisplatin, pre-medication of dexamethasone and granisetron and the hydration protocols involving normal saline, mannitol, potassium and magnesium supplementation are included in the form to minimize the risk of missing necessary drugs. Infusion of monoclonal antibodies would include the relevant pre-medication such as corticosteroids, antihistamine and antipyretic to prevent anaphylactic or infusion reactions. Standardized forms have also been made specifically for intrathecal chemotherapy and only certain anti-cancer drugs which can be given by this route are permitted to be printed on these forms.

As more oral anti-cancer drugs are being developed, optimal treatment outcome becomes dependent on patient drug adherence. OPs are in a good position to educate patients on the importance of drug adherence on the treatment outcome and identify patients' concerns that would potentially dampen drug adherence. [32-35]. Equipped with professional drug knowledge, OPs are able to address any drug-drug and drug-food interactions and advise on the possible management. Drug-drug interactions between oral tyrosine kinase inhibitors (TKIs) such as gefitinib and erlotinib and gastric acid suppressants like proton pump inhibitors (PPI) and histamine-2 receptor antagonist (H2RA) are well documented and with clinical

significance. Patients may require the gastric acid suppressants to treat gastrointestinal conditions such as gastric ulcer and prevent gastrointestinal complications induced by NSAIDs or steroid use. However, gastric acid suppressants may increase the gastric pH and lead to decreased bioavailability of TKIs. [36-38] By understanding patient's usual time of drug administration, OPs suggest the time schedule for taking TKIs that would minimize the potential drug-drug interactions. OPs also examine the chronic medications which the patients are taking may be affected by the chemotherapy and its associated drugs. Patients who would proceed to transarterial chemoembolization (TACE) in hepatocellular carcinoma (HCC) may receive IV contrast during the course of treatment. OPs would remind the doctors and patients to temporarily withhold metformin to prevent contrast-induced nephropathy. Patients would be instructed to stop combination drugs which contain metformin as well.

MONITORING AND EVALUATION

Monitoring and evaluating drug therapy has long been a focusing area that clinical pharmacists can aid to optimize pharmacological therapy. Oncology pharmacists play a critical role in assessing patient's conditions before further continuing chemotherapy. OPs monitor complete blood picture, renal function and liver function in all patients receiving anti-cancer therapy and ensure parameters are within acceptable limits to proceed to the next cycle of chemotherapy. OPs may also advise the appropriate dose reduction in cases of changing renal and liver functions and altered body surface area due to significant weight changes. In patients receiving trastuzumab, OPs also monitor for multigated acquisition scan (MUGA) that measures ejection fraction and may remind physicians to order routine monitoring and temporarily withhold therapy if necessary. [39] Alanine transaminases (ALT) level is monitored in patients receiving tyrosine kinase inhibitors (TKIs) to observe for possible TKI-induced liver injury. Regular monitoring of 24-hour urine protein level before and during treatment of bevacizumab by OPs to ensure the patients are suitable to receive the treatment and prevents worsening of proteinuria after initiation of treatment.

OPs' assessment and evaluation of a patient's tolerability to previous cycles of chemotherapy can aid physicians in prescribing supportive care medicines and make slight adjustment to drug therapy. OPs may recommend prescribing pre-medication and lengthening infusion time

in patients who experienced infusion-related reactions in previous cycles of chemotherapy. Besides, OPs may also identify episodes of nausea and vomiting in patients receiving chemotherapy with low emetogenic potential and make interventions on the use of anti-emetics. By assessing the tolerability and current performance status, OPs are always able to recommend appropriate interventions to optimize anticancer treatment.

PATIENT EDUCATION

Patient empowerment is one of the key components of successful cancer treatment. In Hong Kong, OPs deliver education through two main methods – patient education talks and one-to-one patient counselling. OPs conduct education talks in groups, covering fundamental knowledge of diseases, common anti-cancer drugs and their possible adverse effects and management methods. These talks also provide a platform for both patients who are new to chemotherapy and those who are already on chemotherapy to share their own experience and concern. At the same time, OPs would advise on some frequently-asked enquiries. By carrying out one-to-one patient counselling, OPs are able to educate both the patients and their caregivers about the appropriate use and the intention of anti-cancer treatment. Particular advice on the use of supportive care medications and any patient expectations would also be addressed in direct counselling. In our hospital, OPs would prepare patient information leaflets for oral anti-cancer drugs to facilitate patient understanding. By counteracting patients' misconceptions prior to therapy, OPs can successfully enhance patient adherence and optimize anti-cancer treatment.

Supportive care is one aspect that OPs could play an important role. This involves the use of anti-emetics to prevent chemotherapy-induced nausea and vomiting, the use of granulocyte-colony stimulating factors (GCSF) and antibiotics to prevent chemotherapy-induced neutropenic fever and certain pre-medications for chemotherapy such as pemetrexed and docetaxel. Since these medications usually have particular administration schedule, OPs would provide corresponding recommendation to facilitate patient administration. Besides, OPs would recommend patients to take steroid with famotidine to prevent gastrointestinal complications and at appropriate time to prevent sleep disturbances. Patients who will receive highly emetogenic chemotherapy are prescribed with aprepitant and require particular advice on the schedule and administration time prior to treatment. For patients receiving irinotecan, acute and chronic cholinergic adverse effects are common and may cause patient harm if not well managed, especially diarrhoea. These patients are educated by OPs to identify those acute cholinergic symptoms during administration and to manage diarrhoea by loperamide at home. Patients are also instructed to withhold capecitabine themselves if they experience grade 2 or more severe adverse reactions to minimize toxicity.

Through educating patients to avoid certain food such as grapefruit, drug-food interactions with some TKIs such as gefitinib and erlotinib can be reduced and the possibility of adverse effects can then be minimized. Besides, patients who are taking gefitinib and erlotinib are also discouraged to use over-the-counter gastric acid suppressants to avoid drug-drug interactions.

Various factors have been shown to negatively affect the drug adherence in cancer patients including therapy-related adverse effects. [40-41] The role of OPs in educating the management of potential adverse effects is thus essential to optimal treatment outcome and better quality of life. Dermatological reactions can be present in chemotherapy, oral targeted therapy as well as immunotherapy and result in significant disturbance to the patient. These include but not limited to papulopustular rash, hand-foot skin reaction, hand-foot syndrome and paronychia. OPs can provide skin care education such as decreasing exposure to hot water, friction, avoidance of tight-fitting shoes and advice on the appropriate use of moisturizers, creams if necessary.

IMPACT OF ONCOLOGY PHARMACISTS ON VARIOUS PARTIES

Oncology pharmacy service receives great appreciation from patients, oncologists and other healthcare professionals. Patients value oncology pharmacy service as a means to medication safety and improved quality of cancer therapy. [42-43] Besides, oncology pharmacists serve as an information provider and the bridge between patients and oncologists. [42] Oncologists also value OPs as important team members and are satisfied with the improved treatment quality and safety brought by OPs. Nurses also consider OPs as important partners in improving medication safety and evaluating and managing adverse

drug reactions. [42, 44] OPs can also reduce workload from nurses and oncologists and aid in better patient follow-up and monitoring. Cost is also saved with the input of OPs. [45] The positive ratings from different parties confirmed the beneficial service by OPs.

CONCLUSION

Oncology pharmacists are vital members of the multidisciplinary team in local hospitals of HK by offering a variety of services related to medication management to cancer patients. From selection, prescribing, procurement to monitoring and education, oncology pharmacists contribute heavily to ensure the safe and effective use of anti-cancer drugs in any circumstances. Their professional drug knowledge adds value to the multidisciplinary team and promotes rational use of anti-cancer treatment which are highly recognized by other health care professionals.

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IMPACT OF CO-CREATION FOOTWEAR WORKSHOPS ON OLDER WOMEN IN ELDERLY CENTERS IN HONG KONG

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ABSTRACT

BACKGROUND

The use of appropriate footwear could reduce the risk of falls among the geriatric population. However, the elderly is generally reluctant to accept new footwear designs particularly with the incorporation of fabrication materials and functional design features that are perceived to be less comfortable. Co-creation activities that encourage user involvement during the product design process and development can therefore address this issue and provide unique benefits and better value for users, increase acceptance, and even lead to positive perception as well as positive psychological impacts, thereby increasing the practical use of newly designed footwear.

OBJECTIVE

This study aims to investigate the impact of hands-on footwear workshops on perceived functionality of geriatric footwear for older women.

METHOD

Footwear co-design workshops for older women were carried out in two elderly centers in Hong Kong. Twenty-one healthy females between 64 and 80 years old (mean: 71; SD: 4.2), were recruited. Subjects were invited to decorate the prescribed geriatric footwear prototype and discuss their ideas on footwear design in a group of three. They were surveyed after completing the footwear decoration.

MAIN OUTCOME MEASURES

The perceptions of the subjects on the geriatric footwear and related design features were analysed.

RESULTS

The questionnaire survey shows positive results in the psychological value of the workshops for older women. The participants express high levels of satisfaction with the co-design process and a strong sense of achievement with the newly designed geriatric footwear. The acceptance and awareness of the functions of the footwear are greatly enhanced.

CONCLUSIONS

The co-design approach has positive psychological impacts on the elderly and their acceptance of the final product. This approach also better meets the aesthetic needs of the users.

KEYWORDS

psychological value, co-creation, co-design, footwear workshops, older women

INTRODUCTION

Falling and gait unsteadiness are common problems of the elderly. It is widely believed that age-related deterioration of the neuromuscular system is closely related to increased postural sway, poor balance control and ultimately higher risks of falling. Reports have found that older women are at higher risk of falling than men. [1] However, appropriate footwear can help to prevent the elderly from falling. [2-4] For example, open-toe mule slippers are a popular type of footwear worn at home, and especially favored by older women. They are light in weight and convenient to wear. Nevertheless, prolonged use of footwear with little support that is loosely secured to the feet may lead to foot pain,

deformity and difficulties in maintaining balance. Suitable footwear can protect the elderly from falls and foot abnormalities, thereby reducing the risk of fractures and other serious injuries. Therefore, they are a crucial product to protect the safety of the elderly.

Footwear is intended to offer the first line of protection to the feet. Walking in slippers made of soft footbed material with high compressibility provides better pressure attenuation but requires more muscle activity to maintain postural stability as compared to more rigid footbed materials. Footwear components such as semi-rigid midsole materials, proper arch support, stiff heel collar as well as slip resistance outer sole are therefore recommended in geriatric footwear designs. Many older people, however, are reluctant to accept changes regardless of the increased stability offered by proper footwear. [3] They may prefer to walk barefoot or in socks for comfort but face the risk of a ten-fold increase in falling.

Fashion products not only serve functional purposes, but also involve many psychological factors such as self-esteem and self-image. [5] A research article compared psychological factors, design preferences and fashion experiences across gender in Hong Kong. It found that in addition to function, older women are very concerned about the product design, appearance and characteristics of fashion items. [6] A study also showed that older women are primarily driven by the aesthetics and comfort of footwear. [7] Enhancing the design of conventional footwear might be the first step for improving the practical use and perception of geriatric footwear.

The traditional footwear design process neglects the demand of older people for improved products. [6] The lack of participation of elderly users in the product design and development process may lead to their reluctance to use the product. [8] Recently, the concept of collaborative design (co-design) is becoming an increasingly popular method for designers to better meet the needs of their users. The term refers to the creative product that designers and users create together during the development process of a product design. [9] The positive impact of co-design is evidenced in the literature on service design projects for technology products, in which customers and the relevant organizations have opportunities to experience creativity and collaboration, and the ability of the organization to innovate and change is enhanced. [10]

However, the possible impacts of co-design on footwear development have not been fully reported. The aim of this study is to therefore investigate the psychological value of co-design workshops for older women. The impacts of co-design on the perception of geriatric footwear are also discussed. It is anticipated that the findings of this study will enhance current understanding of the psychological changes in older women after taking part in a co-design process, and provide insights that enhance the use of footwear worn at home for foot protection.

EXPERIMENTAL

SETTING

The appearance design of geriatric footwear has great importance in product development. In this research study, footwear workshops that feature co-creation and decoration of footwear were carried out in two elderly centers in Hong Kong. The elderly subjects were invited to take part in a workshop to decorate shoes after they completed a wear trial for geriatric footwear and each individual was prescribed a geriatric footwear prototype for a wear trial of 4-6 weeks. The subjects were invited to attend a workshop on co-creating footwear which focused on decorating the shoes. Discussion on the footwear design and modifications was encouraged and facilitated. Upon completion of the discussion, the subjects were invited to complete an evaluation questionnaire.

A poster of the footwear workshops was designed (Figure 1), in which examples of shoe designs were shown to inspire the subjects on the design elements for the footwear (Figure 2). Decorative materials, such as different types of flower ornaments, pearl embellishments, lace, fringes, embroidery, applique, beads, etc. were made available at the workshops (Figure 3). Colors that matched the original color of the shoes were used, such as blue and red schemes. To encourage discussion and participation, groups of three were formed in each workshop. With the support of the facilitator, the subjects first discussed the original design of the geriatric footwear. Then, new design features and selected decorative materials, as well as different methods and tools for attaching the shoe decorations were reviewed and analysed. Upon completion of the footwear decoration component, a questionnaire survey was disseminated for completion. The perceptions of the subjects on the geriatric footwear and related design features were subsequently analysed.

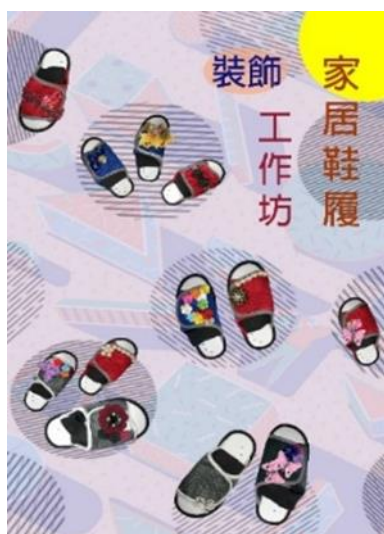**FIGURE 1: POSTER FOR WORKSHOP ON FOOTWEAR CO-CREATION AND DECORATION**

FIGURE 2: PROTOTYPE EXAMPLES OF DECORATED FOOTWEAR

FIGURE 3: DECORATIVE MATERIALS OFFERED AT WORKSHOP

FIGURE 4: EXPERIMENTAL FOOTWEAR: SIZE 42/43 (GREEN); 40/41 (GREY); 38/39 (BLUE); AND 36/37 (RED)

DATA COLLECTION

A questionnaire was conducted which used a 7-point Likert scale (in which 1 denotes "strongly disagree" and 7 denotes "strongly agree"), and yes/no and open-ended questions. The response and perceptions of the subjects on 'satisfaction felt during the workshop', 'feelings and thoughts during the decoration process, and 'ideas during the workshop and attitude towards the workshop' were collected and analysed.

RESULTS AND DISCUSSION

The questionnaire results are provided in Tables 1 and 2. The overall results in the two tables show that the subjects enjoy the co-design process and 95% feel satisfied with their finished footwear prototype. Choosing the design elements, working with the workshop facilitators, and completing the decoration process are considered as the most satisfactory components in the co-creation workshops.

In response to the satisfaction from the co-creation process, 90% of the respondents indicated that they are able to express themselves based on the decoration process and none of them did not enjoy the process. Only 14% experienced challenges during the co-design process. The rest, or 86% of the subjects, agreed that they are able to express their creativity in the workshop. The result is similar to the study which showed that a strong correlation is found between satisfaction and self-expression and between self-esteem and self-confidence amongst the

elderly participants. [6] The decoration workshop enhanced their self-esteem and confidence in footwear creation and design creativity.

In terms of their feelings, all of the subjects felt relaxed and happy during the entire decorating process. Furthermore, 95% of the respondents claimed that they are able to fully engage and focus on the footwear design process. In terms of ideas and attitude during the decoration process, 90% of the respondents indicated that they like to discuss their ideas with other elderly individuals. This result is consistent with the research which showed that most women like to create art in a social context, where they can gain recognition and appreciation for their artwork. [11] In addition, 81% of them agreed that the design process allow use of eye- hand coordination, increased their motor skills, as well as increased finger sensitivity and dexterity.

At the co-design workshops, the subjects experienced a process of internal self-discovery, acceptance and expression. They discussed the aesthetic needs of their footwear with the workshop facilitators. The workshops allow group creativity and increase user satisfaction and loyalty to the product. [10] The level of engagement with the footwear prototype was therefore enhanced. The pleasure and satisfaction experienced at the workshop greatly increased product acceptance. It is expected that older people will rely more on products that are psychologically meaningful. [12] The use of appropriate footwear by the elderly could be therefore increased by incorporating a co-design process in footwear production.

TABLE 1: FEEDBACK ON PERSONAL EXPERIENCES AT FOOTWEAR WORKSHOPS

	ITEMS	N	MEAN	SD	PERCENTAGE DISTRIBUTION (%)		
					1-3	4	5-7
					DISAGREE	NEUTRAL	AGREE
a	I can focus and engage in the creative process.	21	6.0	0.865	0%	5%	95%
b	I encountered difficulties during the creative process.	21	2.2	1.758	76%	10%	14%
c	The process allowed me to express my creativity.	21	5.8	0.981	0%	14%	86%
d	I felt relaxed and happy during the creative process.	21	6.7	0.577	0%	0%	100%
e	I felt worried about how my product looked.	21	2.1	1.558	76%	14%	10%
f	The creative process allowed me to express myself.	21	5.8	0.944	0%	10%	90%
g	The creative process allowed me to use my fine motor skills.	21	5.8	1.179	5%	14%	81%
h	I liked to discuss with others on how to decorate the product.	21	6.3	1.065	0%	10%	90%

TABLE 2: EVALUATION RESULTS OF FOOTWEAR WORKSHOPS

	ITEMS	N	PERCENTAGE DISTRIBUTION (%)	
			YES	NO
i	Before the workshop, did you know how to decorate footwear?	21	14%	86%
	Were you confident in making a satisfactory product?	21	95%	5%
j	Did you enjoy the creative process?	21	100%	0%
	Were you satisfied with the finished product?	21	95%	5%

IMPLICATIONS OF THE STUDY

As the population of Hong Kong ages, the health problems of the elderly are receiving much attention. Geriatric health care product producers and elderly service operators can implement the co-design process to enhance product use. This can further help improve the health of older people as well as their quality of lives.

FURTHER RESEARCH

The small sample size limits the generality of the finding. A larger scale replication study is needed. It is also worthwhile

to compare the frequency of use of geriatric footwear for older people who participated in co-design workshop with those who did not participate in the workshop.

CONCLUSION

In this study, footwear workshops for older women are carried out to examine their personal experiences and perceptions of geriatric footwear design. The survey results indicated that the workshops have positive effects. The creative process provides personal, spiritual and social satisfaction to the older women. The process also gives the women a sense of success. These women feel very satisfied with their own creativity. In addition, they communicate well with others and have the opportunity to share their footwear decoration ideas with others. Overall, the co-design approach has positive psychological impacts on the elderly and their acceptance of the final product. This approach also better meets the aesthetic needs of the users.

ACKNOWLEDGEMENT

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THERMAL EQUATIONS FOR PREDICTING FOOT SKIN TEMPERATURE

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ABSTRACT

PURPOSE:

Studying the foot skin temperature of both the young and elderly is important for preventing foot diseases and improving thermal comfort and variability during gait. However, few studies have predicted the thermal conditions in footwear under different variables. The aim of this study is to therefore formulate thermal equations for both the young and elderly to predict their foot skin temperature under the variables of age, gender, activity level and various properties of different types of footwear.

METHODOLOGY:

A total of 80 participants between 20 and 85 years old are recruited in this study, including 40 younger subjects (mean: 23.0; SD: 4.05) and 40 elderly subjects (mean: 69.8; SD: 4.59). They are tasked to sit, walk and run in a conditioning chamber.

FINDINGS:

Regression equations for predicting the foot skin temperature of the young and elderly people are formulated, with R squares of 0.513 and 0.350 respectively. The level of activity is the most important factor when predicting the foot skin temperature. The material properties of the footwear also show a significant impact on the foot skin temperature of the elderly.
Value: The findings of this study provide the basis for better thermal comfort and help to facilitate the footwear design process.

