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# AJAN

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A culture change in aged care: The Eden Alternative™

29:1

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# The long haul: Caring for bone marrow transplant patients in regional Australia

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## KEYWORDS

Bone marrow transplant, rural, quality of life, cancer, isolation, survivorship

## ABSTRACT

### Objective

To evaluate the experience of, and services to, patients from rural and regional Australia referred to a large urban tertiary referral hospital for allogeneic haematopoietic cell transplantation (allo-HCT) and to compare their quality of life with similar populations.

### Design and setting

A cross-sectional survey of allo-HCT recipients referred from the Calvary Mater Newcastle to Westmead Hospital, Sydney, NSW.

### Subjects

Thirty-seven of forty adult survivors of allo-HCT (92.5%) who underwent transplant between 1999 and 2008 and were at least three months post transplant.

### Intervention

All subjects completed a validated measure of quality-of-life (QoL) in bone marrow transplant recipients (*FACT-BMT* Version 4) and the Regional/Rural BMT Needs Assessment Survey.

### Results

Most patients (79%) were between one and five years post transplant. Almost all reported having been sufficiently prepared for transplant and received most information and support from the Nurse Coordinator. Despite the fact that 89% of patients reported significant adverse effects of allo-HCT, >60% still reported an acceptable quality of life. Importantly, however, about a third of patients experienced financial difficulties associated with transplantation and felt pressure to return to work.

### Conclusion

Patients referred for allo-HCT should be advised about the arduousness of transplant but also reassured that most survivors will experience acceptable levels of functioning and QoL one to two years after transplant. With sufficient local support and with appropriate nursing care and coordination the experiences of regional/rural patients is comparable with other allo-HCT patient populations. Further investigation into vocational rehabilitation is warranted due to the significant financial and occupational pressures reported by survivors of allo-HCT.

## INTRODUCTION

Allogeneic hematopoietic cell transplantation (Allo-HCT or BMT) is a complex, demanding treatment with a high treatment-related mortality and morbidity, requiring a prolonged hospital stay and an extended recovery period (Heinonen et al 2003). Approximately 35-80% of transplant recipients will become long-term survivors who may experience late effects capable of impairing quality of life (QoL) (Pidala et al 2009; Syrjala et al 2004; Socie et al 1999; Curtis et al 1997).

Allogeneic transplant is performed only in major urban tertiary referral centres. BMT may therefore impose additional strains for the 26% of Australians living in rural or regional areas, such as travel, isolation, separation from social support, family upheaval, and financial strain due to distance from the treatment centre (Underhill et al 2006; Burkitt 2003; McGrath et al 1999). These people may also experience difficulties arising from limited access to specialist services and fragmentation of healthcare between regional and metropolitan services (Drury and Inma 2009; Baldwin et al 2008; Hubbard et al 2006; Martin-Macdonald et al 2003; Fitzgerald et al 2001; Davis et al 1998). These challenges may increase psychological and emotional distress following BMT and impair treatment compliance, QoL and even the likelihood of survival (Hubbard et al 2006; Grulke et al 2005; Lock et al 2005).

In recent years, Cancer Care Coordinators have been employed in key regional centres to address the specific needs of cancer patients living in rural and regional areas (Drury and Inma 2009). While there is some literature on the experience of Australian women with chronic illness and cancer living in rural and remote areas, there is no published data on the QoL, experiences and health service utilisation of patients from rural/regional areas of Australia referred for BMT (Drury and Chutarat 2010; Baldwin et al 2008; Clavarino et al 2002; Fitzgerald et al 2001; McGrath et al 1999). This is an important omission as one would anticipate from international literature that patients from rural and regional Australia would have a poorer experience of BMT and consequently have a reduced QoL. This study therefore aimed to evaluate the experiences of and services to patients from regional areas undergoing BMT at a large metropolitan centre in NSW, and to compare the QoL in this sample with similar patients based on previous studies.

## PATIENTS AND METHODS

### Background to the service

Each year, 10-15 patients from the Hunter New England area are referred from the Calvary Mater Hospital, Newcastle (CMN) to Westmead Hospital, Sydney, for allo-HCT. The Hunter New England area is located approx 150km north of Sydney, covers an area of 130,000km<sup>2</sup>, and has a population of 840,000. This represents 12% of the total population of New South Wales, the most populous state in Australia (HNE Health District 2010). Most BMT recipients spend four to six weeks as an inpatient in the transplant ward. Following discharge from hospital, all allo-BMT recipients attend a weekly outpatient clinic at Westmead Hospital for up to three months. To attend, patients from rural and regional areas must initially remain in Sydney. Most stay in local accommodation provided by the Leukaemia Foundation (LF). Later, patients must commute weekly to Sydney from home, which often entails a round trip of 400-500km. Once medically stable, the care of BMT recipients from the Newcastle and Hunter region is transferred to a monthly clinic run by a BMT CNC at the CMN and staffed by BMT physicians from Westmead Hospital.

## Patients

Patients eligible for this study were adult (age > 15 years) survivors of allo-BMT from a regional or rural area referred to Westmead Hospital from the Haematology Department at CMN who underwent transplant at Westmead Hospital between 1999 and 2008, and were at least three months (range 3-96 months, mean 30 months) post-transplant at the time of recruitment. Eligible patients were sent a letter describing the study, copies of the questionnaires and a stamped self-addressed envelope. Follow-up phone calls were made to non-responders after two and four weeks. Participants were asked to complete the Functional Assessment of Cancer Therapy – Bone Marrow Transplant (*FACT-BMT* Version 4) and the *Regional/Rural BMT Needs Assessment Survey*.

## Assessment

The *FACT-BMT* is a validated questionnaire for measuring quality of life in BMT recipients. (McQuellon et al, 1997) It takes 10-20 minutes to complete and combines two instruments, the *FACT-G* and a BMT subscale. The *FACT-G* is a 28-item self-report instrument that measures QoL in cancer patients (Cella et al 1993). It consists of five subscales measuring physical, functional, social and emotional well-being and satisfaction with the doctor/patient relationship. The BMT subscale includes 12 items designed to test QoL in BMT patients. The *FACT-BMT* plus the BMT subscale provides an overall quality of life score. Patients rated themselves over the past seven days using 5-step Likert scales. Responses were used to calculate overall quality of life and subscale wellbeing scores.

The *Regional/Rural BMT Needs Assessment Survey* was developed following a review of relevant literature and discussions with patients attending BMT long-term follow-up clinics. It consists of 64 questions grouped into four sections covering personal and transplant details, medical complications, information and preparation for transplant, support and return to work. The questionnaire uses tick box responses, short answer and Likert scales and takes about 25 minutes to complete. It was piloted in phone interviews with four current patients.

Descriptive statistics were compiled for all items on the *Regional/Rural BMT Needs Assessment Survey* and summary scores were calculated for the *FACT-BMT*. The 'relationship with doctor' sub-score was not used as participants had multiple clinicians involved in their care. QoL scores were extracted from other published reports for comparison. The 'relationship with doctor' score was removed. The study was approved as a quality improvement project by the Hunter New England Research Ethics Unit.

## RESULTS

Completed questionnaires were received from 37 eligible participants (92.5% response rate). The study population was balanced in terms of gender and marital status (table 1). The majority of participants (78%) were

**Table 1: Participant characteristics (N=37)**

<b>Average age (years)</b>	<b>41.8 (range 20-61)</b>
<b>Gender</b>	
Male	21 (57%)
Female	16 (43%)
<b>Family circumstances</b>	
Single	14 (38%)
Married/De facto	23 (62%)
Children	24 (65%)
No children	13 (35%)
<b>Employed pre-BMT</b>	
Yes	29 (78%)
No	8 (22%)
<b>Donor</b>	
Unrelated Cord blood	1 (3%)
Related	23 (62%)
Adult Unrelated	13 (35%)
<b>Conditioning</b>	
Myeloablative	34 (92%)
Reduced intensity	2 (5%)
Not known	1 (3%)
<b>Time since transplant</b>	
<1 yr	6 (16%)
1-5 yr	24 (65%)
>5 yr	5 (14%)
Not known	2 (5%)



employed prior to transplant and were surveyed between one and five years post transplant. Of those transplant survivors who returned surveys, 30 (82%) had undergone transplant as treatment for acute leukaemia, while the remainder had been transplanted for other conditions including aplastic anaemia, lymphoma and chronic leukaemia. The distribution of donor and transplant type were typical for this patient population. Participants reported receiving information about BMT mainly from clinicians and from resources and events designed specifically for them (table 2). Most (78%) reported feeling prepared for the transplant by the information received beforehand, and most also reported feeling physically (78%) and emotionally prepared (62%) for transplant at the time of admission with very few reporting not feeling either physically (8%) or emotionally (3%) well-prepared for transplant. This finding was supported by concordance between expectations of the BMT experience and reports of what it was actually like (table 3).

Most participants (89%) experienced significant adverse effects of allo-HSCT with 27% requiring readmission to hospital and 15% admission to Intensive Care. The most frequently reported acute complications of transplant were acute graft-versus-host disease (GVHD), nausea, vomiting, diarrhoea, mucositis, bacterial infection (central venous line infection and pneumonia) and cytomegalovirus (CMV) reactivation. Many (39%) also reported chronic GVHD.

**Table 2: Sources of information about BMT**

<b>Main information sources before admission</b>	
BMT coordinator (CMN)	30 (81%)
Transplant physician (Westmead)	24 (65%)
BMT coordinator (Westmead)	22 (59%)
Haematologist (CMN)	22 (59%)
BMT patient education day (Westmead)	19 (51%)
Haematology nurses (CMN)	19 (51%)
Leukaemia Foundation	13 (35%)
Internet	9 (24%)
Other transplant recipients	8 (22%)
NSW BMT Network	3 (8%)
Other sources	1 (3%)
<b>Received BMT Network Booklet</b>	
Yes	29 (78%)
No	8 (22%)
<b>Read some or all of booklet (n= 29)</b>	
Yes	26 (90%)
No	3 (8%)
<b>Understood most or all of what they read (n=26)</b>	
Yes	24 (92%)
No	2 (8%)
<b>Satisfaction with BMT patient education day (n=19)</b>	
A little or somewhat satisfied	4 (21%)
Quite or very satisfied	14 (74%)
<b>Felt prepared for transplant with the information</b>	
A little or somewhat	7 (19%)
Quite or very	29 (78%)

**Table 3: Expectations and experience of BMT**

	<b>A terrible ordeal</b>	<b>Very difficult</b>	<b>Somewhat difficult</b>	<b>Not very difficult</b>
Expectations of BMT	5 (14%)	13 (35%)	15 (41%)	3 (8%)
Assessment of actual experience	3 (8%)	10 (27%)	18 (49%)	5 (14%)

Spouses (22; 59%) and parents (12; 32%) were the main sources of support during BMT. Extended family (26; 70%), friends (27; 73%) and work colleagues (11; 30%) also provided support in Newcastle during the transplant period. Overall, reported perceptions of support suggest that – despite a degree of loneliness – the participants' needs were met most of the time, and that effective support was provided during and after BMT by both lay and professional carers (table 4).

**Table 4: Perceptions of support**

	Not at all	Some of the time	About half of the time	Most of the time	All of the time
Felt that needs were met	0 (0%)	0 (0%)	2 (5%)	11 (30%)	24 (65%)
Felt alone	12 (32%)	17 (46%)	5 (14%)	1 (3%)	2 (5%)
Felt supported by staff	0 (0%)	3 (8%)	2 (5%)	8 (22%)	24 (65%)
Felt supported by carer	1 (3%)	1 (3%)	0 (0%)	4 (11%)	29 (78%)
Felt supported post-BMT by Westmead staff	0 (0%)	3 (8%)	0 (0%)	16 (43%)	17 (46%)
Felt supported post BMT by CMN staff	1 (3%)	2 (5%)	1 (3%)	7 (19%)	24 (65%)

Of the 29 respondents who were employed before transplant (table 5), 11 (38%) reported feeling some pressure to return to work while preparing for and recovering from the transplant. At the time of the survey, two thirds (19/29, 66%) had returned to work after a median lapse of seven months (range 1 to 18 months). One third (10/29, 34%) had not yet returned to work, and all but one planned to do so. Of the 19 who had returned to work, most (13, 68%) reported some degree of difficulty and eight changed the nature of the work by reducing work hours or by shifting to casual or seasonal employment.

Patients main source of income were welfare payments (49%), spouse's income (41%), personal savings (24%), insurance (14%) and superannuation (14%). Disturbingly, a third of respondents (13; 35%) reported having insufficient finances during the transplant. The majority of respondents relied primarily on private transport whilst undergoing BMT (29; 78%), and afterwards while travelling between Newcastle and Sydney (27; 73%), although a significant number used transport provided by the LF (13; 35%). More than three quarters of respondents (77%) relied on accommodation provided by the LF, and were overwhelmingly satisfied with the accommodation in Sydney. A significant proportion of respondents used other services provided by the Foundation, including educational resources (32%) and seminars (19%). The majority (62%) made use of the services of the BMT co-ordinator in Newcastle before transplant, as well as other medical and allied health services, including social workers (30%), clinical psychologists (27%), dieticians (27%) and psychiatrists (14%). There was little evidence of unmet needs for medical, nursing, allied health, pastoral care or support services in Newcastle pre-BMT.

Most patients reported an acceptable quality of life with the *FACT-BMT* scores in the study population being comparable to those from similar studies done internationally (table 6).

**Table 5: Employment**

Employment pre-transplant (n=29)		
Full time	17 (59%)	
Part time	7 (24%)	
Casual	3 (10%)	
Unknown	2 (7%)	
	Yes	No
Returned to work post-transplant	19 (66%)	10 (34%)
Felt pressure to return to work	11 (38%)	18 (62%)
Difficulty returning to work	13 (68%)	6 (32%)
Reduced or changed employment	8 (42%)	11 (58%)

**Table 6: Quality of Life scores compared with other studies of BMT patients**

Study	Participants	Location	Physical wellbeing	Social wellbeing	Emotional wellbeing	Functional wellbeing	FACT-G	BMT subscale*	FACT-BMT
McQuellon et al (1998)	45 patients 12 months post-BMT	Salem NC, USA	22.6	23.2	16.8	19.5	82.1	33.6	115.7
Kopp et al (1998)	41 patients 12 months post-BMT	Austria	23.37	20.63	19.63	21.29	82.22	36.61	118.83
Heinonen et al (2001)	91 patients > 12 months post BMT	Finland	23.97	21.6	16.5	19.63	81.7	37.37	119.07
This study (2008)	41 patients, most >12 months post-BMT	Newcastle, Australia	22.29	22.60	16.25	20.55	81.69	35.58	117.27

\*12 Items (McQuellon 1997)

## DISCUSSION

Cancer patients need long-term follow-up to ascertain their long-term prognosis and ongoing needs, and to assess the adequacy of existing services and interventions. To date, there has been no data on long-term follow up for patients from rural and regional areas of Australia referred for BMT. The instrument developed and tested in this study – the *Regional/Rural BMT Needs Assessment Survey* – can be used in combination with validated QoL instruments for this purpose.