KEYWORDS

foot temperature, physiological factors, footwear, activities, prediction equations

INTRODUCTION

The feet have the physiological function of a heat exchanger, thereby acting as a thermal radiator for the thermoregulation of the human body when they come into direct contact with the external environment. According to previous studies, a comfortable foot temperature ranges from 20°C to 33°C, while feelings of discomfort range from 35°C to 38°C [1]. When the foot is subjected to high temperatures inside footwear, higher humidity which promotes the growth of microorganisms (e.g. fungi and bacteria), and eventually result in chronic foot diseases and a greater risk of foot ulcers [2,3]. However, lower foot temperatures would result in a reduction of foot sensation and afferent information, such as temporary sensory loss, and lead to an increase in gait variability, changes in joint movement and reduced electromyography activity of the muscles of the lower limbs [4,5]. Most studies on footwear interventions have examined how they control balance, gait and kinematics, such as the positioning of the foot, reducing shocks for stability, redistributing the plantar pressure, etc. However, recent evidence supports that the in-shoe temperature is also a critical factor that not only enhances the overall wear comfort of footwear, but also protects the feet against different external environments and conditions of use. The in-shoe temperature could be influenced by various factors, including physiological factors (e.g. gender and age), work/activity intensity, footwear construction and materials as well as the shoe microclimate [1]. During daily life, heat is generated and accumulated in footwear due to blood flow, muscle contractions, frictional forces and viscoelastic heating, which are counteracted by the processes of heat loss, such as radiation, conduction and evaporation. The heat loss takes place through blood flow, from the skin and through

other mediums, like footwear with low insulation [6]. However, previous studies have mainly focused on studying the temperature changes on different locations on the feet, as well as temperature changes due to age and gender differences, gait speed and protective footwear. The aim of this study is to therefore integrate the key parameters that affect the thermal environment inside the footwear and formulate numerical equations for the factors of age, gender, activity level and material properties of different footwear to predict the foot skin temperature changes in various types of footwear. It is anticipated that the findings of this study would act as a reference source for the design and development of footwear with better wear comfort.

EXPERIMENTAL

PARTICIPANTS

A total of 80 participants are recruited in this study. Forty (40) are younger between 20 and 39 years old with 24 women and 16 men (mean: 23.0; SD: 4.05). The other 40 participants are elderly people who are between 65 and 82 years old with 25 women and 15 men (mean: 69.8; SD: 4.59). The inclusion criteria are individuals who have no serious foot problems, are free from prescription medication, have no history of cardiovascular disease, and able to walk independently for a long period of time. The body mass index (BMI) of the younger participants ranges from 15.0 to 27.1 kg/m^2 (mean: 21.2; SD: 3.0), while the BMI of the elderly subjects ranges from 17.51 to 29.04 kg/m^2 (mean: 22.87; SD: 2.98). Their foot size ranges from a European size 36 to 44 (mean size 38) for the women and 37 to 45 (mean size 41) for the men. Written informed consent was provided by all of the participants before they took part in the study.

EXPERIMENTAL PROTOCOL

The experiment was carried out in a conditioning chamber in ambient conditions with a controlled temperature of 22±1°C, humidity of 60±5% and air velocity of 0.24±0.01 m/s [7]. All of the participants were required to wear two types of sports shoes, which have a similar shape and design. However, the upper of the shoes is made of different materials, in which one is made of leather and the other of mesh spacer fabric (see Figure 1). Their properties with the specific testing standards are shown in Table 1. The participants also had to wear a standard sports outfit made of cotton with a clothing insulation equal to 0.3 clo, which consisted of a pair of trousers and a long-sleeve T-shirt. The younger participants were to take part in three activities for each type of footwear, including sitting, walking and running, while the elderly participants were only required to sit and walk for each type of footwear. Prior to the commencement of the wear trial, the participants were requested to sit in the conditioning chamber for 30 mins for acclimatization purposes. The length of the sitting task was 20 mins while the walking and running tasks were 30 mins each and took place on a treadmill at a speed of 3 km/hr and 7 km/hr respectively. To reduce possible order effects, the sequence of the tasks was randomized for each subject. An infrared imaging camera (FLIR T420bx, FLIR® Systems, Inc.) with a thermal sensitivity of <0.045°C was used to record the skin temperature of the foot on two occasions: (1) before each test took place, and (2) immediately after the testing from the plantar view, at a distance of 0.8 m. The camera was kept perpendicular to the foot area of interest during recording [8].

FIGURE 1: FOOTWEAR: LEATHER SPORTS SHOES (LEFT) AND MESH SPORTS SHOES (RIGHT)

TABLE 1: PROPERTIES OF FOOTWEAR

	LEATHER SHOES	MESH SHOES
TYPE OF FABRIC	SYNTHETIC LEATHER	MESH SPACER FABRIC
Thickness (mm)	4.74	1.90
Thermal conductivity (with KES-F7 Thermolabo) (W/cm·K)	0.040	0.042
Thermal insulation (with KES-F7 Thermolabo) heat retention (%)	53.69	42.99
Air resistance (with KES F8 air permeability tester) (kPa·s/m)	N/A	0.01
Water vapour transmission rate ASTM E96 (g/m^2·hr)	0.84	38.06
Covered area - Female (cm^2)	498.84	494.26
Covered area - Male (cm^2)	505.24	505.64
Surface Area- Female (cm^2)	805.91	758.27
Surface Area- Male (cm^2)	914.42	838.13

STATISTICAL ANALYSIS

Only the thermal images of the right foot were processed by using Matlab R2008a. The temperature point on the plantar of the heel (centre) was extracted for analysis (see Figure 2). Multiple linear regressions (stepwise method) were conducted by using the Statistical Package for the Social Sciences (SPSS) Version 19.0 (SPSS Inc., Chicago, IL) to examine the impact of gender, footwear and their properties, and types of activities on the foot skin temperature to formulate two thermal equations that would predict the foot skin temperature of both the younger and elderly participants respectively. Pearson's correlation coefficients were also used to evaluate the relationships among these factors. The significant level of the statistical analysis was set at 0.05.

FIGURE 2: TEMPERATURE POINT ON PLANTAR OF HEEL (CENTRE) EXTRACTED

Plantar view

RESULTS AND DISCUSSION

MATERIAL PROPERTIES OF FOOTWEAR

Table 1 shows the properties of the two types of sports shoes which have a similar performance in thermal conductivity. However, the shoe fabricated from mesh spacer fabric is much thinner and has lower thermal insulation properties (lower percentage of heat retention) than the shoe fabricated with leather fabric. As the mesh sports shoes contain openings, they have a much higher air permeability and water transmission rate in comparison to the leather sports shoes. However, the leather sports shoes have a greater covered area and surface area than the mesh sports shoes, except for the covered area of the two sports shoes for the male subjects. It is anticipated that heat and water vapour would be more easily transferred and dissipated from the mesh sports shoes as compared to the leather sports shoes as more of the feet are exposed to the environment.

EQUATIONS FOR PREDICTING FOOT SKIN TEMPERATURE

The foot temperature (heel) is significant between the younger and the elderly subjects (P=0.000) with no significant difference was found between the two genders (P=0.280). Therefore, two thermal equations for predicting the foot skin temperature were formulated for the younger and elderly subjects respectively based on various factors, including the material properties of the footwear, physiological factors of the foot and level of activity. For the younger subjects, only the level of activity was found to be significantly correlated to the measured temperature point on the planar of the heel, in which the Pearson's correlation coefficients among foot temperature and sitting, foot temperature and walking, and foot temperature and running are 0.359, -0.717 and 0.359 respectively. The equation for the younger subjects with an R square of 0.513 is shown below:

$$T_y = 35.001 - 3.623W$$
where

- T_y: Foot temperature at planar of heel of younger subjects (°C), and

- W: Walking activity.

For the elderly people, the foot skin temperature at the planar of the heel is significantly correlated to all of the properties of the footwear, activity level and footwear type, in which the Pearson's correlation coefficient between the foot temperature and walking is the highest (0.575). The equation for the elderly participants with an R square of 0.350 is shown as below:

$$T_e = 29.593 + 2.488W - 0.016V$$
where

- T_e: Foot temperature at the planar of heel of elderly subjects (°C);

- W: Walking activity; and

- V: Water Vapour Permeability.

According to the thermal prediction equations for both groups of individuals, activity level is the most important factor when predicting the temperature of the foot during their daily life activities. This result makes sense since more heat would be generated from the body during dynamic activities. Previous studies have found that the plantar foot temperature increases during walking in both young and older adults, in which the foot temperature increases by around 5°C with walking [6,9]. In the summer, the temperature in the midsole area could be more than 50°C while running during the day [10]. Only the water vapor permeability of the footwear was included when forming the thermal equation for the elderly. This is due to the physiological differences between the young and elderly subjects, and the elderly are more sensitive to the footwear materials in comparison to their younger counterparts.

The temperature point at the planar heel was chosen to form the prediction equation because the temperature on the plantar of the foot, especially the heel area, is clearly increased during gait. This is because the heel is in contact with the ground mostly during gait, the sliding friction between the foot and the sole of the shoe, and the environmental variables, such as air temperature and solar radiation, would take place and result in higher temperatures in a shoed foot. Increases in the gait speed mean greater contact force and higher landing velocity, and the therefore, higher foot temperature [11]. Although the R square for the two thermal equations formed is moderate, it is still useful for manufacturers to predict the in-shoe temperature of both younger and older consumers when designing footwear for them, which could facilitate

the development and production processes. In the future, more temperature points on the foot could be included in the regression model so as to increase the R square of the heat equations. Validation would be also required for the equations in order to increase reliability.

CONCLUSION

In this study, thermal equations for predicting the foot skin temperature of young and elderly subjects have been established respectively, whilst significant foot temperature differences are observed between the two age groups. Level of activity has proven to be the most important factor when forming the equations, while the water vapor permeability of footwear is only included in the thermal equation for the elderly. The findings of this study provide the basis for designing common footwear for different age groups.

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PROMOTION OF APPROPRIATE USE OF ELECTRONIC DEVICES AMONG HONG KONG ADOLESCENTS

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ABSTRACT

The advancement of technology is changing the world so rapidly with implication to people's daily activities and health. The excessive utilisation of electronic devices, particularly among adolescents, are affecting the physical, psychological and social wellbeing of these young people. Physical inactivity, obesity, musculoskeletal conditions, vision, cognitive development, sleep pattern, family relationship, addiction and gaming are issues of importance and attention arising from the inappropriate use of electronic devices. Stakeholders, including the parents, teachers, government, community organisations and the adolescents themselves, have different but complementary roles in the prevention of internet addiction and in the promotion of appropriate use of electronic devices among adolescents.

KEYWORDS

electronic devises, screen devices, internet addition, adolescents

INTRODUCTION

The explosive development of technology in recent decades is clearly manifested through the use of electronic devices including computers, smartphones, tablets computers, and other entertainment products. With the help of computer and the Internet, many tasks in our daily life are becoming easier, quicker and more convenient in different aspects, especially for adolescents. Electronic devices with online function bring lots of benefits and advantages to them in academic studying, literature research, sharing ideas and expressing their feelings in social media, and enjoyment as well. However, the improper use of technology and electronic screen products have also induced health attention to problems associated with excessive use. [1] Some undesirable adverse effects affecting teenagers arising from the addiction in using the electronic devices are, for example, academic failure, problems in interpersonal relationships, absenteeism, and antisocial behaviours. [2] In this review, the current situation of the prevalence of electronic devices among Hong Kong teenagers and the existing practical plans in the promotion of appropriate use of electronic devices among different parties are discussed.

BACKGROUND

In Hong Kong, a large proportion of adolescents have online activities. A Thematic Household Survey performed by the Census and Statistics Department (2017) studied the use of personal computer (PC) and Internet penetration in households has shown that the percentage of the usage of the Internet among people over 10-year-old increased from 87.5% in 2016 to 89.4% in 2017. Almost all persons in the age group 10 to 24 had the knowledge of using PC, and that they had online activities during the 12 months before the survey. [3]

Smartphones are the typical communication tool in our daily life. Many people use the phones all the time playing electronic games on buses, Mass Transit Railway MTR and even when walking on the street. Smartphone obsession is so common in public places that it has earned the users a phrase, 'bowed head tribe'. The popular usage of smartphone among Hong Kong people has been increasing over the past few years. Nearly 5.7 million of

people aged 10 and over had their own smartphone in 2017, 2.3 million more compared with that in 2012. The popularity of using smartphone increased from 54.0% in 2012 to 88.6% in 2017. [3]

To determine the definition of excessive use, the time spent online can be one of the indicators, but it may be differentiated by considering the personal habit on the Internet use and the social environment. In a French exploratory study in 2011, discovered that time spent online was correlated to Internet addiction, but the cut-off of an at-risk amount of time online was hard to define because of many other interacting factors. [4]

RISK FACTORS

In order to prevent the problem in adolescents, it is essential to lower the possibility of risk factors and enhance the related protective methods simultaneously. Hence, it is important to understand both risk and protective factors in the development of internet addiction.

The first predictor related to electronic addiction is age. Adolescents and young adults have a higher chance of becoming internet addicts when compared with those in other age groups. Adolescents are undergoing the process of personality and psychological development. They want to develop a personal identity and to secure peers' acceptance. They need to build up intimate relationship with friends and classmates, so that they can easily get access to the Internet with them either at home or in school. They easily develop Internet addiction behaviours. [5]

Gender is the second predictorfactor related to internet addiction. There are a significantly higher number of male internet addicts than there are of females, although there is a growing number of females in excessive internet use. [5]

The unstable parental marital status is another risk factor. It was reported that internet addiction was more common among adolescents who grew up in single-parent families, and who had more parent-child conflicts or interparental conflicts. Therefore, teenagers who live in a family with parental dissension may present with more behavioural problems such as internet addiction. [5]

CONSEQUENCES

The more time spent on electronic devices, the less time will be available for doing exercises and for interpersonal interactions, resulting in a higher risk in children's growth and mental health. The most obvious impacts of overuse of electronic devices involve three areas, including physical, psychological and social aspects.

PHYSICAL INACTIVITY AND OBESITY

Adolescents are more willing to spend time using electronic devices over physical activity. Childhood obesity and insufficient physical fitness may result from that physical inactivity. Sedentary activities can disrupt healthy eating habits as children tend to eat snack food with high sugar or high calories when they are sitting down to play games. It may lead to higher energy intake which may further give rise to overweight problem. Students who spend more than two hours of screen time per day have a higher chance (two times) of getting overweight or obese than peers who spend less than one hour daily. [6] A study conducted by the University of Hong Kong has shown that kids who spend additional time on playing electronic entertainment apparatus are more likely to result in being overweight. [7]

Excessive time on electronic devices reduces the chances for children to do physical exercises and outdoor activities, and this may affect their health and physical development. [6] In a study in 2017, the percentage of students who had fulfilled the WHO's recommendations on at least 60 minutes of moderate to vigorous intensity exercising daily was only about 8% and 4% in primary and secondary school students respectively. These are extremely low rates (Department of Health, 2018). According to the data from the School Physical Fitness Award Scheme in 2016 and 2017, it was found that Hong Kong students had a pretty poor performance in the flexibility, muscle energy, and cardiorespiratory fitness when compared with students in China, Singapore, and European countries. [7]

MUSCULOSKELETAL PROBLEMS

People usually ignore proper posture when using electronic products, leading to increased risk of suffering from neck ache, back pain and upper limbs soreness. [6] The Hong Kong Polytechnic University (PolyU) and the Hong Kong Physiotherapy Association had conducted joint research in 2013 with 582 students aged between 10 to 15. 84% students were regular users of smartphone, 76% were

desktop computer users and 31.6% were tablet computer users. 30% students reported that they spent 1 to 4 hours every day on their smartphone while 27.6% were suffering from discomforts related to overuse of electronic devices. Among the students who were suffering some pain, nearly 80% had neck pain, 30% had shoulder pain, and 51% experienced wrist and finger pain. [8]

VISION

Computer screens, smartphones, and tablet screens are sources of blue light, which can decrease contrast, leading to digital eye strain. Blue light can transmit through the cornea and the crystalline lens and reaches the retina. Exposing to excess of blue-violet light for a long period of time is hazardous to the human retina. [9] Prolonged usage of electronic devices is associated with Computer Vision Syndrome (CVS), of eye and vision-related problems. The most common symptoms are dry eyes, eye strain, blurred vision, neck and shoulder pain and headache. [6]

SLEEP DEPRIVATION

Sleep is a vital element in children's physical and psychological development. Deficient sleep quantity or poor sleeping quality is a general health concern with deleterious health effects. Electronic devices especially computers and portable mobiles are becoming an indispensable component in children's life and may affect their sleep duration and quality. [10] Children who use mobile devices at bedtime are twice as likely to sleep less than nine hours at night. In a study, 45.4% of children reported that they have insufficient sleep when using the devices just before bedtime and 52% children claimed that they have poor sleeping quality when using a mobile device before going to bed. [10] Among Hong Kong students, the 2017 study found that there was 10.2% increase in deprived sleep time among primary school students who reported adverse effects of electronic screen products use. [11]

COGNITIVE DEVELOPMENT

Some studies have found the definite correlation between over use of electronic devices and Attention-Deficit Hyperactivity Disorder (ADHD). [12] The study from HKU has shown that children who spent more time on electronic devices were more probably having behavioural problems including emotional and hyperactivity, with poor academic performance. The study has also indicated that

the positive relation between screen time and risk of ADHD among the primary school children. [7]

FAMILY RELATIONSHIP

The relationship of parent and child would be affected and is due to a conflict between two parties on the issue of using the electronic devices. According to the survey from the Department of Health in 2017, there was a double-digit increment (11.5%) in the percentage of quarrelling with parents about using the Internet and electronic screen products among primary school children compared with that in 2014. Over 70% of parents had arguments with their children because of the use of electronic devices. [11]

ADDICTION AND GAMING DISORDER

Since 2013, "Internet Gaming Disorder" has been included in the classification of mental and behavioural disorders of the American Psychiatric Association. Gaming Disorder, with its online and offline variants, was defined in the 11th Revision of the International Classification of Diseases (ICD-11) in 2018 by World Health Organization as a pattern of gaming behaviour that results in noticeable problem or significant impairment in personal, family, social, educational or occupational performance (WHO, 2018). It can be recognized and has clinically significant syndrome associated with distress or affected personal development as a result of repetitive gaming behaviour. [13] This addiction is more prevalent in people aged below 30, and more common in younger teenagers below 19. [12]

ROLES OF STAKEHOLDERS

Although currently there are no empirically-based control management for internet addiction, all the related stakeholders have their corresponding responsibilities in the prevention of problematic use in electronic devices and in promoting the appropriate use of such devices among adolescents.

PARENTS

Parents have their specific roles in coping with this issue. Since they are close family members, they are expected to be a motivator to help the children by encouraging them to establish a healthy habit on the Internet and maintain a balance between their cyber activities and social livelihood. They should demonstrate a role model to their children the correct approach in behaviour, and even the

right attitude in using electronic devices. For primary school students, parents are advised to give clear instructions and set requirements to limit the time of use after an agreeable conversation with their children. The increase in the amount of time spent in face-to-face interactions between adults and children can result in better social skills and good quality relationships overall. Parents are also recommended to help their children to explore other interests in physical activities in order to reduce the reliance on electronic entertainments and develop a healthy relationship with peers in their school life. [6]

For adolescent students, their impulsive personality means that they are willing to take part in risk taking behaviours. They learn to do the task independently, but they need others assurance of their own worth and are also desirous in socialization. Thus, parents must guide and coach them through daily life skill trainings, to enhance their strength and ability in identifying the potential risks and in developing skills in the proper use of electronic tools. [6]

TEACHERS

Educators perform similar duties as parents in the use of electronic devices. They both give guidance and supports for the students. For junior students, teachers need to educate and explain to children about the possible risks in using the electronic screening products in order to lower their opportunity of being trapped in the Internet. For senior students, teachers should communicate with them with a positive and caring attitude. For the purpose of maintaining a harmonious atmosphere between teachers and students, sharing self-experiences in complementary communication with each other enhances mutual understanding and performs a concordant relationship. Trust and respect to the students on the usage will help them to avoid the dependence on the electronic devices. [6]

SCHOOLS

Schools are very important in health promotion in terms of health education and personal development in school curriculum. More physical activities are recommended for the primary and secondary students. The study from HKU reported that the School Physical Fitness Award Scheme was an effective strategy to promote physical activity and fitness to students. The sports mentorship programme helps improving the muscular development and mental health of youth. Schools should take a passionate role in helping

children to do more physical activity meeting the recommended standard in physical activity of WHO, besides sitting and learning at classrooms to reduce the risk of getting overweight among the students. [7]

GOVERNMENT DEPARTMENTS

The Government plays the key role in health promotion with its powerful capacity in funding research, and providing expertise, innovation, education and environmental supports. Major working areas of the Government include policy leadership, needs assessment, resources planning, organizing community activities and outcomes measurement.