While this study makes a significant contribution to the literature on patient experiences of transplantation, care must be taken in generalising the results to other populations given the small sample size, the variable length of survival post-transplant and the recruitment of participants from a single geographical region and haematology/transplant service.

This study demonstrates that the majority of transplant recipients experience significant short-term effects of BMT, but most go on to report an acceptable level of functional and social well-being. This is consistent with longitudinal studies of QoL following BMT, which demonstrate early moderate reductions in QoL that largely return to pre-transplant levels within three to 12 months of transplant, with the majority (>60%) of patients who survive more than a year reporting good to excellent QoL (Pidala et al 2009; McQuellon et al 1998; Kopp et al 1998). It is also consistent with both longitudinal studies of BMT survivors and cross-sectional studies which suggest only modest reductions in the QoL of BMT recipients compared to healthy controls or population normative data. (Pidala et al 2009; McQuellon et al 1998; Sutherland et al 1997) Sutherland et al, found that allogeneic BMT recipients were indistinguishable from the ‘normal’ population in terms of physical functioning, emotional role functioning, bodily pain and general health three years after BMT. Other studies have found long-term allo-BMT survivors generally report good functional wellbeing relative to population norms while continuing to be troubled by fatigue, insomnia, lethargy and sexual dysfunction (Andrykowski et al 1997; Sutherland et al 1997; Zittoun et al 1997; Bush et al 1995; Schmidt et al 1993).

Given that other studies have reported reduced QoL in patients with cancer living in rural/regional areas, the fact that participants in this study reported reasonable QoL suggests the support provided to patients in this sample compensated for any disadvantage resulting from living a long distance from the transplant centre.

Due to the small sample size it was not possible to test whether transplant-related complications were associated with a lower QoL. Notably, however, despite the fact many respondents experienced some degree of acute (79%) and chronic (39%) GvHD, the majority still reported an acceptable QoL.

Most participants felt sufficiently informed about the potential complications of allo-HSCT, although imperfect levels of physical (78%) and emotional (63%) preparedness is a reminder that no amount of information can fully prepare patients for the full impact of BMT. The results also suggest that, notwithstanding the increasing popularity of the internet, events and resources tailored for this patient population, particularly, discussion with health professionals responsible for the care of patients referred for transplant, provide the most important and effective means of communicating information about BMT. This is consistent with other evidence that involvement of cancer nurse coordinators may improve the experience of illness and health care delivery of cancer patients in rural/remote settings (Drury and Inma 2010).

About a third of the participants in this study experienced financial pressures associated with transplantation and reported feeling pressure to return to work. This is consistent with other evidence that, while many BMT recipients are able to return to work post-transplant, many have difficulty doing so and may benefit from some form of occupational/vocational rehabilitation (Friedrichs et al 2010; Heinonen et al 2001). Since rural/regional patients are likely to be disadvantaged when it comes to accessing such services, it is reasonable to infer that many may be returning to work prior to full recovery due to financial pressures.

While this study provides some insights into the significance of occupational pressures for survivors of BMT, further research is needed to establish the degree to which such concerns are shared by other populations and to establish whether pre and post-transplant interventions, including education, counselling and support services may assist patients return to work and help them cope with the financial and social impacts of transplantation. Likewise, while this study suggests that the involvement of a clinical nurse coordinator may assist BMT recipients cope with the broad impacts of transplant, further research involving different regions and health services should be conducted to establish whether nurse coordinators may have a more extensive role to play in the management of BMT recipients and to ascertain the optimal model of nursing and medical care for BMT patients referred from different rural and regional areas.

## CONCLUSIONS

Patients should be advised that BMT is an arduous treatment associated with serious risks and complications and that most BMT recipients will experience short and long-term consequences of transplant that may compromise QoL and conflict with expectations of recovery. While advice to potential BMT recipients should be tailored to specific circumstances, patients can be advised that approximately 25% of BMT recipients will have ongoing medical complications. These complications may impair QoL and life-satisfaction and most survivors will experience some symptoms, such as fatigue (Jacobs et al 2007; Lee et al 2001; McQuellon et al 1998). They can also be reassured, most BMT recipients (>60-70%) return to acceptable levels of functioning within one to two years of transplant and experience a good QoL.

Whilst BMT recipients receive a lot of information about BMT from many different sources, patients may benefit from additional psychosocial and emotional support prior to transplant and from practical assistance with, for example, the financial costs associated with transplant, and vocational rehabilitation, to assist patients in returning to work when ready.

The experience of patients from rural/regional areas appears no worse than that reported in similar populations. This suggests that any adverse impact of distance on rural/regional patient's experience of BMT may be ameliorated by the supportive care provided before and after transplant by a clinical nurse coordinator, combined with support from the LF and social networks.

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# The role of low intensity laser therapy in community nursing

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## KEY WORDS

laser, therapy, biomodulation, LILT, community nursing

## ABSTRACT

### Objective

To review the effects of low intensity laser therapy (LILT) on healing and to explore its role in community nursing.

### Setting

Primary care, outpatient clinic, community health centre

### Primary argument

Low intensity laser therapy encompasses many positive attributes that make it a useful healing mechanism in community nursing.

### Conclusions

Laser light is non-invasive, painless, free from side-effects, and can support vital bio-regulating processes, particularly in diabetic and neuropathic conditions. The use of LILT for treatment can bring about positive outcomes for patients, families, communities and governments.

## INTRODUCTION

In 1965, Professor Endre Mester began to study the biomodulating effects of low intensity laser therapy (LILT) on human tissue at Semmelweis University in Budapest. His pioneering work resulted in over 100 published scientific papers and the establishment of the first laser therapy clinic in Budapest for the treatment of non-healing ulcers (Mester 1976). Laser biomodulation is being successfully utilised by doctors, allied health practitioners and nurses in many different clinical environments throughout the world. This modality is, however, still viewed with a considerable degree of scepticism, despite the fact that there are numerous publications in the scientific and medical literature which attest to the biomodulating effects of *non laser* visible red and near infra-red light on a range of cellular functions (Albrecht-Bruehler 1991, Chopp et al 1990, Kato 1981).

A lack of understanding about the importance of correct laser dosimetry and application protocols and poorly controlled studies and reporting have flawed the research literature in the past. Most of the studies supporting the effectiveness of LILT in the treatment of wound ulceration consist of unreliable or poor reports (Posten et al 2005). Though the results have been noteworthy, they usually failed to establish standard criteria for the particular laser, dosage, number, frequency, or duration of treatment (Sobanko and Alster 2008), involved small sample size or compromised clinical protocols (Flemming and Cullum 2008). The recognition of these past shortcomings has produced an ever increasing number of positive, high quality, well designed studies in this emerging field of laser phototherapy over the past decade. The question of whether LILT has a role in community nursing is best answered after reviewing the effects of LILT on certain critical factors that influence healing.

## DISCUSSION

### Laser light can be therapeutic

The word *laser* is an acronym for *light amplification by stimulated emission of radiation*. The term *radiation* raises concerns about the safety and risks of using laser to treat human tissue, but it is the *light* that is of therapeutic importance when applying laser to instigate biomodulation. There are two distinctly different methods of treating human tissue with laser light and this is primarily governed by the power output of the laser device itself.

### Thermal laser activation

The first more commonly known method of laser application is high intensity laser therapy (HILT), the use of laser devices operating with high watt (W) powers to produce photothermal effects within living tissues. Thermally induced reactions range from protein denaturation, coagulation, vapourisation and carbonisation of tissue, and are used to perform various cosmetic, dermatological and surgical treatments. The degree of temperature change and tissue reaction is dependent on the watt power of the laser device and the amount of laser light energy *i.e joules* that is deposited per  $\text{cm}^2$  over a specific period of time *i.e. energy density*. (Tuner and Hode 2002, Simmunovic 2000)

### Non thermal laser biomodulation

The second method of laser application is termed low intensity laser therapy (LILT) and is also widely known as low level laser therapy. Laser devices operating with extremely low power outputs within the milliwatt range (mW) deliver wavelengths of light in the visible red and near infra red range of the electromagnetic spectrum. Light energy is transmitted through the skin surface at low dosages and at a very slow rate that is incapable of causing thermal tissue reactions. This free energy is transmitted well beyond the dermal layer of the skin into underlying tissues, because it has not been consumed as part of a photothermal reaction (Simmunovic 2000, Tuner and Hode 2002).



### Indirect effect of lilt

Biomodulation using LILT instigates both direct and indirect effects. Direct effects occur primarily within seconds and minutes, whilst the LILT treatment is being applied. The indirect effects continue to modulate physiological and biological reactions in another area of the body by generating a nervous or neuroendocrine signal at the treatment site and this can continue for hours and days after the LILT treatment has ceased being applied (Karu 2002).

The ATP dependence of light-sensitive background signal channel currents and supports the scheme of a cellular photosignal transduction and amplification effect resulting in transfer of electrons within the redox pathway and increased production of cellular energy *i.e.* *adenosine triphosphate (ATP)* ultimately leading to cell division (Von Meyenburg and Hansen 1987).

The alteration to one cellular homeostasis parameter will consequently lead to a parallel shift of different reactions which make it difficult to establish the causal relationship. For LILT to be effective, it is imperative that correct treatment protocols and dosimetry are adhered to. This requires the appropriate exposure intervals (*treatment sessions*), wavelength (*nm*), units of energy (*joules*) and pulse frequency (*hertz*) when treating various conditions involving different types of cells and tissues.

Studies examining the effects of LILT on wound healing using scanning electron microscopy clearly indicate enhanced metabolic changes following exposure to LILT, as compared to non irradiated wounds. LILT treated wounds exhibit an accelerated state of healing and a more organised tissue structure, with greater tensile strength and vascularity, and these effects are comparable in both humans and animals (Mester 1976).

### Electrical stimulation

Cells also respond to electrical stimulation (ES) during wound healing via the galvanotaxic effects of direct or pulsed electrical currents. Furthermore the greatest amount of positive evidence in clinical trials has been produced using ES in comparison to ultrasound, hydrotherapy and ultra violet radiation. However, anytime an electrical current is used to assist healing, the wound bed must be debrided and adequately prepared to avoid uneven transmission of the current and precautions must be taken to avoid electrochemical burns. It is contraindicated in patients with metal implants or pacemakers, treating over the pericardium, larynx, carotid sinus, parasympathetic nerves and ganglia and phrenic nerve (Kloth 2002, Wolcott 2002). Such risks and side effects associated with electrical stimulation of wounded tissue can be avoided through the use of laser *light* to assist wound repair (Karu et al 1996, Simmunovic 2000)

### Pharmacology recognises the Arndt- Schulz law

The stimulating function of an irritation is well recognised in pharmacology and physiology, and the oscillating nature of the response of cells and tissues to linearly increasing irritation has been described by Nasonov and Aleksandrov (1940). Pharmacology recognises the Arndt-Schulz Law of regularity and the enormous range of non specific agents that bring about complex specific reactions of stimulation and inhibition relating to the concept of the adaptation syndrome (Selye 1952). The Arndt-Schulz law states that:

- Weak stimuli promote physiological functions
- Medium stimuli accelerate them
- Strong stimuli inhibit them
- The strongest stimuli halt them

There is no universal explanation for the cellular and molecular mechanisms of the adaptation syndrome; and although the irritants may be of a specific nature, the reaction of cells and tissues are in fact nonspecific. The most common form of exchange by cells is at the level of energy metabolism, irrespective of the type

of cell and its specialisation (Kondrashova 1970). Moreover, the cyclic changes in the metabolic activity of mitochondria occur as the action of the physical factor increases; this factor could be either pharmacological or energetic in nature triggering nonspecific responses by cells and tissues to these external irritations. Low levels of laser light (Karu 1988), microwaves (Frohlich 1988) and pulsed electromagnetic fields (Basset 1993) of low intensity can and do exert a stimulating effect on cells and tissues.

When a pharmacological agent interacts with a cell receptor, a chain reaction of events known as the response-recovery cycle takes place. This chain of events is a complicated series of biochemical reactions with agonists and receptors. A common step involved in this stimulus-response recovery cycle is a change in the redox state and intracellular PH of the cell (Kondrashova 1970).

### **Lilt photochemistry and photobiology**

Photochemistry and photobiology utilises a very narrow region of the electromagnetic spectrum UV (200-400nm), visible light (400-700nm) and near infra red (700-1400nm). LILT involves the use of wavelengths ranging from 600nm–1000nm. Radiant laser energy in specific units *i.e. photons*, are absorbed by light absorbing molecules *i.e. photoacceptors*, which are *not* connected with a light response, but take part in a metabolic reaction within the cell (Brown 1992, Hartmann 1983).

In order for a photoacceptor molecule to take part in photobiomodulation during LILT, it must be part of a key structure involved in the regulation of a metabolic pathway *e.g. redox chain*. Proven photoacceptors of wavelengths used in LILT are NADH-dehydrogenase, a flavinic component of the redox chain and Cytochrome c oxidase (cyt c), which is the terminal enzyme of the respiratory chain of all eukaryotic cells. This enzyme plays a central role in mediating the transfer of electrons from cyt c to molecular oxygen (Karu and Afanasyeva 1995).

Absorption of light during LILT instigates pumping of protons vectorially from the mitochondrial matrix to the cytosol. This redox chemistry is converted into an electrochemical potential across the inner membrane of the mitochondria to drive the production of adenosine triphosphate (ATP). Chemical reactions that regulate cellular metabolism can be significantly altered by very small changes in ATP levels (Brown 1992). Direct measurement of ionic currents through the plasma membrane of *non excitable* glial cells, *excitable* neurons and cardiomyocyte cells after absorption of He-Ne laser, demonstrated an activation of background channels. These channels are associated with ATP dependant  $K^+$  - channels or  $Ca^{2+}$  - dependant  $K^+$  - channels (Karu et al 1996). LILT induces photosignal transduction and amplification chain effect from the cellular membrane to the nucleus, resulting in deoxyribonucleic acid (DNA) synthesis and increased cell proliferation (Karu 1988). However, controlling cell proliferation via the cellular signalling pathways also involves changes in intracellular concentrations of  $H^+$ ,  $K^+$ ,  $Na^+$ ,  $Ca^{2+}$ . and cAMP, a cyclic molecule which is active in the regulation of gene expression in bacteria and eukaryotic cells (Hesketh et al 1985; Kaplan 1978; Rozengurt 1986).

### **Laser photobiomodulation can be stimulative or inhibitive**

Studies indicate that when the overall redox potential is optimal, LILT effects can be insignificant or even absent. Stronger responses are shown to occur when the intracellular PH is low and the redox potential is shifted towards a more oxidised direction (Karu 1987; Karu 2002; Pouyssegur et al 1985).

Procollagen synthesis showed an average increase of 4-fold using 633nm wavelength emitted by a Helium Neon (He Ne) laser with a peak response of 36-fold in cultures that previously had very low procollagen production. Cultures that were already producing procollagen did not show any significant increase (Lam et al 1985). Increased synthesis of collagen was also found to be reliant on ascorbate levels indicating a connection to redox activity (Labbe et al 1990).