DEPARTMENT OF HEALTH

The Department of Health has the main responsibility in disease prevention and health promotion to the general public. It carries out major duties in different routines such as summarizing relevant and updated information of the common health issues. In the problem of excessive Internet use, several guidelines have been produced for various groups of people including adolescents, parents and teachers on how to reduce the time spent on the electronic devices without the reliability on the screen products. It has organized diverse health promotion projects, for instance "Change for Health" and "Start Smart Parent Guide". It also publishes educational articles and newsletters regarding the proper usage of electronic devices. Moreover, the Student Health Service of the Department usually organizes talks for adolescents and parents e.g., 'Balance in Net' and 'Never Lost in Net Again'. [1]

EDUCATION BUREAU

The Educational Bureau has noted the potential health impacts of increased time spent on electronic devices in adolescents. It promotes anti-cyberbullying campaigns for students as a part of the school curriculum and provides teachers with training programmes on topics of cyber-safety. It also gives comprehensive advice on the appropriate use of computer and e-books at schools. Besides, its cooperation with selected NGOs it helps to provide counselling services to students, parents and teachers. It also collaborates with the Information Technology sectors to introduce the importance of Internet safety and proper use of mobile screening products to the students. [1]

NON-GOVERNMENTAL ORGANIZATIONS

Non-Governmental Organizations (NGOs) play an essential function in community education through health services, research, workforce development and advocacy. They are dedicated to help parents and the youth, by providing information and advice, counselling, group therapies and individual case management. [14] For example, the Tung Wah Group of Hospitals offers talks, workshops and treatment group to enhance public awareness and promote healthy family life with balanced lifestyle. The 'Say No to Cyber Addiction' Project is targeted for adolescents who are having high risk of internet addiction, youth workers, teachers, and parents. They cultivate adolescents' healthy attitude on internet surfing, strengthen their self-control on internet surfing and awareness of internet safety. They also provide support in strengthening parents' and teachers' knowledge and skills on handling adolescents' internet behaviours. [15]

The Hong Kong Christian Service, another NGO, have been providing the Online New Page Online Addiction Counselling Centre to young internet addicts starting from 2005. They hold activities such as workshops, consultation service, supporting and sharing sessions, outreaching services and professional training, to rebuild and develop effective strategies and skills to regain the life balance of young internet addicts and to help parents of young internet addicts in improving family functioning. They also aim to promote the messages of healthy internet use through community education. [16]

There are some additional programmes offered by other organizations to help with the internet addiction problems among adolescents. The Hong Kong Council of Social Service provides an Internet Learning Resource Platform 'WebOrganic' for low-income group students, through implementing activities in promoting safe Internet usage during learning and searching information. [17] Moreover, the "Game Over Programme" designed by the Department of Psychology in the University of Hong Kong is an effective scheme for prevention of game addiction among Hong Kong primary school students. [18]

ADOLESCENTS

Teenagers have their own responsibility and actions to protect themselves in avoiding Internet addiction. They should learn to be self-protector in considering their health within the settings of their own daily life. They must understand that technology and electronic devices at the school are mainly used for learning purposes, and not designed for other personal uses, such as installing games or playing on student computers. [19] They should make good use of the devices in reading e-books during in-class lessons or completing homework in online platforms. They should not spend too much time in entertainment or game competitions. They should be wiser in searching their own interests so as to create a balanced life with enough physical activity. Developing technological skills, health knowledge, and self-discipline in using the new technologies can help them to keep aware of the risks of the excessive digital devices use. When encountering problems, they are encouraged to share their feeling, problems and thoughts with reliable adults, e.g. parents and teachers, through an open and effective communication. [6]

CONCLUSIONS

It is an undeniable fact that the booming development of electronic devices in this 21st century gives us a wide range of benefits. At the same, we need to consider the drawbacks of excessive use and addiction problems. Every stakeholder should take their responsible actions and work in collaboration with each other to safeguard the health of the young generation. Teachers and parents are responsible for guidance and education. Government departments act as scheme promoters. NGOs are the executors to provide social supports for the needy adolescents. Furthermore, teenagers should self-protect themselves and self-control from the electronic enticement. We should create an active and open platform for discussing and pondering the safe and proper ways in using electronic devices. Hence, the target of lowering the prevalent dependence on digital screen products among adolescents in Hong Kong this can be achieved through the promotion of appropriate use of electronic devices and the participation and contribution in supporting activities by various groups and stakeholders.

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EDITORIAL

HEALTHY GOVERNANCE AND HEALTHY PUBLIC POLICY: TOWARDS REALISTIC HEALTH REFORM AND EMPOWERED COMMUNITIES

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The lead Editorial in this issue – a special issue, as it contains six articles presented at the College of Professional and Continuing Education (CPCE) of the Hong Kong Polytechnic University Health Conference of 2019 is provided by Professor Peter Yuen, Dean of that College and Professor, Department of Management and Marketing of the Hong Kong Polytechnic University.

The theme of the conference was 'Towards a More Humanistic, Holistic and Integrated Model of Care'. Invited speakers came from Japan, Korea, Singapore, Australia, China, Thailand, as well as locally from Hong Kong. You can see from the articles published that the various speakers brought a diversity of perspectives in their articles to the conference theme described above and brings into perspective this authors interest in the 'language of health reform'. As a plenary session speaker, I took the conference theme and thought carefully about its meeting and intent. The definitions of humanistic, holistic and integrated care are, of course variable dependent on the context. From my reading I concluded that the meaning pointed to 'patient centred care'. My professional context, these days is very much focussed on primary healthcare. [1] In addition, I have an abiding interest in health policy and health reform and the variable understanding we all have of the language of health reform.

At that time of the conference in Hong Kong, concern about health reform was contemporary as described in an earlier editorial. [2] Like many health systems there is now a focus on ageing with an under-pinning of prevention and an emphasis on primary healthcare. Part of that approach is the establishment of district health centres, community care and day care within an ageing care framework.

In my plenary presentation I made the point that Australia has had a lot of reform for health and the second point I made was that 'Australia had also had 'health reform without change and change without health reform'. This latter point created some level of humour in the audience response. However, despite that humour, the statement is in fact a truism. Calder and colleagues [3] recently published a report that concludes that Australian health services are too complex to navigate, and they traverse the multiple attempts at health reform over time to describe the inherent difficulties in effective reform. We also need to remember that the other challenge to health reform in Australia is the federated nature of government where there are split responsibilities for funding and delivering of healthcare predominately between State and Territory government and that of the Commonwealth Government.

Fran Baum in her recently published book on governing for health suggests six key measures that include 'reducing inequality to build population health, nesting human health in a broader ecosystem, good governance requires across sector involvement, regulation through public health, measurement of progress and ubiquitous leadership. John Menadue and colleagues have also recently contributed to the debate in Australia about Labor's proposed Australian Health Reform Commission just prior to a national election being called.[4]

Menadue suggests that we need 'an informed public discussion on health issues' and on 'how to improve our health system'. He goes on to suggest that 'providers have an effective veto on health reform'. I would suggest that the 'veto on health reform' goes much further than the interests of providers and goes also to multiple health professions, their industrial associations and professional

organisations, health insurers and pharmaceutical and technology providers and the 'elephant in the room' of State and Territory governments and their extensive bureaucracies. After all, how many health ministries do you need for a mere 24 million people? This is at the nub of all the challenges we have in addressing Health reform in Australia. This is what is referred to as a 'strife of interests' as used by Sidney Sax as far back as 1985 [5] and more than adequately described by Alfords' 'structural interests' theory. [6] A perusal of the dates of the last two references demonstrates that the challenges we are all confronting are certainly not new.

Menadue suggests we need to address in priority order 'out of pocket costs', primary care, workforce reform, private health insurance, Medicare and the 'blame game', that is the 'structural interests, and the 'strife of interests. [5,6] I will not comment on his priorities or how he might have them addressed and like you all, we appreciate his ongoing contribution. The point this editorial make is that all the narrative above demonstrates strategic intent, an intent we have now been engaged in trying to address for the last four decades! Menadue goes on to add some principles such as 'a focus on users rather than providers', 'keeping people healthy (prevention)', solidarity and social inclusion, autonomy and choice and takes personal responsibility for keeping ourselves healthy'. [4]

In my mind the above words are representative of what we might call 'governing for health' and of developing 'healthy public policy'. [7] We have also talked, in the past, about the value of localism and the importance of theories around subsidiarity as away forward for health reform. [8] Returning to the conference theme of 'humanistic, holistic and integrated care and my definition of that meaning, 'patient centred care' I would now extend my definition to be underpinned by notions of 'community, interpersonal, social and individual care' [7] This is described by White as 'applying the socio-ecological model to health systems integration. [7] So this language suggests that we need to empower communities to be central to health decision-making at the individual and community level and not have healthcare as something 'we' do to individuals and communities.

In these contexts, why don't we pilot a move to placed based commissioning of groups of local government areas (LGAs) where consortiums of local hospitals, community health and PHC providers, together with citizens, bid to manage and deliver all local health services, to identify need and respond to that need and, inspire communities to achieve healthier lifestyles? The much larger Local Health Districts (LHDs) and PHNS would still have a role in connecting the smaller consortiums with referral to tertiary services, with establishing health and clinical pathways and supporting strategic planning and direction and over-arching public health monitoring and regulation and supporting the retention of health workforce. Consideration of employment and industrial issues could be accommodated by retaining existing industrial rights through a process of secondment. The pilots would best work in rural communities and may not be effective in urban areas, but the need for health reform is a priority for rural communities that have poorer outcomes.

For those who say this cannot be done the response would be that it used to be the way health services were delivered in Australia before government and health bureaucracy 'slowly started to take control'. [9] A variant of this model was in place in NSW where rural district health services were established by a State government in 1993, only to be quickly disbanded by an incoming government who absorbed those local district health service into very large organisations within a few years of establishment. After four decades of not much progress in national health reform perhaps pilots at the local level that are empowering, innovative and entrepreneurial might just make some progress.

David Briggs

Note: The author is a board director of a current PHN

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EXTRINSIC REWARDS, OCCUPATIONAL COMMITMENT, CAREER ENTRENCHMENT AND CAREER SATISFACTION OF DENTISTS

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ABSTRACT

Information concerning occupational commitment and career satisfaction of dentists in India is incomplete. Satisfaction of dentists with their profession and commitment towards the profession are important determinants of the future of the dental profession. Therefore, the present study examined the relationship between extrinsic rewards and career entrenchment and occupational commitment of dentists. The study also measured the effect of career entrenchment and occupational commitment on career satisfaction of dentists. Data were collected from 85 dentists of two private dental hospitals of Udaipur city, India. Of the total respondents percent (n=48) 56 per cent were male and 44 per cent (n=37) were female. The age of the respondents ranged from 23 to 56 years. 54 per cent of the respondents were employed in their current jobs for less than 10 years and 46 were in the same job for more than 10 years. The data thus collected was analyzed with the help of SPSS 21 using descriptive (mean, standard deviation, percentiles) and inferential statistics (one way ANOVA, post hoc analysis, correlation and multiple regression). The study revealed significant relationship between extrinsic rewards and career entrenchment and affective commitment of dentists. Furthermore, career entrenchment and occupational commitment were found to be significant predictors of career satisfaction. The study puts forward some suggestion for future research in this area

KEYWORDS

extrinsic rewards; career entrenchment; occupational commitment; career satisfaction; dentists

INTRODUCTION

One question that is put frequently to dentists is "If you had it to do over again, would you become a dentist? (Chambers 2000) [1] Choosing a career is one of the most important decisions one has to make. Dentists' occupy an important position in the society. The career offers prestige, autonomy, creativity and an opportunity to help others. Before 1980, India had only 39 dental colleges with few dental graduates available for services (Naidu et al. 2014). [2] Today, there is a staggering of 310 dental colleges in India, producing 30,000 graduates every year.[3] Presently, India's dentist to population ratio in urban areas is 1:8,000 and in rural areas is 1:50,000.[4] There is unequal distribution of dentists nationally. Dentists in the country prefer to work in urban areas with high standards of living. Thus, 70% of the dentists are practicing in cities and only 30% are providing services in the semi-urban and rural areas (Sudhakar 2014).[5]

India is one of the largest producers of dental graduates (Sudhakar 2014). [6] There is a spike in the number of dental colleges in India and students graduating out of these colleges every year. Owing to the huge oversupply of dentists, it is expected that India will have more than 100,000 dentists' surplus by 2020 (Sudhakar 2014).[7] There is a gradual increase in the number of dental graduates in the country. The alarming increase can be attributed to various factors such as poor manpower planning, mushrooming of dental colleges, reliance on faulty statistics, absence of any specific design or policy planning and inefficient regulatory bodies (Sudhakar 2014).[8] The upsurge in dental graduates can limit the job prospects for

the new graduates. Dagli and Dagli (2015) [9] reported that the current scenario pose a threat to the professional integrity of the fresh dental graduates. Dentists in India struggle in terms of placement, poor working conditions, poor income and high workload (Malhotra et al. 2016). [10] In their study Bailoor et al. (2014) [11] suggested that dental surgeons are shifting their professions due to unemployment. The percentage of dentist committing suicide is also on the rise because of unemployment and a sense of hopelessness (Dagli & Dagli 2015). [12]

Dentistry has been identified as one of the most stressful professions (Luzzi & Spencer, 2011). [13] The satisfaction of the dentists with their profession and commitment towards the profession are important determinants of the future of the dental profession. Satisfied providers are more likely to recommend career in dental hygiene to others; satisfaction is highly related to job and career attrition and is ultimately related to job performance and patient care (Bader & Sams 1992). [14] Low job satisfaction of dentist can lead to high turnover with resultant loss of productivity and reduced quality of patient care (Luzzi et al. 2005). [15] Fulfillment in the profession is important. Thus, the present study is undertaken to ascertain empirically the level of career entrenchment, career satisfaction and occupational commitment of dental practitioners. The study will ascertain the relationship of extrinsic rewards with career entrenchment and occupational commitment of dentists and effect of these factors on their career satisfaction.

CAREER ENTRENCHMENT

According to Carson et al. (1996) [16] career entrenchment is "employees' feelings of immobility resulting from substantial economic and psychological investments in a career that makes change difficult". Rodrigues (2009, as cited in Scheible & Bastos 2013) explains "entrenched individuals as one who are stuck in their careers (or organization) by necessity.[17] So, one can assume that these individuals are not very concerned with productivity, and not engaged into contributing, through their work to future generations". Career entrenchment has been considered as an important indicator of permanence of individuals in their profession and/or organization. Entrenchment is a metaphor based on Becker's (1960, as cited in Scheible & Bastos 2013) [18] side-bets theory which states that individual stay in an organization or career even if they do not desire, as it seems more secure. This cognition occurs when individuals do not adapt, are not motivated

and cannot find alternative jobs. Therefore, they do not leave the trench (organization or profession) where they feel protected (Scheible & Bastos 2013).[19] Carson and Carson (1995) [20] define three dimensions of career entrenchment: career investments, emotional costs and limitedness of career alternatives. Career investments is the accumulated investments one has made in one's career success which would be lost or deemed worthless if one pursues a new career. One invests a substantial amount of money, time and effort in their present careers. These accumulated investments can be lost if one changes career. Individuals may also feel that they risk losing accumulated benefits such as high income and status in the present organization (Zacher, Ambiel & Noronha 2015).[21] Emotional costs, focuses on the anticipated emotional costs that would be associated with pursuing a new career. It is the expected socio-economic risks associated with pursuit of a new career such as disruption of friendship with colleagues (Zacher, Ambiel & Noronha 2015).[22] Limitedness of career alternatives, is associated with lack of available options for pursuing a new career. Carson, Carson and Bedeian (1995) [23] stated the symptoms of entrenchment may include social stigma associated with career withdrawal; fear that age and skill-specificity will limit employability; unwillingness to give up the stature acquired in current occupation; and scepticism about future earning ability. With no alternatives, the employees' freezes in their current occupation and thus becomes entrenched. Carson, Phillips and Roe (1996) [24] on the basis of two constructs i.e. career entrenchment and career satisfaction, categorized individuals into four domains viz. entrapped, contended immobile, career changer and voluntary careerist. Entrapped are individuals who score high on career entrenchment and low on career satisfaction. Contended immobile are those who score high on both the constructs. Career changers are those individuals who score low on both the constructs. Voluntary careerists are individuals who score low on career entrenchment and high on career satisfaction.

OCCUPATIONAL COMMITMENT

Occupational commitment refers to the "psychological link between an individual and his/her occupation that is based on affective reaction to that occupation" (Lee, Carswell & Allen 2000). [25] Goswami, Mathew and Chadha (2007) [26] stated that employee loyalty is shifting from organization to one's occupation because of various changes happening in the business environment such as job rotation, employee resizing, organizational

restructuring, and job insecurity. Individuals with high occupation commitment identify strongly with and have positive feeling towards their occupation (Ciftcioglu 2011). [27] Meyer and Allen (1991) [28] on the basis of three-dimensional structure of organizational commitment conceptualized occupational commitment as a three-dimensional construct. The three dimensions consist of affective, continuance and normative commitment. Affective commitment is the emotional bond an employee develops towards the organisation in which he works. When affective commitment is strong employees stay with the organisation and identifies with the values that organisation upholds. Continuance commitment is the cost the employee associates with leaving or staying in the organisation. When the employee feels the cost of staying is less then they stay and vice versa. Normative commitment is the obligation employee feels towards the organisation which he works. They feel that they need to stay in the organisation for various reasons (Brown 2003).[29] At any point of time an employee can have these commitments in varied degrees (Brown 2003). Although numerous researchers have studied organizational/occupational commitment (Chen et al. 2014; Kaldenberg et al. 1995; Merk & Turkmen 2015), [30][31][32] we found no study which has been conducted to study occupational commitment of dentists practicing in India. Occupation is a major focus of one's life and occupational commitment keeps one's relationship with the job or with the organization (Bakan et al. 2012).[33] It has an important consequence on employees' work related behaviour such as turnover (Wang et al. 2011) [34], absenteeism (Mowday et al. 1982) [35], and job performance (Undale & Pande 2016) [36].

Because, continuance commitment echoes to the term entrenchment as both of them refers to staying in the organization out of need and not desire (Scheible & Bastos 2013) [37], therefore only affective and normative dimensions of occupational commitment will be studied in the present study.

CAREER SATISFACTION

Career satisfaction is the satisfaction that individual derives from the intrinsic and extrinsic aspects of their careers, including pay, advancement, and developmental opportunities (Greenhaus, Parasuraman, & Wormley 1990). [38] It implies doing a job one enjoys, doing it well and being rewarded for one's efforts (Brikend 2011). [39] Researchers in the past have found various factors that influence career satisfaction of individuals such as income

(Poon 2004) [40], promotion opportunities (Bozionelos 1996) [41], tenure (Judge at al. 1995) [42], supervisory support and recognition (Greenhaus, Parasuraman, & Wormley 1990) [43] and challenging and visible jobs (Richardsen, Michelsen, & Burke 1997) [44]. Jankiram et al. (2017) in their study among 580 public health dentists in India reported that the career satisfaction was low among dentists due to job insecurity and unemployment. The researchers reported that nearly half of the study respondents felt that they did not achieve the desired accomplishment in the profession. [45] Similar results were reported by Kaipa et al. (2015) in their study on dental practitioners registered with Indian Dental Association. The researchers found medium level of satisfaction among the respondents with the dental profession as a career.[46]

EXTRINSIC REWARDS

Motivating employees is responsibility of an organization. Employees put maximum efforts in their work when they feel that they are treated fairly. Porter and Lawler (1968) [47] distinguishes between two categories of rewards: intrinsic rewards and extrinsic rewards. Intrinsic rewards are defined as the satisfaction one derives from doing a job. On the other hand, extrinsic rewards are the tangible benefits obtained as a result of doing the job. Extrinsic rewards can take forms such as money. Extrinsic rewards can be social and organizational rewards. Social rewards are those rewards that are derived from interactions with others (like co-workers, superiors) on the job. Organizational rewards are the tangible rewards such as pay, incentives, allowances, promotion, recognition, and other organizational benefits. Individuals are extrinsically motivated when they engage in work in order to obtain some goal that is apart from the work itself (Amabile 1993). [48] Extrinsic rewards raise employees' effort in the job. It has a significant impact on job satisfaction of employees and also increases employee retention (Ajmal et al. 2015).[49] Satisfied employees also show great loyalty and commitment towards the organization. Researchers have found significant relationship between rewards and affective commitment (Kuvaas 2006; Lee et al. 2012; Miao et al. 2013) [50][51][52], normative commitment (Lee et al. 2012; Korir & Kipkebut 2016; Miao et al. 2013)[53][54][55] and continuance commitment (Lee et al. 2012; Umoh et al. 2014) [56][57].