Fibroblast cells react to all incoming information such as metabolites, hormones, neurotransmitters and pH changes thereby assisting in maintaining homeostasis via local feedback information from the extracellular matrix (Nietfeld et al 1994).

Furthermore, more than one cell function can be influenced by LILT in many different types of cells and an alteration of one cellular homeostasis parameter will ultimately lead to a parallel shift in others. The catalytic effect of activating an enzyme can initiate thousands of chemical reactions, making it nearly impossible to determine the exact cause of the effect on the cell.

Biological systems are energetically open; taking in nutrients i.e. dissipative energy from the environment and releasing waste products of lower energy. Energetically open systems oscillate and demonstrate feedback mechanisms that are characteristic of non linear behaviour, which exhibit no starting conditions (Adolph 1982, Szent-Gyorgyi 1941).

Opportunity for prediction of outcomes on the basis of initial and final states is not possible, because the whole biological system reacts with flexibility to non physiological changes and thereby permits adaptation processes to naturally occur (Klima et al 1987). At the molecular movement level, oscillating rhythms give way to higher oscillations that can be measured, such as heartbeat in seconds, intestinal peristalsis in minutes, sleep-wake cycle in hours, healing and regeneration in days and growth in years. Each molecule, cell, tissue and organ has an ideal resonant frequency that assists in the co-ordination of the whole biological system. In non linear systems the natural oscillations (*i.e. frequencies*) are never fixed, allowing small frequency variations to modulate information transfer. If a nonlinear system receives a suitable energy, the energy is distributed throughout that system and can create short lived fields of oscillation that can adjust or change spontaneously to re-instate biological coherence in other parts (Heine 2000).

#### **Pain control mechanisms of lilt**

The studies on pain control using LILT have demonstrated an analgesic stimulus response in all levels of the nervous system. Release of endogenous opiates  $\alpha$ - and  $\beta$  endorphins binds to opiate receptors of the nociceptive system and in particular the substantia grisea centralis. Binding endorphins block the entry of the opiate receptors to the incoming nociceptive transmission substances and thereby cause narcotic analgesia (Walker 1998). Furthermore, nociceptive information may be modulated by the gate control theory, through deceleration of transmission rates of A- and B-fibres in the gray matter of the posterior horns in the cells of the spinal ganglia (Ohshiro 1991). Acceleration of C-fibres assist in controlling and modulating descending inhibitory systems, especially in the reticulospinal tract (Melzack 1996).

#### **Lilt induced immune response**

Experimental data relating to LILT has historically been directed towards relieving pain (Walker, 1983, Walker and Akhanjee 1985). Investigations into the regeneration of nerves in animal tissue with LILT revealed that it prevents a drop in action potential in injured peripheral nerves, thereby helping to preserve conductivity as well as decrease the degeneration of motor neurons. Accelerated regeneration of the injured peripheral nerves and a lessening of the degenerative changes in the corresponding segments of the spinal cord will also occur (Rochkind et al 1989, Anders et al 1993).

Changes in the electrophysiological parameters of nerves by direct skin mediated photo-neuroimmunological actions have also been reported. The main cells involved in the immune response are B cells and T helper/inducer cells CD4 (T4), suppressor/cytotoxic cells CD8 (T8), natural killer cells, that have been studied by full mitogenic activation and blast transformation. Release of chemical signals in response to LILT also occurs in the form of cytokines and lymphokines (Karu et al 1989).

Wound healing can be slowed under various conditions, and the cells' susceptibility to hypoxic injury will depend largely on their ability to maintain redox potential (Khan and O'Brien 1995). Release of a macrophage-derived growth factor has been demonstrated to promote angiogenesis i.e neovascularisation in an avascular and hypoxic area of tissue (Banda et al 1985).

Macrophage cells play a pivotal role in the wound healing process (Clarke 1985) and are capable of surviving for extended periods in hypoxic tissue. These cells respond favourably to LILT and are essential if repair is to continue. They are an important source of a variety of biologically active substances and growth factors, which attract fibroblasts and activate other cells and the growth of granulatory tissue (Bolton et al 1990;1991; Rajaratam et al 1994).

During phagocytosis, mononuclear phagocytes (eg. *macrophages*) and polymorphonuclear leucocytes (e.g. *neutrophil granulocytes*) emit light in the form of *biophotons* (Klima et al 1987). It is also further postulated that excited oxygen molecules ( $O_2^*$ ) within the cell membrane of phagocytes take part in phagocytosis, as either a possible source or mediator of light during immune defence (Roscher et al 1984). The wavelengths of these endogenous biophotons are within the same range of red and near infra-red light implemented during LILT.

#### **Biological communication and detoxification via the extracellular matrix**

The body's cellular defence system involving the reticuloendothelial system is comprised of T and B lymphocytes, macrophages, neutrophilic granulocytes and capillary endothelial cells. Epithelia and vascular endothelia maintain a functioning barrier against a variety of antigenic substances, in combination with the molecular filtering function of the extracellular matrix (ECM) of the connective tissue.

The major detoxification process takes place in the ECM whereby harmful endogenous and exogenous substances are filtered through this tissue space and excreted via venous capillaries and the lymphatic system. When the ECM becomes congested with waste substances (i.e. chemicals, metabolites and heavy metals), tissue drainage is slowed down. This interferes with the passage of essential nutrients, which are necessary for cells to maintain cellular metabolism and redox homeostasis (Regling 1992; Hascall and Hascall 1981)

#### **Maintaining homeostasis**

Maintenance of homeostasis of the entire body requires the matrix to react very rapidly to complex changes and this is achieved by the high diversity and rapid turnover and coupling capabilities of the extracellular sugars and regulation of the ECM. This provides a highly ordered state that is distinct from thermodynamic equilibrium, thereby enabling restoration processes to repeatedly occur. Optimum functioning of the ECM is of paramount importance in maintaining biological regulation of an energy exchanging system and determines the normal and pathological reactivity of genetic material of the cell.

Genes govern the manufacture of molecules, but it is the forces exerted by internal electromagnetic energy fields that bring the molecules together (Adey 1990). The ECM is the extracellular environment that acts as a molecular sieve through which all substances leaving a cell or reaching a cell must pass through. Each cell requires an adequate environment to realise its genetically determined functional potential.

A self monitoring autocrine feedback loop maintains the ECM in a constant state of re-modelling by tissue-degrading proteolytic enzymes and their inhibitors. Disturbance of their equilibrium will consequently lead to excessive synthesis of connective tissue resulting in fibrosis or inflammatory degradation of tissue (Pienta and Coffey 1991; Bassett 1968).

The central nervous system reacts to internal and external electromagnetic fields when the ECM undergoes changes. This plays an important role in maintaining coherence and integrative communication within the body. This dynamic coherence begins at the sub atomic level to the molecular, cellular and anatomical tissues

and organ levels (Ho and Knight 1998). Water and many of the liquid crystalline molecules within the cell membrane are electrical dipoles, which can transduce and convert mechanical and acoustical oscillations, including oscillating frequencies of light. This can be one way in which the cell membrane increases its permeability and cellular transport processes and removal of waste products (Oschman 1990).

The work of Frohlich (1988) and Davydov (1987), based on quantum physics, has confirmed that the ECM produces coherent laser like oscillations that move through the entire organism. These semiconductor properties form an electronic and photonic network of varied frequencies, which include visible and near visible light (Pienta and Coffey 1991). These frequencies serve as signals that integrate processes involving immune defence, growth including injury repair and the functioning of the body as a whole. Thus photon-induced chemistry gives rise to biological reactions (Smith and Hanawalt 1969).

### Effects of lilt on the lymphatic system

Animal studies performed by Leivens (1977) examined localised oedema, adhesion of the scar to underlying tissue and regeneration of lymph and blood vessels in wounds following LILT. Results revealed that tissue adhesion rarely occurred in the laser experimental group, but was present in 100% of the control group by the fourth day after wounding. Tissue adhesion creates a barrier against migration of endothelial cells and new vessel formation within the wounded area. Fibrotic tissue greater than 0.5mm has been shown to inhibit migration of endothelial lymph cells and growth of lymphatic vessels (Clodius 1977).

The Lievens (1977) study outcomes relating to the rate of regeneration of both blood and lymph vessels in the laser group was statistically significant and it was noted that the cut lymph vessels never regenerated in the form of a network, as was seen in the control group. Instead, the cut lymph vessels repaired to their original pattern, and after several days were less permeable and more functional. Lymph vessel permeability in the control group was, however, still evident in 50% of the cases, some for as long as six months.

Another study by Leivens (1985) has demonstrated an increased dilation of blood and lymph vessels immediately following exposure to LILT, while Piller and Thelander (1995) have also observed significant reduction in oedema and tissue fibrosis following LILT.

Experimental studies relating to the pathophysiology of lymphoedema, has revealed histological evidence that enhancement of phagocytic activity stimulated proteolysis of accumulated proteins. This in turn facilitated the release of osmotically retained lymph fluid, and a subsequent increase in the lysis of fibrotic tissue (Casley-Smith and Casley-Smith 1986; Piller et al 1988).

The LILT induced enhancement of immune response and phagocyte activity (Karu 1988) can assist proteolysis and provide additional protection against the development of cellulitis.

### Costs of managing lymphoedema

In 1994 the cost of reducing oedema relating to a lymphoedematous limb using manual lymphatic drainage, complex physical therapy and other multifaceted regimes in a public hospital were costly and amounted to approximately AU\$60 per percentage point of reduction and costing up to AU\$3,000 in the first year for a 50% average reduction in oedema (Casley-Smith and Casley-Smith 1986). It is highly likely that these costs would have spiralled upwards in the past 16 years.

**Figure 7: Primary lymphoedema prior LILT**



**Figure 8: Reduced limb circumference and fibrosis after six LILT sessions**



The estimated cost of LILT for treatment of lymphoedema during another study conducted in Australia by Piller and Thelander (1995) was approximately AU\$16 per percentage point reduction and a 19% average reduction in oedema within the first 10 weeks of LILT application. Despite these significant clinical results and cost savings being demonstrated over a decade and half, no further cost effective study has been conducted nor has LILT been integrated into the lymphoedema treatment regime within community health centres and hospital outpatient clinics in Australia. The very fact that implementing LILT with an adequately powered non thermal laser to instigate lymphatic drainage would take less time and physical effort than it does to perform manual lymphatic drainage massage is a time cost saving in itself.

#### **New wholistic treatment of lymphoedema with lilt**

Lymphoedema not only effects the limbs but the whole person, as the improvement in the mobility and visible appearance of the LILT treated limb results in a more positive state of mind and self-esteem. The most prevalent clinical methods of managing lymphoedema involve manual lymph drainage, compression garments and bandaging. While these methods are highly effective in controlling excess oedema, they do not address the underlying inefficiency of the lymphatic system and related fibrosis that continues to restrict lymphatic and blood flow.

The anti-fibrinolytic action of LILT on the associated tissue fibrosis of chronic lymphoedema via improved immune response and Phagocyte activity (Casley Smith-Smith and Casley-Smith 1986) mean that the affected ECM is now capable of facilitating migration of endothelial lymph cells and re-canalisation of lymph vessels (Clodius 1977). Add to this the systemic immune support to defend against the occurrence of cellulitis while rapidly reducing limb circumference within minutes (Leivens 1977), and new holistic level of treatment is now possible to address all aspects of lymphoedema.

#### **Diabetic support with lilt**

LILT enhanced immune competence has the potential to provide a major benefit in reducing the incidence of infections and morbidity, particularly in diabetic patients.

In diabetes type 2, the supply and removal of cells throughout the body is restricted when the ECM becomes congested with undesirable waste products, and tissue drainage is impaired. The body's capacity to communicate diminishes as regulatory function declines, nervous tissues are compromised and availability of essential nutrients for nerve and tissue repair reduces. This can result in diabetic foot ulceration and blindness.

It is forecast that the incidence of diabetes will double in the next 20 years and impaired wound healing will be the pivotal event responsible for most of the morbidity in diabetic foot disease (McLennan et al 2008). Diabetic lower limb ulceration and amputation result from neuropathy and vascular disease, which predisposes the diabetic foot to injury, bone fracture and infection without sensation. Adequate serum levels of

**Figure 5: Secondary lymphoedema and fibrosis before LILT**



**Figure 6: Reduced fibrosis after 21 LILT sessions**



**Figure 9: Amputee and neuropathic foot ulcer prior to LILT session**



**Figure 10: After six LILT sessions**



antibiotics may not reach the infected sites due to vascular occlusions. Staphylococcus bacteria can survive intracellularly and infect bone, leading to the development of osteomyelitis (Taylor and Porter 1987). Non healing ulceration is a major pre-disposing factor for 85% of lower limb amputations, and more than 50% of all lower limb amputations are associated with diabetes and increased risk of mortality (Pecorato et al 1990). High glucose levels impair the functioning of human fibroblast cells and inhibit the wound healing potential of the diabetic patient, but could be significantly improved with the integration of LILT into the wound care regime.

**Figure 11: Type 1 diabetic non responding ulcer and osteomyelitis for surgical amputation**



**Figure 12: After 18 LILT sessions**



**Figure 13: After 32 LILT sessions**



**Figure 14: After 40 LILT sessions**



A diabetic foot requires management by a multi-disciplinary team, in order to contribute and communicate specific knowledge for appropriate treatment. However, the first line of defence to maximise outcomes in any wound treatment should be to support the mitochondria, which is responsible for producing 95% of the cells energy and this vital support is a primary action of LILT.

#### **Early GP referral to community health centres for ulcer prevention**

The management of chronic pain and the healing of wounds and their complications put an ever increasing financial burden on healthcare costs worldwide. Early GP referral of patients to community health centres who present with

- venous stasis dermatitis
- venous insufficiency or ischaemia
- chronic pilonidal or non-healing wounds, leg and foot ulcers
- newly developing ulcers
- oedema in upper or lower body limbs

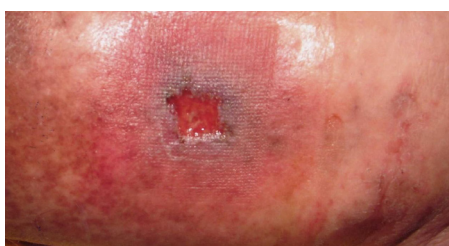
#### **Does lilt have a role in community nursing?**

Poorly coordinated and inconsistent management of chronic wounds without LILT has been shown to contribute to lower healing rates and higher costs (MacLellen 2000). National, systematic GP referral for the above listed conditions would be the first major step towards preventing client neglect or mismanagement that could lead to hospitalisation, amputation or prolonged nursing care in the future.

**Figure 1: Chronic non healing leg ulcer before first ILIT session**



**Figure 2: New graduation tissue with decreased maceration and increased vascularisation four days after one ILIT session**



Furthermore, existing wound care clinics in community health centres, could ultimately become *ulcer prevention clinics*, and the portability and varying prices of laser devices used in LILT makes it possible for patients to be treated both in their regional community health centre and in their home.

**Figure 15: Chronic venous leg ulcer and venous dermatitis prior to LILT session**



**Figure 16: Resolving dermatitis and decreased slough after 13 LILT sessions**



**Figure 17: Complete healing of ulcer after 26 LILT sessions**



Medium to large wounds should ideally be treated three times a week within the community health centre initially, until the wound has reduced in size and morbidity. After that, wound management and LILT treatment could continue to be provided in the client's home, to prevent wound breakdown and further assist with wound closure.