Based on the above arguments, the study proposes following hypotheses:

- Ha1: There is a significant negative relationship between extrinsic rewards and career entrenchment such that dentists with high extrinsic rewards will experience less entrenchment.

- Ha2: There is a significant positive relationship between extrinsic rewards occupational commitment (affective commitment and normative commitment) such that dentists with high extrinsic rewards will experience higher occupational commitment.

- Ha3: There is a significant positive relationship between occupational commitment and career satisfaction.

- Ha4: There is a significant negative relationship between career entrenchment and career satisfaction.

- On the basis of the above literature and formulated hypotheses, the hypothetical framework for the study is as under:
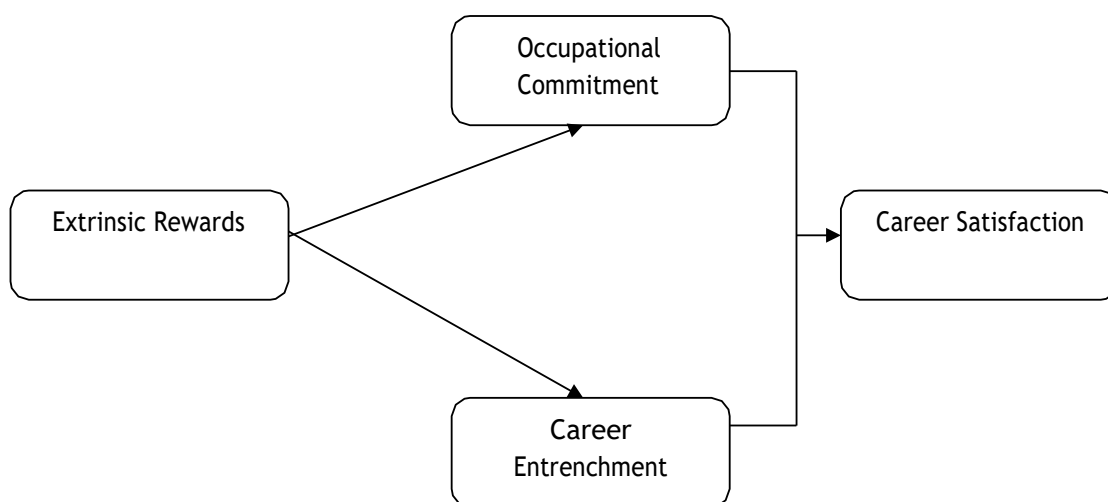
METHODS

PARTICIPANTS AND PROCEDURES

The questionnaire-based survey was conducted during April 2018 and May 2018. The study was conducted among two private dental hospitals of Udaipur city, India. The final respondents were selected using convenience and judgment sampling techniques. A total of 102 dental practitioners were approached for participation in the study. A total of 85 dentists completed the questionnaire for a response rate of 83 per cent. Of the total respondents percent (n=48) 56 per cent were male and 44 per cent (n=37) were female. The age of the respondents ranged from 23 to 56 years and a mean age of 35±7.7. 54 per cent respondents had been employed in their current jobs for less than 10 years and 46 had been in the same job for more than 10 years. The data thus collected have been analyzed with the help of SPSS 21 using descriptive and inferential statistics.

MEASURES

Career entrenchment: To gauge career entrenchment, scale developed by Carson, Carson and Bedeian (1995) [57] was used. The scale is a 12-item multi-dimensional instrument. It measures three dimensions of career entrenchment: career investments (4 items), emotional costs (4 items) and limitedness of career alternatives (4 items). The responses were recorded on a five-point scale (1= strongly disagree to 5= strongly agree).

Occupational commitment: Occupational commitment was measured using a scale developed by Meyer, Allen and Smith (1993). [58] The scale comprises

eighteen items rated on a five-point scale (1= strongly disagree to 5= strongly agree). It measures three form of occupational commitment: affective commitment (6 items), normative commitment (6 items) and continuance commitment (6 items).

Career Satisfaction Scale: Career satisfaction was measured using a scale developed by Greenhaus, Parasuraman, and Wormley (1990).[59] The scale comprises five items rated on a five-point scale (1= strongly disagree to 5= strongly agree). One sample item is "I am satisfied with the progress I have made toward meeting my overall career goals."

Extrinsic Rewards: The short form of Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England & Lofquist 1967) [60] was used to study extrinsic rewards. Table 1 lists the extrinsic rewards MSQ scales used in the present study.

DATA ANALYSIS

DESCRIPTIVE STATISTICS

Extrinsic Rewards: scores on extrinsic rewards (Table 2) ranged between 15 and 28. The mean score was found to be 21.34 and the standard deviation was reported as 2.88. 50% of the dentists scored below 22 and 50% scored above 22. As per the quartile deviations, 25% of the respondents scored below the score of 19 and 25% scored between 23 and 28. *Career Entrenchment*: scores on career entrenchment (Table 2) ranged between 22 and 51. The mean score was 37.29 (2.88). 50% of the dentists scored below the score of 38. As per the quartile deviations, 25% of the respondents scored below the score of 34 and 25% scored between 40 and 51. *Occupational Commitment*: scores on occupational commitment (Table 2) ranged between 22 and 48. The mean score was 35.74 with 5.31 standard deviation of was reported as 2.88. 50% of the dentists scored below 36 and 50% scored above 36. As per the quartile deviations, 25% of the respondents scored below the score of 32 and 25% scored between 40 and 48. *Career Satisfaction*: scores on career satisfaction (Table 2) ranged between 6 and 20. The mean score was found to be 13.14 (3.51). 50% of the dentists scored below 13 and 50% score above 13. As per the quartile deviations, 25% of the respondents scored below the score of 10 and 25% scored between 16 and 20.

EXTRINSIC REWARDS, CAREER ENTRENCHMENT AND OCCUPATIONAL COMMITMENT

In order to find out the relationship between extrinsic rewards and career entrenchment and occupational commitment, Pearson correlation coefficient was employed and the results are shown in Table 3. Extrinsic rewards was found to be significantly and negatively related with career entrenchment (r= -.36**, p<.01). Furthermore, from the results of the table 3, extrinsic rewards were also found to be significantly and positively related with affective commitment (r=.48**, p<.01) and total occupational commitment (r= .37**, p<.01). However, no significant relationship was found between extrinsic rewards and normative commitment r=.02**, p=n.s.).

To test hypothesis Ha1 and Ha2, the respondents were classified into three groups (Table 4) based on the scores obtained in the questionnaire as those with a) low extrinsic rewards - score < (Mean-0.5 S.D.); average extrinsic rewards; b) average extrinsic rewards: score between (Mean-0.5 S. D.) and (Mean + 0.5 S.D.); and c) high extrinsic rewards -score > (Mean+0.5 S.D.). One-way ANOVA was employed to find whether there is any significant difference in occupational commitment and career entrenchment of dentists at three levels of extrinsic rewards i.e. low, average and high.

One of the assumptions of the one-way ANOVA is that variances of the groups should be similar. Table 5 shows the results of Levene's Test of Homogeneity of Variances, which tests for similar values. The sig. value was found to be less than 0.05 for career entrenchment. Thus, the assumption of homogeneity of variance was not met and therefore two robust tests (Brown-Forsythe and Welch) were conducted. Table 6 shows the results of the two tests. From the details of the table, F value was found to be significant (F=5.827, p<0.05). The results imply that there is significant difference in career entrenchment of dentists at various levels of extrinsic rewards. Since the groups were found to be significantly different, the post hoc test was employed to identify the pair of groups that contributed to significant differences. Table 8 shows the results of Games-Howell post hoc analysis. The details presented in the table revealed that the p-value between low and average and low and high groups was less than 0.05, implying that the mean scores between low and average and low and high groups differed significantly at the 5% level of significance. However, the p-value for average and high groups was found to be greater than 0.05, implying that there were no significant differences among these groups. The results

imply that career entrenchment differed significantly among dentist with low and average and low and high extrinsic rewards, however, does not differ significantly among dentists with average and high extrinsic rewards. As shown in Figure 1, career entrenchment was highest among dentists with low extrinsic rewards, followed by dentists with average extrinsic rewards. Career entrenchment was least among dentists with high extrinsic rewards. Thus, hypothesis Ha1 was accepted.

For occupational commitment, from the results of Levene's Test of Homogeneity of Variances, significance value was found to be greater than 0.05 (Table 5). Thus, the assumption of homogeneity of variance was supported. Table 7 shows the results of ANOVA analysis. F values were found to be significant for occupational commitment (F=6.206, p<0.05). The results suggested significant differences in occupational commitment of dentists at low, average and high levels of extrinsic rewards. Since the groups were found to be significantly different, the post hoc test was employed to identify the pair of groups that contributed to significant differences. Table 9 shows the results of Tukey HSD post hoc analysis. The details presented in the table revealed that the p-value between low and high and average and high groups was less than 0.05, implying that the mean scores between low and high and average and high groups differed significantly at the 5% level of significance. However, the p-value for low and average groups was found to be greater than 0.05, implying that there were no significant differences among these groups. The results imply that occupational

commitment differed significantly among dentists with low and average and low and high extrinsic rewards, however, does not differ significantly among dentists with average and high extrinsic rewards. As shown in Figure 2, occupational commitment was highest among dentists with high extrinsic rewards, followed by dentists with average extrinsic rewards and dentists with low extrinsic rewards. Thus, hypothesis Ha2 was accepted.

CAREER ENTRENCHMENT AND OCCUPATIONAL COMMITMENT EFFECTS ON CAREER SATISFACTION

Multiple regression analysis was used to study the impact of career entrenchment and occupational commitment on career satisfaction. Based on the standardized coefficients of each of the independent variable, the impact on the dependent variable was assessed. From Table 10, it was noted that Career Entrenchment (β=-.681) was more influential factor in explaining the career satisfaction of dentists. Occupational Commitment (β=.175) was also found to be a significant predictor of career satisfaction of dentists. The direction of variables was consistent with the prior expectations. As noted in Table 11, R2 was .57, which indicated that approximately 57% of the variation in career satisfaction could be explained by both of the factors combined. The significant F ratio (F=54.63, p<0.05) indicate that the results of the regression model could have hardly occurred by chance. Hence, Hypothesis Ha3 and Ha4 were accepted.

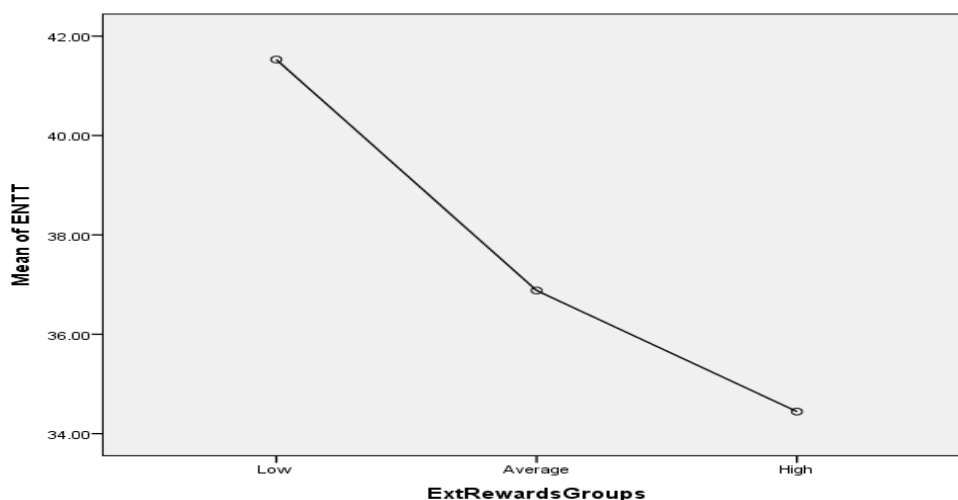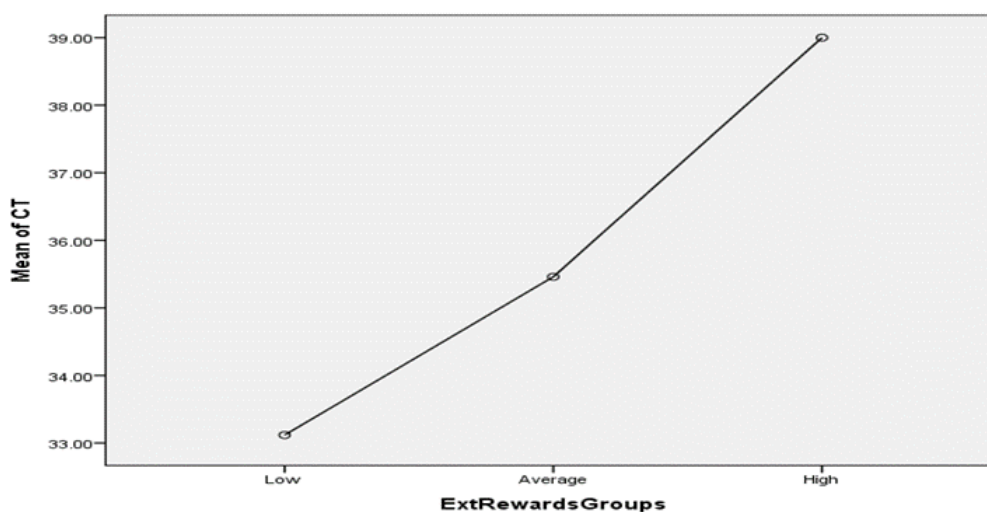**FIGURE 1: CAREER ENTRENCHMENT AT VARIED LEVELS OF EXTRINSIC REWARDS**

FIGURE 2: OCCUPATIONAL COMMITMENT AT VARIED LEVELS OF EXTRINSIC REWARDS

DISCUSSION AND CONCLUSION

The research results of the study show significant output. It was found in the study that extrinsic rewards have much importance to improve occupational commitment of dentists and reduce career entrenchment. The study found significant positive relationship between extrinsic rewards and affective commitment. No significant relationship was found between extrinsic rewards and normative commitment. The present study also reported significant negative relationship between extrinsic rewards and career entrenchment. Dentists were grouped on the basis of their scores on extrinsic rewards into three categories viz. low, average and high. Occupational commitment was found to be significantly high among groups with high extrinsic rewards as compared to dentists with low extrinsic rewards. Also, dentists with high extrinsic rewards experienced relatively less career entrenchment as compare to dentists with average extrinsic rewards and low extrinsic rewards.

The results of the present study contribute to discussions on consequences of rewards on overall satisfaction and commitment of employees. Motivation is a driver of career success and rewards motivate individuals. Rewards have an important place in the quality incentive structure. If dentists are rewarded appropriately with salaries, incentives, increments; have opportunities for advancement; perceive policies as fair and transparent etc., they may show more commitment to the occupation. Also, such rewards may make them feel less entrapped in their career. Furthermore, as seen from the results of the regression analysis of the present study, higher commitment and less career entrenched dentists may also experience higher career satisfaction.

The present study was important because internationally the relationship between rewards, commitment and career satisfaction have been extensively investigated. However, such research has rarely been conducted on dentists working in India. The alarming increase in dental workforce in the country and rise of unemployment put emphasis on designing the jobs in a manner which is seen as extrinsically rewarding. By strategically managing rewards, the dentistry profession can capitalize on the benefits of committed and satisfied workforce. Since rewards have strong implications on the satisfaction of dentists, policy makers and management should emphasize on different types of extrinsic rewards. Extrinsic rewards that are important to dentists must be the centre of interest of administration authorities. These rewards can influence dentists' job satisfaction, improve retention (Ajmal et al. 2015) [61] and increase organizational commitment (Lee et al. 2012) [62].

LIMITATIONS AND RECOMMENDATIONS

The limitation of this study is its small sample size and the sampling technique used. This may limit the generalizability of the results. More studies can be carried out in the future with a larger sample size. Furthermore, the study only examined intrinsic rewards. Studies in the future should combine both intrinsic and extrinsic rewards and study their impact on dentists' overall satisfaction. A better understanding of these factors can help to optimise the dentistry profession. In addition, the study is cross-sectional design and therefore was unable to determine the relationship between the studied variables over a period of time. Therefore, it is recommended that such study is repeated in the form of a longitudinal research to determine the impact of rewards on career entrenchment, occupational commitment and overall career satisfaction. In addition, the respondents of the study were from private hospitals only. Future research can be done on dentists working in public hospitals. A comparative study of public and private can also be undertaken.

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APPENDIX

TABLE 1: LIST OF EXTRINSIC FACTORS

Co-workers	The way my co-workers get along with each other
Recognition	The praise I get for doing a good job
Advancement	The chances for advancement on this job
Supervision-human relations	The way my boss handles his/her workers
Supervision-technical	The competence of my supervisor in making decisions
Company policies	The way company policies are put into practice
Compensation	My pay and the amount of work I do
Working conditions	The working conditions

TABLE 2: DESCRIPTIVE STATISTICS FOR STUDY VARIABLES

Statistics	Extrinsic Rewards	Career Entrenchment	Occupational Commitment			Career Satisfaction
			Affective Commitment	Normative Commitment	Occupational Commitment (Total)	
N	85	85	85	85	85	85
Mean	21.34	37.29	16.36	19.37	35.74	13.14
S.D	2.88	6.20	3.97	3.39	5.31	3.51
Range	13	29	16	16	26	14
Minimum	15	22	10	10	22	6
Maximum	28	51	26	26	48	20
Percentiles						
25	19	34	14	17	32	10
50	22	38	15	20	36	13
75	23	40	19	22	40	16

TABLE 3: CORRELATION COEFFICIENT BETWEEN EXTRINSIC REWARDS AND CAREER ENTRENCHMENT AND OCCUPATIONAL COMMITMENT

Extrinsic rewards		Correlation
Career entrenchment		-.367**
Occupational commitment	Affective Commitment	.481**
	Normative Commitment	.027
	Occupational Commitment	.377**

TABLE 4: CLASSIFICATION OF DENTISTS

	Classification					
	Low		Average		High	
	N	%	N	%	N	%
Extrinsic rewards	17	20	50	58.8	18	21.2

TABLE 5: TEST OF HOMOGENEITY OF VARIANCES

	Levene Statistic	df1	df2	Sig.
Career Entrenchment	15.065	2	82	.000
Occupational Commitment	2.994	2	82	.088

TABLE 6: ROBUST TEST OF EQUALITY OF MEANS – CAREER ENTRENCHMENT

		Statistic	df1	df2	Sig.
Career entrenchment	Welch	5.827	2	26.81	.008
	Brown-Forsythe	4.578	2	31.66	.018

TABLE 7: OCCUPATIONAL COMMITMENT AT VARIED LEVELS OF EXTRINSIC REWARDS

Sources of variance	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	273.443	2	136.722	5.340	.007
Within Groups	2099.662	82	25.606		
Total	2373.106	84			

TABLE 8: GAMES HOWELL POST HOC ANALYSIS FOR COMPARISON OF CAREER ENTRENCHMENT AT VARIED LEVELS OF EXTRINSIC REWARDS

(I) Ext. Rewards Groups	(J) Ext. Rewards Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Average	4.64941*	1.46817	.012	.9605	8.3384
	High	7.08497*	2.58513	.028	.6887	13.4813
Average	Low	-4.64941*	1.46817	.012	-8.3384	-.9605
	High	2.43556	2.27484	.543	-3.3358	8.2069
High	Low	-7.08497*	2.58513	.028	-13.4813	-.6887
	Average	-2.43556	2.27484	.543	-8.2069	3.3358
*. The mean difference is significant at the 0.05 level.						

TABLE 9: TUKEY HSD POST HOC ANALYSIS FOR COMPARISON OF OCCUPATIONAL COMMITMENT AT VARIED LEVELS OF EXTRINSIC REWARDS

(I) Ext. Rewards Groups	(J) Ext. Rewards Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Average	-2.14235	1.42068	.292	-5.5335	1.2488
	High	-5.49346*	1.71136	.005	-9.5785	-1.4084
Average	Low	2.14235	1.42068	.292	-1.2488	5.5335
	High	-3.35111*	1.39092	.047	-6.6712	-.0310
High	Low	5.49346*	1.71136	.005	1.4084	9.5785
	Average	3.35111*	1.39092	.047	.0310	6.6712
*. The mean difference is significant at the 0.05 level.						

TABLE 10: PREDICTING CAREER SATISFACTION OF DENTISTS: MULTIPLE REGRESSION ANALYSIS

	Beta (β)	T	Sig.
Constant	-	8.382	.000
Career Entrenchment	-.681	-8.923	.000
Occupational Commitment	.175	2.297	.024

TABLE 11: REGRESSION MODEL SUMMARY

R Square	Adjusted R Square	F	Sig.
.571	.561	54.63	.000

WHAT IS THE PROFESSIONAL IDENTITY OF ALLIED HEALTH MANAGERS?