Ongoing wound management either in a wound clinic or in the client's own home would ideally involve LILT treatment at selected intervals beginning with fortnightly, then monthly and three-monthly, during the first twelve months after wound closure to support cellular and immune function, blood and lymph circulation and maximise stabilisation of the wound site, to prevent a recurrence.

### **Health care costs in an ageing population**

A large increase in the number of older Australians over the age of 65 years is expected to double within the next 40 years and with it comes the increased risk of lower limb ulceration (Margolis et al 2002). In 1996, a study in Australia estimated the private hospital cost for managing a chronic leg ulcer was \$8,734 per admission for a mean stay of 23.9 days (Grindlay and MacLellen 1997). Alleviation of inflammation and pain utilising LILT in an age care facility, where clients are already taking a plethora of medications for existing pathologies, would be of major benefit in reducing suffering, health care costs as well as pressure ulcers.

Studies have reported that community leg ulcer clinics are more effective and less expensive than hospital care for the management of chronic leg wounds (Bosanquet et al 1993). Furthermore some community wound clinics have shown that they provide more cost-effective treatment than domiciliary care through improved rates of healing (Bentley 2001; Thurlby and Griffiths 2002). One of the difficulties of living outside the metropolitan area of a city, especially rural Australia, is the time, effort and financial costs for the client to get to the community health centres and hospital outpatient clinics. Consequently, lack of treatment can result in worsening of their wound condition or lymphoedema and further functional impairment and decline in quality of life and overall health of the individual.

## **CONCLUSION**

### **Evidence based practice**

The philosophy of evidence-based medicine is the explicit, judicious and conscientious use of the best existing evidence to make decisions about the care of individual patients (Sackett et al 1996). Given the number of randomised trials and clinical investigations already undertaken in the area of LILT and meta-analysis of LILT



literature related to wound healing (Woodruff et al 2004), the issue is how much of what is proven about LILT is actually being applied in the front lines of patients living in Australia today.

LILT is a biomodulating phototherapy that has stood the test of time and diversity in clinical application worldwide and has been scientifically proven to be capable of supporting an organism's ability to:

- sustain its redox potential (Anders et al 1993)
- increase immune competency (Karu et al 1991)
- enhance lymphatic drainage and angiogenesis (Leivens 1977)
- improve blood flow (Leivens 1985)
- modulate inflammation and pain pathways (Walker 1983)
- accelerated regeneration of soft tissue, bone and neural tissue (Mester 1976; Trelles and Mayayo 1987; Rochkind et al 1989; Woodruff et al 2004).
- regenerate nerve tissue and preserve nerve conductivity (Rochkind et al 1989)

Nurses are at the interface of acute hospital care and community management of chronic wounds and lymphoedema and are therefore the most suitable healthcare practitioners for providing LILT treatment as part of their patient care regime. Moreover, home based nursing care has the potential to be expanded to treat more people in a day than could be otherwise treated in the community health centre or outpatient clinic, as our ageing population increases.

Healing rates have a real potential to be accelerated utilising a multifaceted approach incorporating best practice of evidence-based wound care in conjunction with the supportive biomodulating effects of LILT, in standardised nursing teams and centres throughout Australia, and particularly to prevent amputation in diabetic clients and in remote outback regions, where indigenous Australians have a higher incidence of diabetes (Australian Bureau of Statistics 2001). The utilisation of the natural healing powers of laser light that is non-invasive, painless and free from serious side-effects can support vital bio-regulating processes, particularly in diabetic and neuropathic conditions, with obvious and positive outcomes for patients, families, communities and governments worldwide.

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**Figure 3: Impaired circulation of lower leg in 85 year old male**



**Figure 4: Tissue regeneration and improved circulation after 12 LILT sessions**



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# Foot care within the Jordanian healthcare system: a qualitative inquiry of patient's perspectives

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## KEY WORDS

Diabetic foot, Preventive, Patients' views, Screening, Culture of Practice, Jordan

## ABSTRACT

### Objective

The objective of this study was to elaborate patient's views of diabetic foot care within the Jordanian healthcare system.

### Design

A qualitative approach with unstructured face-to-face interviews was used in this study.

### Setting

Participants were recruited from six hospitals throughout Jordan plus a university affiliated healthcare centre.

### Subjects

Seven patients with diabetes and suffering from a foot burn injury were recruited from a university affiliated hospital plus public hospitals located in Amman, the capital of Jordan. In addition to Amman, the facilities were located in two main Jordanian governorates; Irbid and Al-Karak.

### Results

Our findings are consistent with what is known about barriers to effective diabetic foot care. Participants were not practising preventive foot care behaviours due to personal beliefs about healthcare and the structure and culture of healthcare practice in Jordan. Specifically, participants of this study believed that the presence of diabetes does not necessitate the need for regular foot examination when there are no active ulcers on their feet. Additionally, providers of healthcare were not performing foot examination as part of regular diabetes care.

### Conclusions

Efforts should be made to promote preventive care practices within the context of the Jordanian healthcare system. By so doing, the incidence and severity of diabetic foot ulceration and other consequences may be reduced.

## INTRODUCTION

Foot ulceration is one of the most serious complications of diabetes which may result in prolonged hospitalisation and amputation of the lower limb (King 2008). Diabetic foot is a complex syndrome in which a range of bodily structures are insulted, creating difficulties for optimal management (King 2008; Singh et al 2005). Currently, it is widely accepted that diabetic foot ulcers should be managed by a co-ordinated multidisciplinary team of clinicians (Sanders et al 2010). The effectiveness of such an approach has reportedly reduced the incidence of lower limb amputations (Houtum et al 2004; King 2008; Krishnan et al 2008; Batista et al 2010). In addition to the health professionals on a multidisciplinary team, a person with diabetes is considered a core member in that ideally, they work with team members to adopt behaviours that enable them to avoid injury or at least discover injuries in the early stages and subsequently reduce the incidence and severity of ulcers (Naude and Bruwer 2006; National Institute for Health and Clinical Excellence 2011).

Active participation in care planning and injury management by the patient necessitates persistent commitment towards implementing clinicians' advice of self-care. Similarly, clinicians should exhibit positive attitudes towards managing diabetic foot ulcers. Literature has documented several barriers towards providing optimal diabetic foot care that includes patients themselves, who have a lack of interest towards implementing clinicians' advice, especially when the advice contradicts their own beliefs (Gagliardino et al 2007; Gale et al 2008; Jinadasa and Jeewantha 2011). Several publications have reported that clinicians lack interest in managing people with diabetes (Gagliardino et al 2007; Peimani et al 2010). The concept of multidisciplinary diabetic foot care is still evolving and many countries have not adopted such a model (Apelqvist et al 2008; Boulton 2000; Bakker 2009). The situation is more dramatic in developing countries (Morbach 2006; Tulley et al 2009; Bakker 2009), where the prevalence of type 2 diabetes (The Lancet 2009), and foot ulceration (Morbach 2006; Unwin 2008; Tulley et al 2009; Ramachandran 2004), are alarming. To add to the complexity, healthcare systems in developing countries are mainly hospital oriented, and the focus is to treat acute illnesses; whereas the recommended diabetic foot management requires long-term preventive strategies.