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ABSTRACT

OBJECTIVE:

This paper explores the professional identity (PI) of Allied Health Managers (AHMs) and how their identity is typically constructed.

METHODS:

A qualitative research methodology utilising semi-structured interviews was employed for this research. Thematic analysis was used to extract relevant data from the transcripts.

SETTINGS:

The study was undertaken in five acute hospitals within one of the largest metropolitan Local Health Districts in New South Wales, Australia. A total of sixteen AHMs and deputy AHMs were interviewed.

RESULTS:

Three key themes identified were: PI of AHM, motivation of becoming a manager, and construction of their identity. Factors motivating AHMs to follow a management pathway were identified as being a natural progression and having interest in high-level decision-making. Despite AHMs sharing similar role conflict as the medical managers, they adapted to hybrid manager roles with minimal resentment. They also adopted to the hybrid manager role with a positive, realistic and flexible perspective.

CONCLUSION:

Despite facing role conflict as a hybrid-professional-manager, AHMs manage the transition from clinicians to managers with a positive approach. This indicates that AHMs may require certain skills or characteristics to successfully construct their PI.

INTRODUCTION

Allied Health (AH) is a collective term for health professionals who are university-trained but are not part of medical, dental or nursing professions. In Australia, AH make up a quarter of the total health care workforce [1] and is described as the third pillar of the patient care workforce, in addition to doctors and nurses [2]. Each AH discipline has their unique and specialised expertise in preventing, diagnosing and treating a range of conditions and illness [3]. AH professional (AHP)'s roles and interventions focus on protecting, maintaining and restoring the basic functions and needs of an individual, such as mobility (physiotherapist), eating/nutrition (dietitian), activities of daily living (occupational therapist), communication and swallowing (speech pathologist), psychological and social wellbeing (social worker). AHPs contribute to safe and speedy patient discharge in hospitals [4,5]. However, the literature suggests that AHPs remain under acknowledged, including having a lower value within the clinical team, which results in a perception of less clinical contributions, lack of autonomy in decision-making, and lack of authority [6-8].

In health, clinicians in the medical and nursing domains are often employed to carry both clinical and managerial roles. They are referred as hybrid-professional-managers (HPMs) [9-11]. The role and position of AH managers (AHMs)

within healthcare organisations also make them suited to the description of 'hybrid-manager'.

Professional identity (PI) is a stream of social identity [12]. It arises from how a group of professionals classify and differentiate themselves. PI can be viewed at a macro or micro level. At the macro level it relates to the status, privileges, duties and self-image of the profession, while at the micro level it refers to the unspoken behavioural norms of the professions [8].

The PI of HPMs is well researched in health, particularly in doctors and nurses [13-17]. The majority of the research found HPMs experience an internal tension of being both a manager and a clinician [13,18]. These complex and challenging identities often arise from the difference in orientations between professionals and managers [14,19,20].

HPMs often experience role conflict when balancing time allocated for managerial tasks, clinical work, teaching, and research responsibilities [21-23]. Role conflict is also evident when organisational decision making is required for resource priorities, such as staffing levels, that impact on patient care [21,23,24]. Employees often have the perception of 'them' (management) and 'us' (clinicians), and managers are at risk of being seen as a traitor to their professional group and thus lose support from their subordinates [11,23].

At present, there is limited research on the PI of AHMs. The tradition of medical dominance remains prevalent in health, such as medical intimidation during ward rounds and unfair workspace allocation [25-27]. AHPs continue experiencing difficulty in establishing their roles within the healthcare system [7,28,29]. This lack of authority is likely extended to decision-making at the management level. The importance of AH disciplines in patient care is increasingly being recognised, however AHPs still experience significant challenges through medical dominance and lack of professional recognition. The AHMs are role models for staff (AH clinicians) in establishing their disciplinary role within the hospital, while accepting the reality of being less influential in the health care hierarchy. A strong and concrete PI is essential for the success of mastering a role [30]. Therefore, a more in-depth understanding of the construction of AHMs PI is critical in the professional development of an AHM. The aim of this paper is to explore the nature and construction of the PI of AHMs.

METHODS

This paper reports on the qualitative component of a wider mixed-method study investigating the competencies of AHMs. Qualitative research methodology was used as some competencies, especially those skills which are ambiguous and difficult to articulate, such as emotional intelligent. A qualitative research approach is best suited to investigate such complex concepts [31].

The study sites consisted of all five acute hospitals within one of the largest metropolitan Local Health District (LHD) in New South Wales, Australia. Approximately 620 AHPs are employed in the five hospitals, accounting for 6-7% of the health workforce in this LHD. The percentage is much lower than the national average (25%) as not all AH disciplines are employed in the hospital settings, such as music therapists. The AH disciplines included in this study were: dietetics, speech pathology, physiotherapy, occupational therapy and social work. In the LHD, a total of 35 managers and deputy managers are employed across these five hospitals within the five disciplines. Invitation emails with a research information sheet were sent to all hospital facility AH Directors or Discipline Directors to forward on to the potential research participants.

A total of sixteen AH managers and deputy managers volunteered to participate in the interview component of the research, with recruitment ceasing when no additional new themes were identified. To ensure the sample was representative, demographic data were collected in the introductory questions of the interview. These data are shown in Table 1.

Face-to-face semi-structured interviews were conducted by the principal investigator (MM) using an interview guide. Audio recordings of the interviews were transcribed verbatim. Their accuracy was confirmed by cross-checking the written transcription and the audio recording (by MM). Data coding and analysis were performed by MM. Thematic analysis was used to analyse the data from the semi-structured interviews using NVivo version 11.4 (QSR International, Melbourne, Vic., Australia). Braun and Clarke's six step approach was followed to syntheses themes: familiarising data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing up [32]. The following diagram illustrated the creation of the theme "centre of knowledge".

TABLE 1 DEMOGRAPHICS OF THE PARTICIPANTS

	SEX		YEARS IN MANAGEMENT*			ROLE	
Disciplines	MALE	FEMALE	< 2 YEARS	3-5 YEARS	>10 YEARS	MANAGER	DEPUTY
Dietetics		4	2	1	1	3	1
Occupational Therapy	2	1	2		1	3	
Physiotherapy	3	1	2	2		4	
Speech Pathology		3	2		1	3	
Social Work	1	1	1		1	1	1

* None of the respondents had management experience between 6-10 years

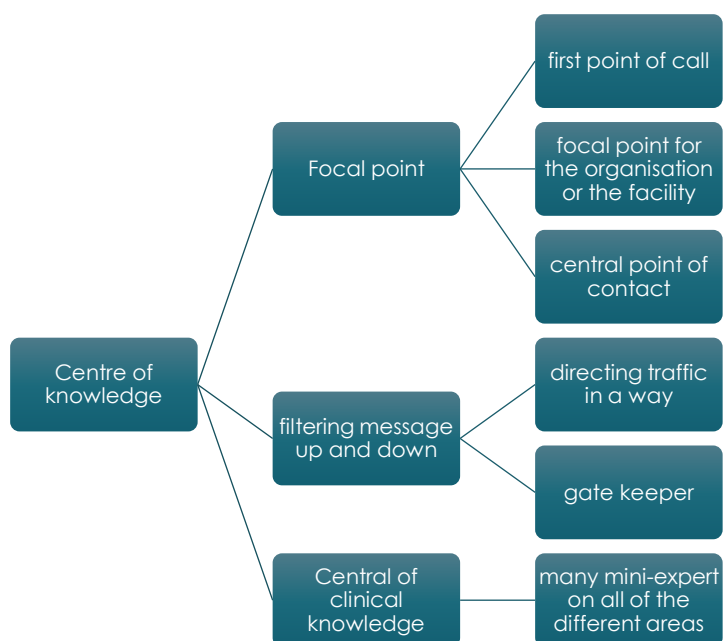**FIGURE 1: EXAMPLE OF THEME GENERATION – CENTRE OF KNOWLEDGE**

TABLE 2. SCORE OF INDIVIDUAL DOMAINS FOR COREQ CHECKLIST

DOMAINS (NUMBER OF CRITERIA PER DOMAIN)	NUMBER OF CRITERIA REPORTED	NUMBER OF CRITERIA NOT REPORTED BUT HAS BEEN TAKEN INTO CONSIDERATION DURING THE STUDY
Personal characteristics (n=5)	3	2
Relationship with participants (n=3)	2	1
Theoretical framework (n=1)	1	
Participant selection (n=4)	4	
Setting (n=3)	3	
Data collection (n=7)	3	2
Data analysis (n=5)	4	
Reporting (n=4)	4	

Consolidated criteria for reporting qualitative research (COREQ) checklist was used to rate and ensure the quality of the interview [33]. Table 2 shows the score of individual domains.

Overall, this study met 27out of the 32 criteria. Some of the criteria, such as gender and training, have been taken into consideration during the research process but have not been reported. The main bias of this study was originated from the personal characteristics of the researcher and the relationship with the participants. The researcher was a AHM and has worked with some of the participants. In order to mitigate the selection and respondent bias, the recruitment process was through an independent person (Directors). There was also no selection of participants as all volunteered participants were included in the study. The use of a standardised interview guide also assisted to ensure the consistency of the interview irrespective of the relationship between the researcher and the interviewees. Since the researcher is an AHM, subjectivity and own opinion may create bias to the results. To ensure the rigor of the study, a subset of transcripts was reviewed by other researchers to confirm the accuracy of the coding.

Ethics approval for the research was obtained from the Human Research and Ethics Committees of the South Western Sydney LHD (LNR/16/LPOOL/203) and Western Sydney University (RH11762).

RESULTS

The PI of AHM was identified from discussions exploring how respondents viewed their roles, hierarchical level and influential power within the acute hospital setting. The construction of their PI was identified from their management career progress and the way they responded to challenges in relation to conflicts between their AHM role and PI. Various concepts related to AHM PI were identified, such as: centre of knowledge, lower hierarchical status, and construction of these identities. These were further condensed into three key themes: 1) identity as AHM, 2) motivation for becoming a manager and 3) construction of the identity. Table 3 presents the themes related to PI identified by the participants.

TABLE 3: THEMES AND SUB-THEMES OF THE MANAGERIAL CHALLENGES OF AHMS

THEMES	SUB-THEMES
Identity as allied health manager	Less influential and lower status Expectation of being the centre of knowledge Being hybrid professional manager
Motivation of becoming a manager	Opportunity Ability to make changes and be involved in decision making More enjoyment from a management than clinical role
Construction of professional identity	Positive motivation of being a manager Identity work

IDENTITY AS ALLIED HEALTH MANAGER

Similar to other medical and nursing HPMs, respondents in this study experienced role conflict. In addition, there were various factors acknowledged as being central and unique to the identity of AHMs, including the profession being less influential and holding a lower status, and the expectation of others to be the centre of knowledge.

The issue of occupational prestige remains prevalent and there is a status difference between AHPs and their medical and nursing counterparts [8]. This power difference may extend to their managerial role. All participants commented on a self-image of lower status and hierarchical position (when compared to other health managers). One respondent described AH as being:

 "at the bottom of the pile' (respondent four).

Since PI also relates to unspoken behaviour and rule [8], another respondent provided an example of how doctors and nurses often take priority over AHPs when it comes to resource allocation.

"If you have money at the end of the financial year, they will take it from you and give it to medical and nursing. That's those behaviours show you that they are the important one and they are the one to take priority over AH. (respondent six)

In addition to comparing themselves with other health service managers, respondents also described how they were viewed by other professions and stakeholders. Respondents reported that AHMs are expected to have high levels of clinical knowledge in all clinical areas:

"It can be difficult in terms of the perception that the manager needs to be a clinical expert of having clinical knowledge about all clinical areas." (respondent eleven)

This expectation creates additional stress to the AHMs, especially those with less managerial experience.

"If you try to lead something that you're not 100% knowledgeable in, you can make a huge mistake and you can lose a lot of respect. Once you lose the respect, you can't get it back." (respondent six)

Similar to other HPMs in health, various respondents also described PI role conflict. This conflict originated from the AHM holding various responsibilities with limited time and resources.

"Take into account the responsibilities for supervising staff and undertaking clinical duties. All those restrict the time for strategic work [which I am passionate about]." (respondent five)

In addition to time constraints and multiple responsibilities, respondents described an internal conflict that exists between balancing organisational priorities and responsibilities, and their passion as a clinician. One respondent also expressed experiencing ethical struggles of being a HPM.

"I take that patient-clinician hat with me wherever I go….. if you do not have a clinical role, then you probably can make those decisions [cutting services] much easier. But for me that's always my struggle." (respondent four)

Within this hybrid identity, there was a difference in how the respondents viewed their main role. Managers with greater experience as a clinician have a stronger clinician PI.

"I would see myself as a [professional S] with managerial duties." (respondent twelve)

Whereas, managers with less clinical experiences have a stronger managerial identity.

"I came into management after probably three years as a clinician. I don't have that ingrained professional identity to [professional O] compare to somebody that was [professional W] for 25 years and became a manager. " (respondent eleven)

In summary, AHMs identified being at a lower hierarchical level and being the centre of knowledge as their unique identity. They experienced role conflict and time constraints of being a HPM. AHMs with less clinical experience have a stronger managerial identity and are less attached to their clinician identity, when compared with those working up their career path over many years. These differences may be related to the motivational factors drawing them to management, which will be discussed in the next section.

MOTIVATION FACTORS

A person's identity in an organisation may change as he/she progress in their career or change roles [34]. Therefore, the AHM's motivation to become a manager will have an impact on this identity transition. Various respondents commented that progressing into management roles is a natural pathway for their career progression.

"I came into this role, kind of worked my way up in this District." (respondent two)

Some respondents deliberately chose the management path as they have an interest in being involved in high-level strategic activity and decision-making.

"At the early phase, the interesting part was a new hospital is being built ……. We were actually developing the service and working out the process; and working with people and the organisation to develop those good services." (respondent sixteen)

Other respondents, with less clinical experience, had a clear interest in management work rather than the clinical work.

"I love being with patients but also to be honest I don't want to do that all the time. I really like that non-clinical side, so I applied for the deputy position." (respondent fifteen)

In summary, there were different factors motivating respondents to follow a management pathway, including natural progression and interest in being involved high-level decision-making. Male respondents and those with less clinical experience were drawn to managerial roles because of a strong interest in management tasks. In addition to motivational factors, the way that an AHM constructs his/her managerial identity has a strong influence on how this identity is consolidated. This construction will be discussed in the next section.

CONSTRUCTION OF IDENTITY (IDENTITY WORK)

When a clinician first moves into a management role, he/she constantly compares the actual work with their initial expectation. This leads to a deeper understanding of the PI of this new role. This is referred as integrity violation [12]. Being at a low hierarchical level and status has been identified as a unique PI of AHMs. One respondent suggested this PI is a result of AHMs experiencing integrity violation in relation to power.

"I don't think AH has as much power within that organisational structure. I think we have inherited this construct of powerlessness and sometimes there's a little bit of this victim mentality." (respondent seven)

Adaptation to this integrity violation may be easier for those AHMs without a strong clinician PI.

"For me, I don't feel that I need to justify why [professional O] is so great ...... I have a more practical approach to it. I look at it from the use of resources and time factor." (respondent eleven)

When facing this lack of status in the managerial role, the respondents reported they adapt and change their 'manager' identity to suit the situation.

"Whatever influence we have to build, it's not something necessarily comes with 'I am an AH manager title'....... So I think our management position doesn't' carry an assumed level of power the way a similar medical manager would." (respondent two)

Many respondents described the method they used to consolidate their managerial identity. This included building confidence with both objective and subjective measures, such as seeking feedback and number of complaints. Others described this as a "trial and error" process. Role modeling is a common strategy described by the respondents as part of their identity learning.

"I definitely think a mentor or a support person is important.... Somebody that you aspire to be like or you really trust and value their opinion that can help support you through some challenging times." (respondent three)

In summary, the respondents accepted the AHM identity may not necessarily come with power and authority. They accepted this 'reality' and adapted their behaviour to suit the situation. The respondents also suggested the ways or strategies they use to build this identity, such as implementing subjective and objective measurement, role modeling and mentoring.

DISCUSSION

The findings of this research, including lower hierarchical level, centre of knowledge and hybrid manager, were developed through the lens of PI theory. Medical dominance over AH has been widely studied [25-27]. This hierarchical difference also exists at the managerial level. The widespread nature of AHPs practice, including varying age groups, clinical areas and settings, plays a significant part in the "centre of knowledge" identity expected of AHMs.

This research confirms the role conflict experienced by other HPMs. The majority of PI research finds HPMs experience role conflict in being both a manager and a clinician [14,19,20]. They expressed internal conflict when management work intruded on their clinical role [13,35]. However, contrasting with previous reports, respondents did not express resentment regarding managerial tasks as do medical managers, and they appear to adapt well with their new identity.

This positive adaptation to this role conflict and lower hierarchical status may indicate some respondents had a less strong AH clinician PI, especially those who transitioned to a managerial role early in their career. As Pratt et al. suggest, a new identity is constructed through violation of identity, and when violation occurs, a person will either choose identity patching (i.e. adapting to the new identity through adding to existing identity) or identity splinting (i.e. reverting back to a previous familiar identity) [12]. So, instead of reverting to their previous clinician identity, the respondents were more willing to change their expectations and adjust for the role conflict or lower hierarchical status.

In addition to the less strong AH clinician PI, the motivational factors drawn to management would also explain the positive adaption of the hybrid role. The majority of the respondents described the transition from clinician to managerial role as a mostly opportunistic and a natural progression. This is similar to findings in other studies in AH [36]. In addition, respondents also reported other positive motivating factors, such as wanting to be involved in high-level decision-making and a genuine interest in management. Two respondents (both male) were drawn to management much earlier in their career. They had established these goals and desires even two or three years after graduation. This finding is different from that for medical HPMs described in other studies. Doctors were motivated by feeling pressure from colleagues, being obligated to address a problem, preventing someone else taking on the role, or by being the oldest in the department [13,16].

Another interesting finding is related to the construction of the AHM identity through organisaitonal socialisation [37]. Some of the less experienced AHMs expressed a feeling of being unsure about their roles and apprehensive about their status. In order to fit-in within the organisation they need to understand the politics and work process, the role expectation and behavioural norm, and the power and

status structure through observation of others and mentoring. In addition to the external factors, the new managers are also required to build their self-definition or identity through socialisation. The present findings confirm the importance of social validation through feedback and role modeling [36].

This research identifies that having a clear goal and positive motivation in management progression is essential in establishing the AHM's PI. In addition, AHMs are required to accept the reality of having a lower hierarchical identity despite having a manager title. The ability to adapt and establish this identity is necessary in surviving this less-than-ideal situation while continuing to advocate for their department and patient care. This research provides key insight into what qualities a person may require to master a managerial role under the medical dominance environment. This will assist in establishing a list of characteristics which will be useful in succession planning for AHM positions.

Historically, the most senior and experienced clinician was viewed as the most suitable candidate for a management position. This research highlights that this may be different for the AH discipline. A motivated clinician with a career goal as a manager and less developed clinician PI (i.e. less clinical experience) may also be an ideal candidate. However, since AHMs are often viewed as the 'centre of knowledge' for the discipline, this may create challenges for those less experienced clinicians in gaining respect from their peers, doctors and nurses as they may not have worked in all clinical areas. Additional guidance should be provided to this group of AHMs, such as utilising support from other senior clinicians or other discipline managers.

A limitation of this research is the small number of participants (n=16). However, concept saturation was reached. Although this research was conducted in one LHD, the analysis indicates the identity described was AH specific, such as lower hierarchical status and centre of knowledge, rather than context specific. Therefore, the results are likely be transferable to other organisations. However, more research on AHM's PI are required, including the comparison with other professions.

CONCLUSION

Despite AH making up of a quarter of the healthcare workforce, there is limited research in understanding the PI

of AHMs. It is evident that AHMs adopt an identity of being less influential and having lower status than other HMs. Instead of showing resentment, they develop mechanisms to cope with this less than ideal situation. AHMs also carry the identity of being the centre of knowledge for their discipline, which is particularly challenging for new managers. With less experienced clinicians increasingly being willing and interested in stepping into managerial role, an organisation's ability and mechanisms to identify talent and provide support to build managerial capacity is essential, and strongly dependent on employing the right person at the right time. Therefore, it is important to properly investigate the unique attributes required for an AH professional to better adapt to a managerial role.

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MANAGERS OF AGED CARE RESIDENTIAL SERVICES: 2006-2016

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ABSTRACT

PURPOSE

Aged care Australia is going through a transformation reform to respond to the growing number of aged people in need of support in daily living. In this context, this article provides analyses of the number and characteristics of managers of aged care residential services in relation to number of aged people, residents of aged care facilities and people employed in them.

METHODOLOGY/DESIGN

Design of the analyses follows specifications provided by the authors for tabulations prepared by the Australian Bureau of Statistics (ABS) from the censuses of population conducted by ABS in 2006 and 2016.

ANALYSIS

Analysis of changes of the number of managers of aged care residential facilities against the number of aged people, residents of aged care facilities, and people employed in them. Further, the analyses examine changes in the age and sex of managers, their category, field and level of education, weekly income, hours worked, marital status, country of birth and indigenous status.

FINDINGS

There was a large increase in the number of employees and managers per resident, and a stable ratio of managers per employees. While the proportion of female managers declined, the average age of managers increased slightly. Both the fields and level of education remained similar in the decade. The average income of managers was similar as that in all industries in 2016, with a larger increase during the decade than in all industries. Average hours worked remained about the same. The same applied to marital status. The proportion of Australia-born managers declined while that of managers born in Asia rose substantially. The proportion of indigenous managers about doubled during the decade.

IMPLICATIONS

Relevance to those concerned with the evolving transformation of aged care in Australia and those interested with management training of the growing number of managers of aged care residential services. nalysis

KEYWORDS

health service managers, aged care residential services, health labour force, training and career path development

GROWING DEMAND FOR AGED CARE RESIDENTIAL SERVICES

Australia's population grew substantially in the decade 2006-2016, at the average rate of 1.64% per year. However, the number of people 70 years of age and older increased at the considerably greater average annual rate of 2.76%. Consequently, as older people suffer from a greater degree of disability than the average, the demand for their support is rising. The relevance of the services provided is dependent on the type and degree of disability experienced. What has been described as *transformation reform* has taken place to enhance the appropriateness of the services rendered. [3] The range of services provided

may take the form of varying degrees of support in the community, at home or in aged care residential facilities in hostels or nursing homes. The delivery of community and home support services has risen substantially reducing the need for residential care, but the number of people in aged care residential services still grew from about 154,900 in 2006 to 181,000 in 2016: an average annual rate of 1.56%. [2] [3] In this context, the number of people employed in aged care residential services rose from 128,300 in 2006 to 211,600 in 2016, an average annual rate of 5.0%, and the number of managers from 6,200 in 2006 to 10,200 in 2016, at the same rate of increase. [8] [1] The analyses in this paper are concerned with the characteristics of managers of age care residential services and changes that have taken place in the 10-year period 2006-2016, which have relevance to the organisation and management of these services and those concerned with management training.

DATA SPECIFICATIONS

The data are from the Census of Population and Housing conducted by the Australian Bureau of Statistics (ABS) in 2006 and 2016. The authors provided the specifications for the tabulations prepared by ABS. The occupation and industry classifications used by ABS were the same for the 2006 and 2016 censuses. The detail of these classifications was provided in the first article prepared by the authors on this matter. [4] The same applied to the demographic and other characteristics used by ABS. The data relate to four categories of managers: managers not further defined (M(nfd)), chief executive officers/general managers (CEO/GM), specialist and service managers. The industry of employment is Aged Care Residential Services. The specification of other variables followed ABS' coding of age, sex, marital status, field of study, level of education, country of birth, Indigenous status, individual income and hours worked. The hours worked and income related to the week before the census. For comparison purposes, the authors also requested information on health services and all industries (excluding farmers and farm managers). Other data in the analyses are from sources given by the authors. The authors followed ABS definitions of sex and gender. Sex is defined as the biological characteristics of males and females. Gender refers to psychological and social characteristics that are culturally determined from belief systems as to what masculine and feminine behaviour is or ought to be. ABS changed figures in some cells of the tabulations to avoid the unlikely identification of individuals. This resulted in small differences in the figures provided.

Nevertheless, this did not affect in a material way the results of the analyses carried out by the authors. It should be stated that although the basic data was provided by ABS in tabulations according to the authors' specifications, most of the figures and the information in the tables are the result of the authors' analyses.

CHANGE IN GROWTH

Efforts to provide services in the community and at home to the growing number of older people have resulted in a lower growth in the number of older people in aged care residential services in the period 2006-2016, while the number of people employed increased at a larger rate than the resident population in these facilities (Table 1).

Accordingly, the number of people resident in aged care residential services fell from 82.1 per thousand people aged 70 years and over in 2006 to 72.8 in 2016. The increase in the number of employees led to a reduction in the number of residents per employee from 1.207 in 2006 to 0.856 in 2016. The ratio of the number of employees per manager remained about the same (20.7 employees per manager) during that period (Table 2).

NUMBER OF MANAGERS BY CATEGORY

The *transformation reform* of aged care in general and residential services in particular led to an increase of 64.9% in the number of managers of aged care residential services that kept up with the growth in the number of people employed during the decade 2006-2016. This fast rate of growth of managers was well above the proportional increase in health services (51.5%) and about three times the average for all industries (21.8%) (Table 3).

The number of managers concerned with ancillary services such as catering, cleaning and maintenance (+68.2%), and to a lesser extent top executives (+66.1%), increased at a somewhat higher rate than the average, with specialist managers growing at the lowest rate of all managers (+63.8%) during the period 2006-2016 (Table 4).

However, the ratio of top executives (CEO/GM/Mnfd) to service and specialist managers in 2016 (8.55) remained almost the same as that in 2006 (8.50) with minor changes

in the service manager (+0.04) and the specialist manager (-0.09) ratios (Fig. 1).

SEX AND AGE OF MANAGERS

The labour force of aged care residential services was mostly female both in 2006 (87.4%) and 2016 (83.7%). Females also constituted the majority of managers in 2006 (66.2%) and 2016 (64.2%). However, there was a gap between the proportion of females in the labour force and the proportion of female managers in both years: 21.2% in 2006 and 19.5% in 2016 (Table 5).

The proportion of female managers was highest in the case of specialist managers, 74.0% and 70.9% in 2006 and 2016 respectively, and lowest in the aggregate categories of chief executive/general manager/manager not further defined: 45.1% and 49.5% respectively (Table 6).

The average age of managers of aged care residential services was 50.1 years in 2016. This was older than the average for all industries (44.6 years), and that of the older managers of health services (47.2 years). The average age in 2016 was about one year older than the average in 2006 (49.2 years), and similar to the average increment in all industries during that decade (Table 7).

On average, female managers were slightly younger (49.9 years) than males (50.5 years) in 2016. However, the proportion of males and females varied, with larger proportion of males at older ages, and greater proportion of females in middle age (Fig. 2)

Managers of aged care residential services were older in all categories than the average for all industries and health services in 2006 and 2016. As in other activities, those in the CEO/GM category were older (53.0 years) than other managers in 2016. Contrary to the experience in other activities, managers of ancillary services were older (50.7 years) on average than specialist managers (49.2 years) (Table 8).

FIELD OF STUDY OF MANAGERS

More than half of managers in aged care residential services in 2016 came from either management and commerce (28.3%) or health (25.2%) fields of study in 2016. This was similar to health services but different from the

average for all industries in the case of the health field of study (Table 9).

The fields of study of female and male managers of aged care residential services in 2016 followed the general specialisation with a greater proportion of females in the fields of study concerned with health, education, social and related fields, and a larger proportion of males from engineering, architecture, information technology and natural and physical sciences (Table 10). This was also the pattern in 2006. [6]

LEVEL OF EDUCATION OF MANAGERS

Managers of aged care residential services had a higher level of education at graduate and postgraduate level (49.0%) than the average for all industries (39.6%), but lower than in health services (61.2%) in 2016. The proportion of those at diploma/certificate level (34.4%) was about the same as the average for all industries (33.2%) and greater than the average for health services (24.6%) (Table 11). The level of education at graduate and postgraduate level in 2016 was somewhat higher than that in 2006 (44.9%) while the proportion at diploma/certificate level in 2006 (31.9%) was similar to that in 2016 (Table 11) .[6]

In 2016, the proportion of female managers of aged care residential services at graduate or postgraduate level of education (50.8%) was higher than that of males (45.8%), while males had a larger proportion at diploma/certificate level (38.5%) than females (32.1%) (Table 12).
Again, this was about the same order as that in 2006. [6]

Managers in CEO/GM positions had a higher proportion with graduate and postgraduate degrees (70.1%) compared with managers in other categories. Specialist managers had the second highest proportion (60.1%), and service managers had the lowest proportion (15.2%) at that level.   The latter had the highest proportion at diploma/certificate level (53.4%) (Table 13).

INCOME OF MANAGERS

Managers of aged care residential services had a slightly higher average weekly income ($1,903) in the week before the 2016 Census than the average for all industries ($1,894). At that rate, it would be the equivalent of an annual

income of $99,200 compared with an average of $98,800 for all industries (Table 14).

The average income of managers of aged care residential services rose by 44.6% in the decade 2006-2016. This increase was larger than that in health services (39.4%) and the average for all industries (41.2%) (Table 15).

Managers in the CEO/GM category earned 57.5% more than the average income of all managers of aged care residential services in 2016. Specialist managers earned 6.5% more while ancillary service managers 35.7% less than average in that year. Female managers earned less than males in all categories: 16.6% less on average (Table 16).

HOURS WORKED BY MANAGERS

On average, managers of aged care residential services worked 43.6 hours the week before the 2016 census. This was close to the average hours worked one decade earlier in 2006 (43.3 hours). It was 2.4 hours less than the average for all industries (46.0 hours) in 2016 but one hour more than the average for health services (42.6 hours) (Table 17).

CEOs/GMs of aged care residential services worked on average 6.9 hours more than the average of all managers in 2016. Specialist managers worked about one hour longer and managers of ancillary services 5 hours less than the average. On average, male managers worked (45.0 hours) or about two hours longer per week than females (42.9 hours) (Table 18).

The lower average hours worked by female managers was partly due to the higher proportion of females working part-time (less than 35 hours per week). When the hours worked by full-time managers (working 35 hours or more per week) were assessed, the average difference in hours worked by female and male managers was reduced to 0.4 hours per week (Table 19).

MARITAL STATUS OF MANAGERS

Most managers of aged care residential services in 2016 were married (64.7%). This is close to the average in health services and all industries. The proportion of divorced or separated (18.6%) was higher than that in health services (13.9%) and in all industries (11.2%), while the proportion of never married (14.7%) was lower than in health services (19.1%) and in all industries (24.0%) (Table 20).

However, managers of aged care residential services are much older than the average (Table 7) and marital status is associated with age. Nevertheless, when marital status was standardised for sex and age using all industries as the standard, it showed that the number of actual managers who were divorced or separated was greater than expected given the sex and age distribution, while the number married was close to that expected, and the number of those never married and widowed was less than expected. This was similar to the situation in 2006. [7]

COUNTRY OF BIRTH OF MANAGERS

The country of birth of managers of aged care residential services in 2016 was similar to the average for all industries. As would be expected, most were born in Australia (68.9%), about the same proportion as that in all industries (68.7%). This proportion was a drop from the proportion born in Australia at the time of the 2006 census (73.5%). Other major changes were the lower proportion of mangers born in European countries outside the United Kingdom and Ireland that fell from 9.4% in 2006 to 3.6% in 2016, and the increase in those born elsewhere, mostly in Asia, from 2.6% in 2006 to 12.6% in 2016. The proportion born in the United Kingdom and Ireland remained about the same (10.6% and 10.5% in 2006 and 2016) (Table 21).

INDIGENOUS STATUS OF MANAGERS

The proportion of managers in aged care residential services who declared to have indigenous status was 1.1% in 2016. This was higher than the average for all industries (0.9%) but lower than the average in health services (1.7%) (Table 22). Nevertheless, it was almost double the proportion in 2006 (0.6%). [7]

TRANSFORMATION REFORM

Aged care went through substantial changes during the decade 2006-2016 with a greater emphasis on the support of aged people in the community and their own homes. There was also an effort to improve the quality of aged care residential services that was reflected in the larger growth of people employed than the increase in the number of residents of these facilities.

It resulted in a significant change in the ratio of residents per employee from 1.21 in 2006 to 0.86 in 2016. This was accompanied by the growth in the number of managers at a similar rate as that of employees (average annual rate of increase of 5%). Accordingly, the number of managers rose by about 65% in the ten-year period to reach 10,200 in 2016. This was much greater than the proportional increase in health services and the average for all industries. The ratio of GEO/GM to specialist mangers of 1:6.1 and to service managers of 1:2.5 remained about the same during the decade.

Most managers of aged care residential services were female both in 2006 and 2016 (62% and 64% respectively). However, the gap between the proportion of female employees and the proportion of managers in aged care residential services continued: 21% in 2006 and 20% in 2016. This gap was higher at the CEO/GM/M(nfd) category (34%) than in the specialist manager category (13%) and that of service manager (29%) in 2016.

Managers of aged care residential services in 2016 were considerably older with an average age of 50 years than those in health services (47 years) and the average for all industries (45 years). The increase of about one year in their average age since 2006 was about the same as the rise in the average age of managers in health services and in all industries. CEOs/GMs were three years older than the average of all managers of aged care residential services in 2016. This was similar to health services and in all industries. But it represented a substantial increase during the decade since 2006.

The fields of study of managers of aged care residential services in 2016 were substantially different from that for all industries but close to those of managers in health services, with an emphasis on management and commerce (28%), health (25%) and social and related fields (14%). There was a difference between female and male managers that reflected conventional specialisation of females and males, with female specialising in health and social and related fields of study and males in engineering, architecture and building, and information technology. The level of education of managers of aged care residential services was substantially higher (49% at graduate and postgraduate level) than the average for all industries (40%), but lower than that in health services (61%) in 2016. Female managers had a higher level of education (51% at graduate and postgraduate level) than males

(46%) in 2016 with males having a higher proportion at diploma/certificate level (39%) than females (32%). Those in the CEO/GM category had a considerable higher proportion at graduate and postgraduate level (70%) than the average (49%), and specialist (60%) and ancillary service (15%) managers. The latter had predominately diploma/certificate qualifications (53%) in 2016.

In association with their lower average level of education than those in health services, aged care residential services earned less ($1,903) per week than those in health services ($2,089), and close to the average for all industries ($1,894) in 2016. During the decade 2006-2016, the increase in their income (45%) was higher than that of health service managers (39%) and the average for all industries (41%). There was gap between the average income of female managers and that of males of 17% in 2016. This was most pronounced in the cases of the small group of managers (nfd) (-27%) and the more numerous specialist managers (-23%).

Part of this difference was due to the higher proportion of female managers who worked part-time (less that 35 hours per week), as female managers worked on average 43 hours per week and males 45. The difference between the number of hours worked by female and male managers declined to less than one hour (-0.4) on average when managers working full-time (35 hours or more) were considered. CEOs/GMs worked substantially longer hours (+7 hours per week) than the average for all managers (45 hours per week) in 2016, while ancillary service managers worked less hours than the average (-4 hours per week).

The marital status of aged care residential services was considerably different from that in health services and especially the average for all industries. Some of this difference could be attributed to their average age. However, when the marital status was standardised for sex and age distribution, using all industries as the standard, the actual number of divorced/separated and widowed was much higher than expected and the actual number of never married lower than expected.
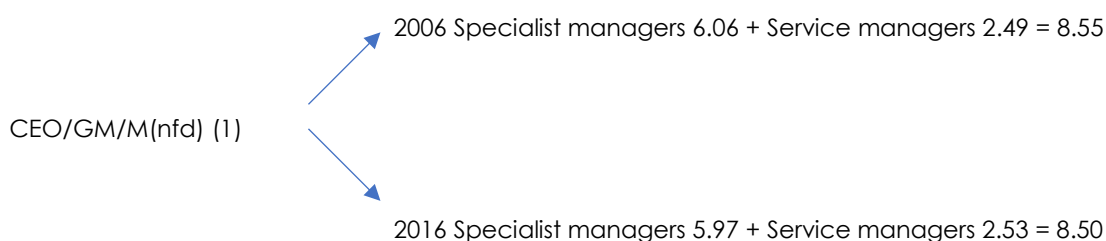
There were changes in the country of birth of managers of aged care residential services comparable with those in health services and the average for all industries during the decade 2006-2016. These reflected the increasing proportion of people in Australia born Overseas and change in the origin of migrants. Consequently, the proportion of managers in aged care residential services

born in Australia declined from 74% in 2006 to 69% in 2016. The proportion born in the United Kingdom and Ireland remained about the same (11%), but that of those born in other European countries fell from 9% in 2006 to 4% in 2016, as migrants from earlier migration from those countries retired. As the origin of migrants from non-European, mostly Asia, increased their proportion of managers rose from 3% in 2006 to 13% in 2016.

Another important change was the almost doubling in the proportion of managers with indigenous status from 0.6% in 2006 to 1.1% in 2016.

These findings add to the understanding of the changes that have and are still taking place in aged care residential services, their organisation and who manages them. They also suggest an agenda for research from other sources, regarding the relevance of academic training of managers of aged care residential services, and their continuing education, aimed at improving the competence of these managers in enhancing the quality and effectiveness of these services for the fast growing population of aged people in Australia.

FIGURE 1: SPECIALIST AND SERVICE MANAGERS PER GENERAL MANAGER, AGED CARE RESIDENTIAL SERVICES, AUSTRALIA, 2006 AND 2016

2006 Specialist managers 6.06 + Service managers 2.49 = 8.55

CEO/GM/M(nfd) (1)

2016 Specialist managers 5.97 + Service managers 2.53 = 8.50

Source: Table 4. Source: ABS (2017).

Fig.2 Age distribution of managers, aged care reidential services by sex, Australia, 2016
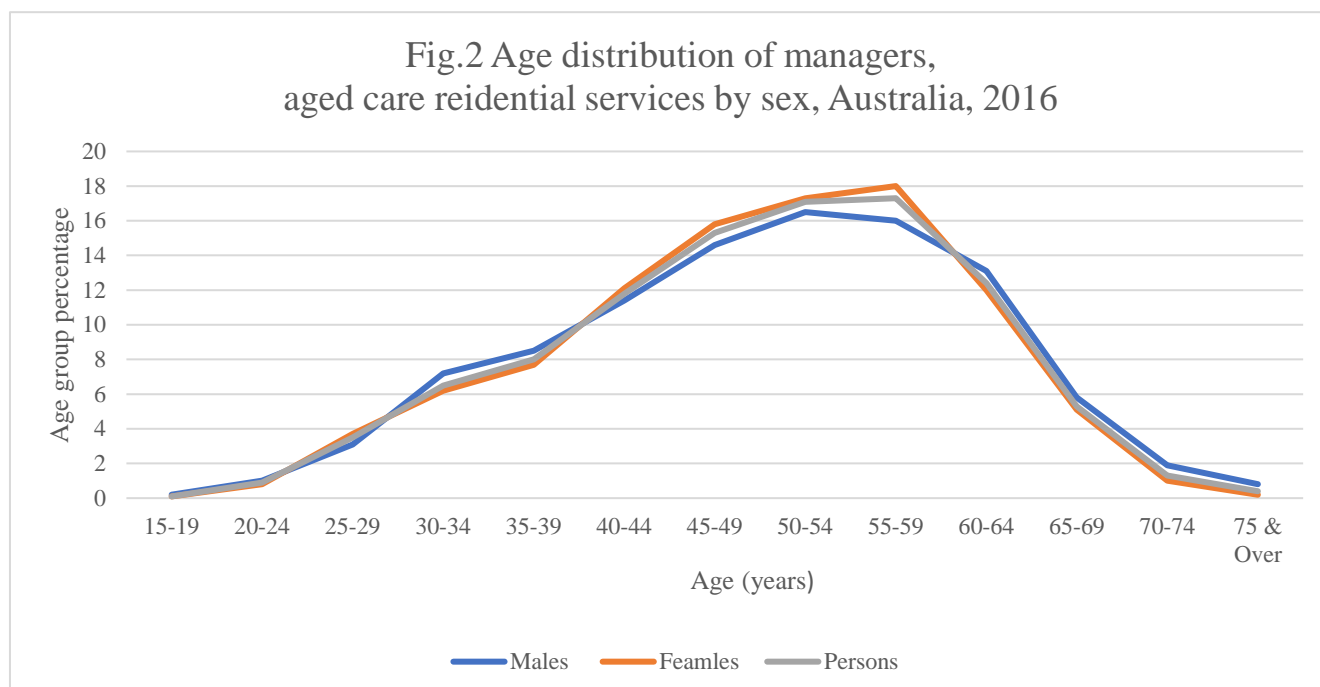
TABLE 1: AGED CARE RESIDENTIAL SERVICES TARGET POPULATION, RESIDENTS, PEOPLE EMPLOYED AND MANAGERS, AUSTRALIA, 2006 AND 2016

TARGET POPULATION, RESIDENTS, EMPLOYEES & MANAGERS	NUMBER		AVERAGE ANNUAL GROWTH %
	2006	2016	
Population 70 years of age and over	1,887,000	2,487,800	2.76
Residents of aged care residential facilities	154,900	181,000	1.56
People employed by aged care residential services	128,300	211,600	5.00
Managers of aged care residential services	6,200	10,200	5.01

Sources: Martins & Isouard (2014); ABS (2017).

TABLE 2: AGED CARE RESIDENTIAL SERVICES RESIDENTS PER TARGET POPULATION, RESIDENTS, EMPLOYEE AND MANAGERS, AND EMPLOYEES PER MANAGERS, AUSTRALIA, 2006 AND 2016

RATIOS	2006	2016	INCREASE 2006-2016 %
Number of residents per 1,000 people >69 years of age	82.1	72.8	-11.4
Number of residents per employee	1.207	0.856	-29.1
Number of residents per manager	25.0	17.0	-29.2
Number of employees per manager	20.7	20.7	-

Sources: Martins & Isouard (2014); ABS (2017).

TABLE 3: MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2006 AND 2016

MANAGER PLACE OF EMPLOYMENT	NO. OF MANAGERS (000S)		INCREASE 2006-2016 %
	2006	2016	
Aged care residential services	6.2	10.2	65.0
Health services	19.4	29.4	51.5
All industries	1,025.4	1,248.6	21.8

Sources: Martins & Isouard (2014); ABS (2017).

TABLE 4: MANAGERS IN AGED CARE RESIDENTIAL SERVICES PER CATEGORY, AUSTRALIA, 2006 AND 2016

MANAGER CATEGORY	NO. OF MANAGERS		INCREASE 2006-2016 %
	2006	2016	
CEO/GM	526	972	84.8
Managers (nfd)	123	106	-13.8
Sub-total	649	1,078	66.1
Specialist managers	3,932	6,432	63.6
Service managers	1,619	2,723	68.2
All	6,200	10,233	65.0

Note: (CEO/GM) chief executive officers and general managers; (Managers nfd) managers not further defined; (Specialist managers) managers who perform specialist functions such as finance, human resources, information technology, medical and other clinical services, nursing and allied services; (Service managers) managers concerned with catering, cleaning, maintenance and other ancillary services.

Sources: Martins & Isouard (2014); ABS (2017).

TABLE 5: AGED CARE RESIDENTIAL SERVICES PROPORTION OF FEMALE EMPLOYEES AND MANAGERS, AUSTRALIA, 2006 AND 2016

YEAR	FEMALE %		% GAP MANAGERS-EMPLOYEES
	EMPLOYEES	MANAGERS	
2006	87.4	66.2	-21.2
2016	83.7	64.2	-19.5

Sources: Martins & Isouard (2014); ABS (2017).

TABLE 6: AGED CARE RESIDENTIAL SERVICES PROPORTION OF FEMALE MANAGERS BY CATEGORY, AUSTRALIA, 2006 AND 2016

MANAGER CATEGORY	FEMALE %		2016 % GAP
	2006	2016	MANAGERS-EMPLOYEES
CEO/GM	42.6	48.3	-35.4
Managers (nfd)	56.1	61.3	-22.4
	45.1	49.5	-34.2
Specialist managers	74.0	70.9	-12.8
Service managers	55.7	54.4	-29.3
All	66.2	64.2	-19.5

Note: (CEO/GM) chief executive officers and general managers; (Managers nfd) managers not further defined.
Sources: Martins & Isouard (2014); ABS (2017).

TABLE 7: AVERAGE AGE OF AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2006 AND 2016

MEASURES OF CENTRAL TENDENCY	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
2016			
Average age (years)	50.1	47.2	44.6
Median age (years)	51.1	47.6	44.5
Standard deviation (years)	11.1	10.9	12.0
Coefficient of variation	0.22	0.23	0.27
2006			
Average age (years)	49.2	46.0	43.5
Median age (years)	50.1	46.6	43.5
Standard deviation (years)	10.0	10.0	11.6
Coefficient of variation	0.20	0.22	0.27

Sources: Martins & Isouard (2012b); ABS (2017).

TABLE 8: AVERAGE AGE OF AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES BY CATEGORY, AUSTRALIA, 2006 AND 2016

MANAGER CATEGORY	AGE (YEARS)		
	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
2016			
CE0/GM	53.0	49.8	49.1
Manager (nfd)	49.3	48.0	47.3
Specialist	49.2	47.0	44.8
Service	50.7	45.7	42.9
All	50.1	47.2	44.6
2006			
CE0/GM	50.6	47.8	47.4
Manager (nfd)	53.1	47.4	47.2
Specialist	49.5	45.7	43.5
Service	48.8	45.4	41.9
All	49.2	46.0	43.5

Note: (CEO/GM) chief executive officers and general managers; (Managers nfd) managers not further defined;
Sources: Martins & Isouard (2012b); ABS (2017).

TABLE 10: FIELD OF STUDY OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES BY SEX, AUSTRALIA, 2016

FIELD OF STUDY	%		
	FEMALE	MALE	PERSONS
Management & commerce	25.6	33.2	28.3
Health	34.5	8.5	25.2
Social & related fields	15.7	9.6	13.5
Food & hospitality	3.5	5.5	4.2
Engineering	0.4	11.0	4.2
Architecture & building	0.3	8.3	3.1
Education	2.7	1.7	2.4
Information technology	0.3	3.6	1.5
Natural & physical sciences	0.5	1.2	0.8
Other*	16.3	17.5	16.7
All	100.0	100.0	100.0

Note: (*) Other includes managers whose field of study was inadequately described, not stated or without a field of study (in relation to post-school qualifications). Figures may not add up due to rounding.
Source: ABS (2017).

TABLE 9: FIELD OF STUDY OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2016

FIELD OF STUDY	%		
	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
Management & commerce	28.3	29.3	26.8
Health	25.2	28.4	3.2
Social & related fields	13.5	10.7	10.5
Food & hospitality	4.2	1.7	3.3
Engineering	4.2	3.7	11.5
Architecture & building	3.1	0.9	5.7
Education	2.4	2.4	4.1
Information technology	1.5	2.7	3.5
Natural & physical sciences	0.8	5.2	2.7
Other*	16.7	15.1	28.7
All	100.0	100.0	100.0
Relative difference index	53.4	50.9	Standard

Note: The relative difference index = [∑ | {(aᵢ/bᵢ)*100}-100 |] / (2*n); (aᵢ) is the proportion of managers with field of study (i) in given service; (bᵢ) is the proportion of managers with field of study (i) in all industries; (n) is the number of fields of study. (*) Other includes managers whose field of study was inadequately described, not stated or without a field of study (in relation to post-school qualifications). Figures may not add up due to rounding.
Source: ABS (2017).

TABLE 11: LEVEL OF EDUCATION OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2016

LEVEL OF EDUCATION	%		
	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
Postgraduate	18.4	29.4	14.2
Bachelor degree	30.6	31.8	25.4
Graduate subtotal	49.0	61.2	39.6
Diploma/certificate	34.4	24.6	33.2
Other*	16.6	14.2	27.1
All	100.0	100.0	100.0
Relative difference index	11.6	36.5	Standard

Note: (*) Other includes managers whose field of study was inadequately described, not stated or without a post-school qualifications. Figures may not add up due to rounding. The relative difference index = [∑ | {(aᵢ/bᵢ)*100}-100 |] / (2*n); (aᵢ) is the proportion of managers with level of education (i) in given service; (bᵢ) is the proportion of managers with level of education (i) in all industries; (n) is the number of levels of study.
Source: ABS (2017).

TABLE 12: LEVEL OF EDUCATION OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES BY SEX, AUSTRALIA, 2016

	%		
LEVEL OF EDUCATION	**FEMALES**	**MALES**	**PERSONS**
Postgraduate	18.2	18.7	18.4
Bachelor degree	32.6	27.0	30.6
Graduate subtotal	50.8	45.8	49.0
Diploma/certificate	32.1	38.5	34.4
Other*	17.1	15.7	16.6
All	100.0	100.0	100.0

Note: (*) Other includes managers whose field of study was inadequately described, not stated or without a post-school qualifications. Figures may not add up due to rounding.

Source: ABS (2017).

TABLE 13: LEVEL OF EDUCATION OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES BY CATEGORY, AUSTRALIA, 2016

	%				
LEVEL OF EDUCATION	**CEO/GM**	**M(NFD)**	**SPECIALIST**	**SERVICE**	**ALL**
Postgraduate	33.4	20.8	21.9	4.6	18.4
Bachelor degree	36.6	30.2	38.2	10.6	30.6
Graduate subtotal	70.1	50.9	60.1	15.2	49.0
Diploma/certificate	17.6	27.4	29.0	53.4	34.4
Other*	12.3	21.7	10.9	31.4	16.6
All	100.0	100.0	100.0	100.0	100.0

Note: (*) Other includes managers whose field of study was inadequately described, not stated or without a post-school qualifications. (CEO/GM) are chief executive officers and general managers; (Mnfd) are managers not further defined. Figures may not add up due to rounding.

Source: ABS (2017).

TABLE 14: AVERAGE WEEKLY INCOME OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2016

MEASURES OF CENTRAL TENDENCY	**AGED CARE RESIDENTIAL SERVICES**	**HEALTH SERVICES**	**ALL INDUSTRIES**
Average weekly income ($)	1,903	2,089	1,894
Median weekly income ($)	1,676	1,865	1,589
Standard deviation ($)	1,046	1,077	1,185
Coefficient of variation	0.55	0.52	0.63

Note: The average weekly income refers gross weekly income the week before the census. The figures exclude managers who did not state their weekly income (1.1%).

Source: ABS (2017).

TABLE 15: AVERAGE WEEKLY INCOME OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2006 AND 2016

YEAR	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
2016 Average weekly income ($)	1,903	2,089	1,894
2006 Average weekly income ($)	1,316	1,499	1,341
% increase 2006-2016	44.6	39.4	41.2

Note: The average weekly income refers gross weekly income the week before the census. The figures exclude managers who did not state their weekly income in 2016 and 2006 about 1% in the case of aged care residential services and health services and 1.5% in all industries.
Sources: Martins & Isouard (2012c); ABS (2017).

TABLE 16: AVERAGE WEEKLY INCOME AGED CARE RESIDENTIAL MANAGERS BY SEX AND CATEGORY, AUSTRALIA, 2016

MANAGER CATEGORY	AVERAGE WEEKLY INCOME ($)			FEMALE % BELOW MALE
	FEMALE	MALE	PERSONS	
CEO/GM	2,747	3,212	2,997	-16.9
Managers (nfd)	1,949	2,472	2,056	-26.8
Specialist managers	1,907	2,349	2,027	-23.2
Service managers	1,154	1,287	1,223	-11.5
All	1,799	2,098	1,903	-16.6
CEO/GM % above average	+52.7	+53.1	+57.5	

Note: The average weekly income refers gross weekly income the week before the census. The figures exclude managers who did not state their weekly income (1.1%). (CEO/GM) are chief executive officers and general managers; (Managers nfd) are managers not further defined.
Source: ABS (2017).

TABLE 17: AVERAGE WEEKLY HOURS WORKED BY MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2016 AND 2006

MEASURES OF CENTRAL TENDENCY	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
2016			
Average weekly hours worked	43.6	42.6	46.0
Median weekly hours worked	40.2	40.4	40.8
Standard deviation (hours)	16.6	17.1	17.8
Coefficient of variation	0.38	0.40	0.41
2006			
Average weekly hours worked	43.3	41.9	46.9
Median weekly hours worked	39.8	39.7	43.6
Standard deviation (hours)	16.1	17.8	19.6
Coefficient of variation	0.42	0.42	0.42
2016-2006			
% difference of average	+0.7	+0.7	-0.9

Note: The average weekly hours worked refers to the hours worked the week before the census. The figures exclude managers who did not state the number of hours worked: aged care residential services 0.4%, 0.5% in health services and 0.9% in all industries in 2016; 1.2% in aged care residential services, 1.1%in health services, 1.7% in all industries in 2006.

Source: Martins & Isouard (2012d); ABS (2017).

TABLE 18: AVERAGE WEEKLY HOURS WORKED BY AGED CARE RESIDENTIAL MANAGERS BY SEX AND CATEGORY, AUSTRALIA, 2016

MANAGER CATEGORY	AVERAGE WEEKLY HOURS WORKED			FEMALE BELOW/ABOVE MALE HOURS
	FEMALE	MALE	PERSONS	
CEO/GM	49.1	51.7	50.5	-2.6
Managers (nfd)	48.4	39.7	44.8	+8.7
Specialist managers	43.8	46.8	44.7	-3.0
Service managers	37.8	39.7	38.7	-1.9
All	42.9	45.0	43.6	-2.1

Note: The average weekly hours worked refers to the hours worked the week before the census. The figures exclude managers who did not state the number of hours worked (0.4%). (CEO/GM) are chief executive officers and general managers; (Managers nfd) are managers not further defined.

Source: Martins & Isouard (2012d); ABS (2017).

TABLE 19: AVERAGE WEEKLY HOURS WORKED BY FULL-TIME MANAGERS OF AGED CARE RESIDENTIAL BY SEX AND CATEGORY, AUSTRALIA, 2016

MANAGER CATEGORY	AVERAGE WEEKLY HOURS WORKED			FEMALE BELOW/ABOVE MALE HOURS
	FEMALE	MALE	PERSONS	
CEO/GM	53.9	55.8	54.9	-1.9
Managers (nfd)	48.4	45.4	47.3	+3.0
Specialist managers	48.2	49.4	48.6	-1.2
Service managers	45.4	43.8	44.6	+1.6
All	48.1	48.5	48.2	-0.4

Note: Full-time managers are those who worked 35 hours or more the week before the census. The figures exclude managers who did not state the number of hours worked (0.4%). (CEO/GM) are chief executive officers and general managers; (Managers nfd) are managers not further defined.

Source: Martins & Isouard (2012d); ABS (2017).

TABLE 20: MARITAL STATUS OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2016

MARITAL STATUS	%		
	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
Never married	14.7	19.1	24.0
Married	64.7	65.9	63.9
Divorced/separated	18.6	13.9	11.2
Widowed	2.0	1.1	0.9
All	100.0	100.0	100.0

Source: ABS (2017).

TABLE 21: COUNTRY OF BIRTH OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2006 AND 2016

COUNTRY OF BIRTH	%		
	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
2016			
Australia	68.9	69.7	68.7
New Zealand and Oceania	4.4	3.7	3.8
United Kingdom & Ireland	10.5	9.7	7.7
Other Europe	3.6	2.9	3.8
Other	12.6	14.0	16.0
2016 All	100.0	100.0	100.0
2006			
Australia	73.5	74.3	73.2
New Zealand and Oceania	3.9	3.0	3.5
United Kingdom & Ireland	10.6	10.7	8.4
Other Europe	9.4	8.4	10.9
Other	2.6	3.6	4.1
2006 All	100.0	100.0	100.0

Source: Martins & Isouard (2012d); ABS (2017).

TABLE 22: INDIGENOUS STATUS OF MANAGERS IN AGED CARE RESIDENTIAL SERVICES, HEALTH SERVICES AND ALL INDUSTRIES, AUSTRALIA, 2016

INDIGENOUS STATUS	%		
	AGED CARE RESIDENTIAL SERVICES	HEALTH SERVICES	ALL INDUSTRIES
Indigenous	1.1	1.7	0.9
Non-indigenous	98.9	98.3	99.1
All	100.0	100.0	100.0

Note: The proportion of people who did not state their indigenous status was 0.4% in all activities.
Source: ABS (2017).

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THE PURSUIT OF PURPOSEFUL PARTNERSHIPS-MAKING A HEALTH MATRIX SUCCESSFUL

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ABSTRACT

OBJECTIVE:

To analyse a matrix model of management to optimize the partnerships, collaboration and interaction between vertical management structures (services and geographical clusters) and horizontal clinical structures (Clinical Networks and Streams) in a large Local Health District [LHD] in New South Wales, Australia.

APPROACH:

An 'Action Research' approach utilising a maturity tool, the Collaboration Rubric®, an evidence-based model for Network analysis. The rubric describes four types of collaboration and defines the three essential drivers that allow successful collaborations.

OUTCOMES:

Benchmarking comparisons indicate that this LHD is operating at a level well above base level for the three drivers that enable collaboration [capacity, authority and shared value]. The professional relationship between Clinical Networks/ Streams and Operational Managers, is the main barrier to improving collaboration. The Operational Managers have clear positional authority related to the organisational structure and are accountable to their Executive for good governance and financial management. Clinical leaders hold substantial influential power derived from their professional authority.

The following actions have been identified to improve collaboration.

- Ensure all leaders actively "manage for collaboration"

- Executive fosters joint innovation projects characterised by collaborative practice between the Clinical Networks/Streams and Operational Managers.

- Ensure leadership accountabilities are held as close as possible to any projects (locally) involving reform or innovation

- Clinical Network/Streams' operational plans are jointly agreed with local management and signed off by Executive

- LHD recruit leadership with skills in managing for collaboration

CONCLUSIONS:

This evaluation supports the use an Action Research approach using the Collaboration Rubric® as a useful tool to define not only the type of collaboration required but the key drivers that must be addressed to facilitate improved [horizontal and vertical] partnerships leading to better outcomes. This local health district will build improved collaboration utilising the insights gained from this analysis.

KEYWORDS

Clinical Networks, Collaboration rubric, Matrix structure, Partnerships

INTRODUCTION

The Local Health District (LHD) developed and implemented the Clinical Networks Program (CNP) in 2007 as a key priority for ensuring clinician engagement in the strategic planning and performance of health care across the region.

Over the past ten years the organisation has conducted several evaluations to guide the development of the CNP. These reviews have focussed on how the Clinical Networks are formed and understanding the factors that make Clinical Networks successful. [1] This knowledge allowed

the development of strong and effective Clinical Networks whose role in the LHD is now unquestioned but leaves open the opportunity to undertake further research to translate the learnings into practice

The development of the Clinical Networks Program has seen the LHD develop a Matrix organisational structure. This paper describes a review of the CNP and how this operates in the matrix model of management, with the goal being to optimise interaction between the vertical management structures (services and geographical clusters) and the horizontal clinical structures (Clinical Networks and Streams).

BACKGROUND

This LHD was formed in 2005 from the merger of three smaller health services. This health service is responsible for services across more than 120 sites, from small rural community health centres to major tertiary referral hospitals. With over 16,000 staff and an expenditure budget of 2 billion AUD per annum, it provides services to a population of more than 900,000 people across an area of 130,000 square kilometres.

Due to the size and range of services within the health service, the Executive, identified the development of Clinical Networks as a key strategy to engage clinicians in decision making and planning for the health service. This is conceptualised as a matrix organisational structure. In this structure, reporting relationships comprise a grid, rather than clustering employees exclusively in terms of function (i.e., by department). The matrix structure allows employees to form additional groups around areas of expertise or goals (Diagram 1). Advantages of this structure include increased information flow across boundaries, deeper development of expertise and knowledge, and greater flexibility and responsiveness. To ensure these benefits are attained challenges must be actively managed. Typical challenges are misaligned goals, conflicting loyalties, confusion about roles and responsibilities, and delayed decisions due to shared decision making with lack of clarity on accountability or delegated authority. If these are successfully addressed the organisation greatly benefits from a richer resource base of expertise and experience. [2]

Previous Evaluation of the programs (2009-2010) have articulated nine core success factors required to develop

successful Networks [1], which have been monitored and optimised on a regular basis. While the internal functioning of the networks has been enhanced with alignment to the nine success factors, challenges for effective functioning, within the matrix, are evidenced by ongoing leadership and resourcing tensions, lack of clarity in regard to accountability/delegated authority and communication across the organization. If these factors are not addressed partnerships within the matrix may be driven by the "suppression of mutual loathing in the pursuit of ...... funding". [3]

A review of the literature [3-9] identified that Clinical Networks rely on effective collaboration through partnerships to produce sustainable outcomes. Collaboration should not only be seen as an ideal but as a basic design element to improve public services. [3] Currie et al [10] supported this and highlighted the importance of "Brokering" where interventions that mediate interprofessional and intraprofessional hierarchy and utilise social mechanisms are essential for service improvement.

This analysis aimed to identify ways in which this LHDs matrix model of management might best operate including the interaction between the vertical management structures (services and geographical clusters) and the horizontal clinical structures (Clinical Networks and Streams). A particular focus of the analysis is to improve collaboration through partnerships that improve patient experience and outcomes.

DIAGRAM 1   LHD MATRIX ORGANISATIONAL STRUCTURE
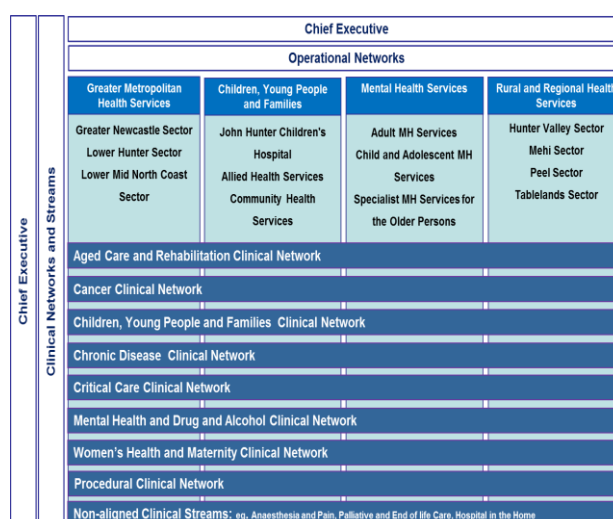
APPROACH

An 'Action Research' approach was chosen for this analysis. 'Action Research' and 'Action Learning' refer to a group of research methodologies which pursue both change (action) and understanding (research), simultaneously. [11] These approaches, which focus on cyclical models of planning, acting, observing, reflecting and planning again, are particularly well suited to health contexts, in which practitioners are typically reflective about their work and keen to improve practice as quickly as possible.

A review of the literature identified the Collaboration Rubric®, as an evidence-based maturity tool, developed over time in Australia to enhance collaboration and partnerships across a range of Human Services Contexts. [12, 13, 14, 15, 16, 17] Through research and working with many organisations and sectors an action learning framework was developed which allows point in time evaluation data while at the same time encourages network leaders to take responsibility for improving the commitment, operational capacity and the public value of their partnerships at both a clinical and management level.

The Rubric® draws on well-established theories of change [18; 19], key concepts in the broad collaboration literature [20, 21, 22] and the extensive practice experience of the developers in human service settings.

The Rubric® is based on two central features: four Collaboration "types" (Diagram 2) which increase in complexity; and three essential drivers for sustaining and building these four types of collaboration (Diagram 3)

The three essential drivers are:
1. Capacity - time, skills and resources - (the Capacity) to work together.
2. Authority - a shared commitment across leaders and key stakeholders (an Authorising Environment) that allows partnerships to develop.
3. Shared value- a shared understanding of what can be achieved together and how this will be measured (the Shared Value of the Partnership)

As the following diagram illustrates, within these 3 drivers are 15 key enablers
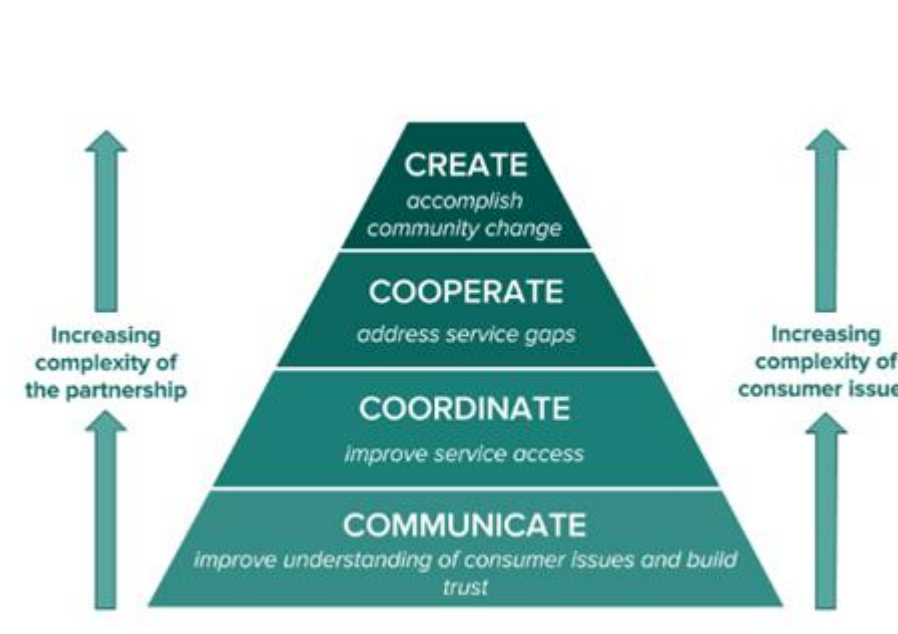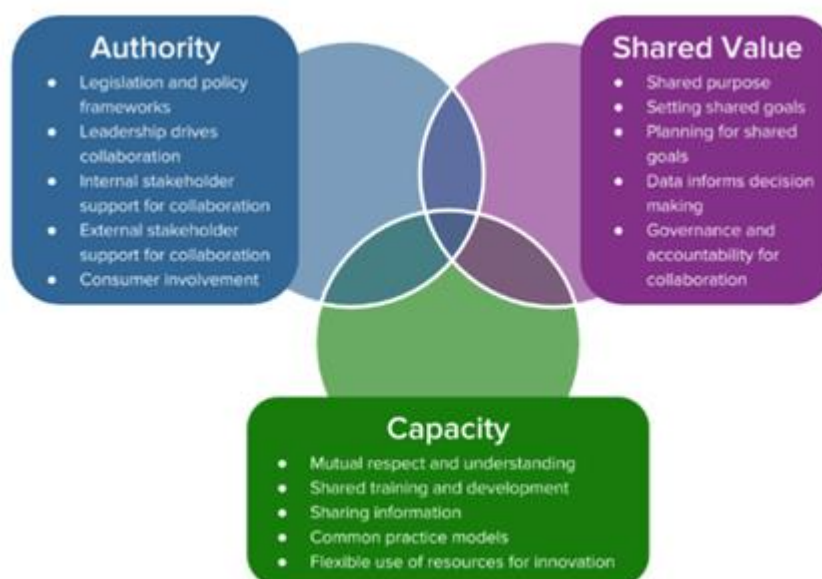
DIAGRAM 2 TYPES OF COLLABORATION

DIAGRAM 3 THREE DRIVERS OF COLLABORATION

METHODOLOGY

An expert reference group was commissioned to oversee the conduct of this analysis consisting of external academics, organisational leaders and researchers. Given the complexity of the project the organisation engaged the developers of the Collaboration Rubric® as consultants to provide additional design experience to ensure a comprehensive approach to the matrix. A mixed method approach using two main sources of data collection was employed:

- A survey containing both closed and open questions
- Two case studies using semi structured interviews

The survey focused on two aspects of collaboration; partnerships within the Clinical Networks and Streams and partnerships between the Networks and Streams and the Operational Managers.

Two case studies were identified as providing the opportunity to add depth to the analysis. Data was collected through 12 one-hour interviews with 16 participants who responded to a lightly structured set of questions about the achievements, enablers, barriers and priorities of the CNP. The interviews were conducted on a face- to- face basis and via videoconference. The case studies were transcribed and coded in the same way as the open-ended survey questions. Given the substantial scope of the project, and although the case studies contributed to the findings, those results are not discussed in detail in this paper. These will be the subject of a subsequent publication.

FINDINGS AND ANALYSIS

The survey was sent to 955 people of whom 550 responded. Three hundred and twenty comments from the survey were analysed using the Rubric® as a coding framework. Each comment was aligned to one of the drivers of collaboration (Shared Value, Authority, Capacity), then further coded, each into one of the 15 enablers which most closely matched its meaning.

Initial benchmarking was undertaken by the consultants comparing this LHD to another organisation where the "Base" figures are the initial assessments of that organisation and the "Advanced" figures are the results of the survey after intervention to address issues identified by the first survey. The Chart indicates that this LHD is operating at a level well above Base level.

FUNCTIONING OF THE CLINICAL NETWORKS AND STREAMS AS COLLABORATIVE PARTNERSHIPS

The survey responses indicated that the fundamental aspects of the three Collaboration Rubric® drivers were well established. The statements which were most strongly endorsed by all respondents are those related to the Network/Streams' role in improving practice, sharing information and promoting multidisciplinary approaches. Respondents indicate that Network/Stream members believe that it is important to collaborate with staff from other professions to solve problems and that strong informal networks exist between staff across the Clinical Network/Stream. In the driver of Shared Value, statements which received the strongest endorsement were those relating to the Network/Streams' understanding of their role

in delivering high-value healthcare and whether they have a shared operational plan to achieve their agreed purposes.

These statements indicate a strong foundation is in place for the Clinical Networks/Streams and the practices of these Clinical Networks/Streams are consistent. Review of the survey data and case studies identified a number of areas should be developed to improve the functioning of the Clinical Networks/Streams, these included Strategic use of data, ensuring they have the right partners to achieve goals, including consumers as partners and ensuring there are committed resources to specifically support the coordination of the Clinical Networks/Streams

DIAGRAM 4 BENCHMARK COMPARISONS
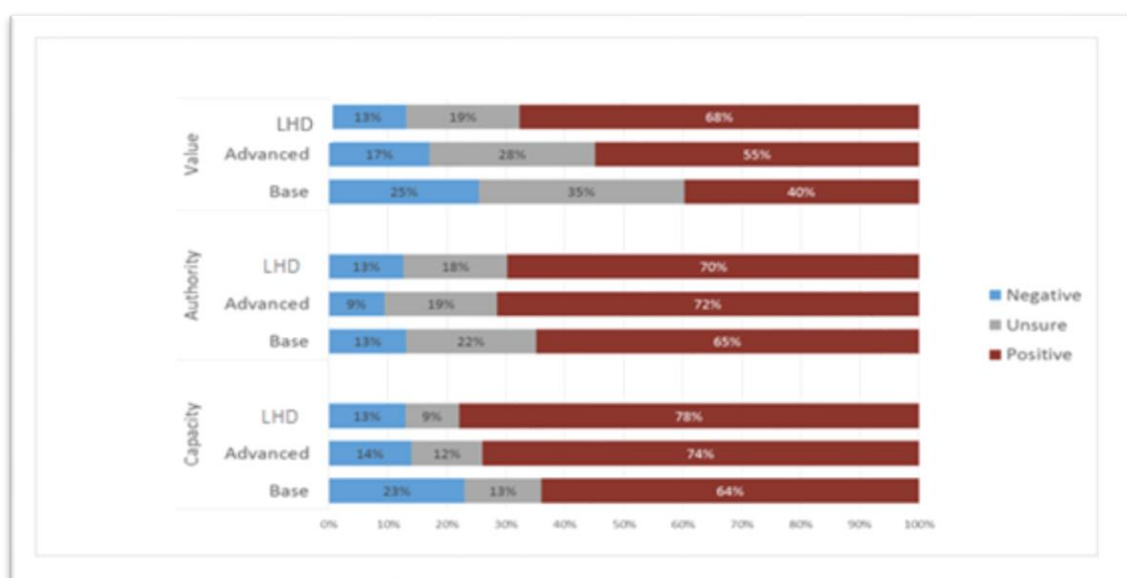
THE RELATIONSHIPS BETWEEN CLINICAL NETWORKS/STREAMS AND OPERATIONAL MANAGERS

The result of the survey was analysed utilising three groups of staff: those who only had a role in a clinical network, those who only had an operations role and those that had both a clinical and operational role. Survey respondents were asked to rate the overall status of drivers of collaboration; Authority, Capacity and Shared Value as it applied to the relationship between Operational Managers and Clinical Networks/Streams. The overall ratings for the drivers from these three groups is represented in Diagram 5.

Only one of the positive ratings exceeded 50%, which was the assessment by the group of staff with both Operational and Clinical Network/Streams' roles commenting on the capacity to develop effective partnerships. For the other

assessments, positive ratings were approximately 30%-35% for those who worked within a Clinical Network or Stream. The Operational Managers' own rating of the shared sense of value with Clinical Networks/Streams was only 15% positive.

The Operational Managers in particular are less confident that the relationship is well-founded, generally rating the statements less positively than the other 2 groups. The managers with both operational and Clinical Networks/Streams leadership are most positive with regard to this relationship.

Review of the survey data and case studies identified a number of areas for development to improve collaboration

between the Clinical Network/Streams' and Operational managers these include;

Policy Leadership

- The Executive Leadership Team and General Managers need to speak convincingly about the need to work in partnership

Executive Leadership/sponsorship

- General Managers can play a significant role in focusing the work of the Clinical Networks/Streams on operational management issues at the same time as they advocate on behalf of Networks and Streams with other Operational Managers.

Operational managers' authorising environment

- The endorsement and support of Operational Managers for agreed activities undertaken by Clinical Networks/Streams
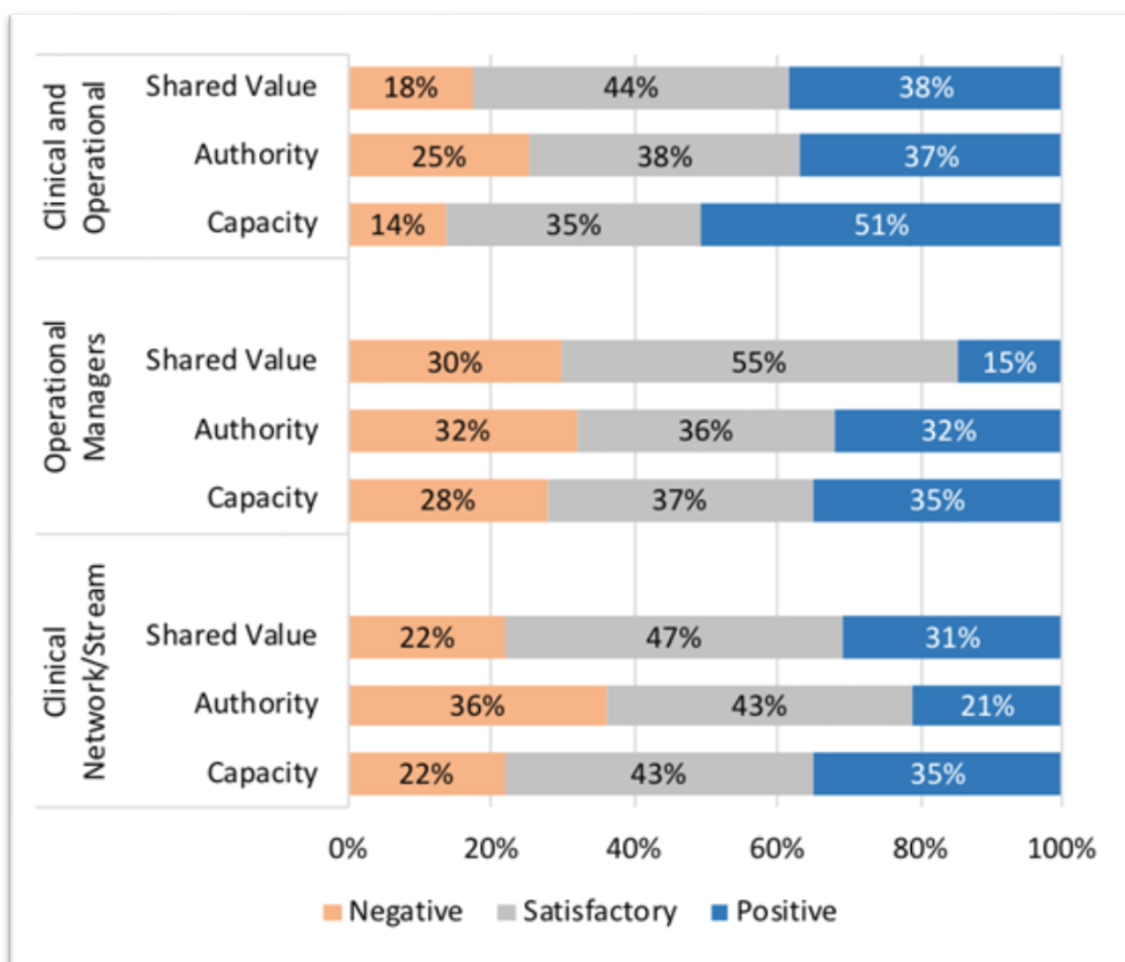
Structured opportunities to meet and plan

- The need for respectful communication, clear purpose and performance measurement against agreed outcomes with defined time frames, to build a shared sense of purpose, joint leadership and success.

The Role of Clinical Network Managers

- These positions are central to the creation of good quality partnerships. The Clinical Network Manager must bring operational and clinical experience to allow them to provide the bridge needed between Clinical Networks/Streams and operational management.

DIAGRAM 5   OVERALL RATINGS OF PARTNERSHIPS BETWEEN OPERATIONAL MANAGERS AND CLINICAL NETWORKS/STREAMS BY 3 GROUPS OF RESPONDENTS IN 3 RUBRIC DRIVERS

		Negative	Satisfactory	Positive
Clinical and Operational	Shared Value	18%	44%	38%
	Authority	25%	38%	37%
	Capacity	14%	35%	51%
Operational Managers	Shared Value	30%	55%	15%
	Authority	32%	36%	32%
	Capacity	28%	37%	35%
Clinical Network/Stream	Shared Value	22%	47%	31%
	Authority	36%	43%	21%
	Capacity	22%	43%	35%

DISCUSSION

Overall this LHD has a well-developed and recognised Clinical Networks Programme that bench-marked satisfactorily with other industries. The current matrix does not realise its full potential for collaboration, as evidenced by the lower responses between the Clinical Networks/Streams and Operational Managers, and this structural issue impeded the shift to creative partnerships which are required to solve complex problems (Diagram 2).

The survey has shown how Clinical Networks/Streams can, through creative, collaborative practice, achieve positive outcomes for patients and consumers that could not have been achieved through more siloed approaches. However, there is a risk that the lack of shared purpose between Operational Managers and Clinical Leaders could be counter-productive to the delivery of high quality services. Clinicians express their great frustration that they are either not 'heard' or their issues are being "stage managed" by management, while Operational Managers indicated frustration that they are not told about projects or initiatives being led by Clinical Network/Streams.

The central issue in a matrix model is that Executive and staff alike need to resolve the issue of two forms of power operating in a single domain. The Operational Managers have clear positional authority related to the organisational structure and are accountable to the Executive for good governance and financial management. Clinical leaders hold substantial influential power derived from their professional responsibilities. Without clear intervention and leadership that ensures collaboration it is possible (in fact quite common) that the two will have separate and competing goals. The realisation that network managers & operational managers with clinical experience functioned more effectively and reported higher satisfaction in the matrix model leading to improved collaboration was a new understanding that can lead to strengthening of the model.

Five areas were identified to resolve conflict, build clarity and improve patient experience and outcomes:

- Relationships will be improved by explicitly providing a policy framework for Clinical leaders and Operational Managers to work together for improved patient experience and outcomes.

- Inclusion in leadership positions a key accountability to manage for collaboration to drive recruitment with relevant skills.

- Joint innovation projects characterised and managed for collaborative practice between the Clinical Networks/Streams and Operational Managers.

- Local accountabilities; the accountability framework should be used to ensure accountabilities are placed as close as possible to any projects (locally) involving reform or innovation into particular locations. For example by holding the Operational Managers and the Clinical Leaders responsible and accountable for defined outcome measures in key clinical areas in a given location, managers explicitly required to work together with clinicians, depending on each other, in achieving outcomes.

- Clinical Network/Streams' operational plans, with agreed and defined accountabilities, need to be supported by Operational Managers at the local level and signed off at an Executive level.

CONCLUSIONS;

Clinical Networks and Streams have proven successful in engaging clinicians in providing leadership in strategies to improve patient experience, outcomes and reducing clinical variation. At times these efforts have struggled due to lack of collaboration with the right partners including operational managers. This analysis supports the use of an Action Research Approach utilising maturity tools such as the Collaboration Rubric® to identify the necessary elements of successful collaboration. This approach proved helpful in defining not only the type of collaboration required but the key drivers that must be addressed to facilitate improved [horizontal and vertical] partnerships leading to better outcomes through encouraging reflection about and actions to improve collaboration between clinical networks/streams and operational managers. This LHD will build improved collaborative partnerships utilising the insights gained from the evaluation.

FUTURE PUBLICATIONS:

Information derived from the evaluation allows for further exploration of a number of themes including how the Collaboration Rubric® can be used to:

- describe the "Types of Collaboration" required to meet the desired organisational outcome, so that effort is matched to outcome,

- optimising the role of the Network Manager to "manage for collaboration"

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