In order to develop health services which are based on the best available evidence, research that gathers patients' perceptions of long term preventive diabetic foot care in developing countries is necessary. Jordan was chosen as a setting to conduct the current study because this developing country faces an increasing prevalence of poorly controlled diabetes (Centres for Disease Control and Prevention 2006; Ajlouni et al 2007). Additionally, data on the status of foot care services within the Jordanian healthcare system context are lacking. Accordingly, information is necessary to address issues concerning diabetic foot care within the Jordanian healthcare system and provide greater understanding of Jordanians' knowledge of diabetes and preventive foot care.

## METHODS

The reported study employed an interpretive phenomenological approach and was conducted in seven healthcare settings in Jordan. Approval to conduct the study was provided by the three ethics committees governing the seven research settings. Recruited patients gave written informed consent for participation after receiving verbal and written information about the study, which detailed what was required of them and their rights in participation.

### Recruitment

Recruitment from burn units was not possible because cases of a foot burn injury in Jordan are not admitted into burn units due to lack of beds and the high incidence of severe burn injuries. Recruitment through hospital records was also not possible because foot burn injuries are not usually recorded as an admission

diagnosis. Accordingly, visiting the participating healthcare centres and establishing personal communications with hospital staff was considered an appropriate strategy to identify patients hospitalised with diabetes and a foot burn injury.

A purposeful sampling approach was employed to recruit participants from a university affiliated hospital plus public hospitals, located in Amman, the capital of Jordan, and located in two main Jordanian governorates; namely, Irbid and Al-Karak. In accordance with advice from hospital administrators, to identify patients with diabetes and a foot burn injury the first author approached general surgical wards of hospital sites located in the governorates mentioned earlier. As a result, four participants agreed to take part in the study. An additional participant was recruited from the diabetic foot clinic of a large military healthcare centre located in Amman. Another participant was recruited after discharge through the plastic surgeon of the university affiliated hospital. Finally, a seventh participant was recruited through a university affiliated healthcare centre.

### **Data Collection**

In a 40 minute in-depth conversational style digitally recorded interview conducted by the first author, participants were asked to express their views on the type of foot care they believed should be received as part of regular diabetes management. Following this initial question, further questions elaborated participants' answers, and explored their perceptions of the contribution diabetes made to foot burn injuries. The time, date and setting of the interviews were arranged to suit each participant, who was given the opportunity to invite family members or friends.

### **Data Analysis**

Being a bilingual speaker of Arabic and English, the first author conducted and transcribed all the interviews verbatim into text files, checked the accuracy of the transcription from the original language of the interviews, Arabic, and coded the interviews for data analysis. Such strategies assured the authors that the emergent themes were consistent with the original transcribed interviews. Importantly, the first author was from the same culture as the participants and this ensured the cultural focus was not lost in the translations. The translated excerpts were discussed extensively by the two authors who are from different cultures (Arabic and Caucasian). A final point to be made is that back translation was undertaken to ensure the English version was equivalent to the original Arabic text. Excerpts presented in this manuscript are from the transcribed interviews.

The engagement of the first author in conducting and transcribing the interviews verbatim established familiarity with the texts and enabled a comprehensive understanding of participants' views on the type of foot care they should receive as part of diabetes management.

Thematic analysis, incorporating the concept of the Hermeneutic Circle was used to identify common themes within the texts (Lindseth and Norberg 2004). Each transcription, in its Arabic version, was examined carefully, using different reading approaches, in order to grasp main ideas in the texts. Commonalities between transcriptions were extracted leading to the formulation of themes and sub-themes. The formulated themes and sub-themes were connected and drawn together to formulate a meaningful picture of participants' perspectives on diabetic foot care.

## **FINDINGS**

### **Participants Profile**

Six of the seven participants were recruited from secondary healthcare facilities when receiving treatment of an acute foot injury. Similarly, six out the seven participants were known cases with diabetes. In the case of the seventh participant, the diagnosis of diabetes was made following the occurrence of a foot burn injury. All the participants were either in the fifth or sixth decade of life.

To ensure anonymity, each participant is identified by a pseudonym to remain anonymous. The chosen pseudonyms start with either the prefix 'Abu' for male participants or 'Umm' for females. The aforementioned prefixes are Arabic words that mean in English father and mother, respectively. It is a tradition in Jordan to call a person by the name of his/her older son. Accordingly, if the participant was male, so the pseudonym begins with the prefix 'Abu'. Similarly, if the participant was female, so the pseudonym begins with the prefix 'Umm'.

After completing interviews with seven participants, a decision was made to stop recruiting further participants because the point of data saturation was reached. Data saturation is the point at which information to answer the research question becomes repetitive and interviewing additional participants would not add further significant data to the study (Polit and Beck 2004).

### **Core Themes**

Analysis of the transcribed interviews yielded two core themes: (1) foot screening: not necessary; and (2) diabetes: no role. These two themes are discussed to provide an understanding of participant's thoughts and perceptions of diabetic foot care.

#### **Screening: Not Necessary**

When the participants spoke about the foot care they received as part of diabetes management, they reported that foot examination was not routinely part of that care. Furthermore, participants also believed that diabetes did not necessitate the need for regular foot examination.

Umm-Haitham (participant) stressed that no one had examined her feet since she was diagnosed with diabetes. Indeed, Umm-Haitham insisted there was no need for regular foot examination because her body and feet were all right.

*No, no they have not.... No, no, nothing. We thank God the body is okay. Nothing is wrong in my feet... Doctors used to say that my diabetes is satisfactory, but I need to control my diet.*

Indeed, Umm-Haitham's view was common among the other participants who gave a similar justification for why they thought that regular foot examination was not necessary in the absence of an acute problem. In this context, Abu-waleed had never sought healthcare for his diabetes or possible complications because he considered his health to be "okay". Yet, Abu-waleed expressed a good understanding of complications that could result from diabetes.

*The researcher: over 20 years, has any one examined your feet?*

*Abu-waleed: my feet, no.*

*The researcher: no one! What about your eyes?*

*Abu-waleed: no,*

*The researcher: Do you know about diabetes complications?,*

*Abu-waleed: yes.*

*The researcher: what are they?*

*Abu-waleed: Oh, it causes paraesthesia, stenosis of the arteries, damages the kidneys and retina*

*The researcher: so, why do you not follow up with screening?*

*Abu-waleed: I think things are okay.*



Umm-Falah declared that her feet had not been examined from the time of her diagnosis with diabetes (fourteen years). Indeed, Umm-Falah's tone implied that she did not consider foot examination necessary because her feet were not hurting. Specifically, Umm-Falah's reply to the question, if her feet were being examined regularly as part of regular diabetes care, was *"It (the foot) was not annoying me, just since it was burned"*.

*Abu-Salem mentioned that since sustaining foot burn injuries, he was receiving foot examination at a hospital, whereas prior to injury his feet had not been examined. The following excerpts have been taken from interviews with Abu-Salem.*

*The researcher: since being diagnosed with diabetes in the 1980s, when you visited the doctor, were your feet examined, that is, did the doctor inspect the soles?*

*Abu-Salem: no, no, no*

*The researcher: no examination! So you mean that foot examination took place after the burn injury?*

*Abu-Salem's wife: yes*

*Abu-Salem: after this accident.*

In review, participants justified their views that regular foot examination is not necessary, due to no acute problems with their feet. Participants explained that the care provided was limited to periodic visits to the local healthcare centre, where medications were supplied without discussion and advice on diabetes management and possible complications was not provided.

*Abu-khaldun: ...they asked me some questions like you, for instance: how long have you have diabetes and such things and they gave me the medicine, and then I took myself home.*

*Umm-Falah: I go to the healthcare centre to obtain the tablets...*

Out of the seven participants only one person was managed by a foot care professional within a specialist diabetic foot clinic for several months, which resulted in complete healing of the injury.

*Umm-Hamed: ... visiting the clinic for months and the wound completely healed.*

### **Diabetes: No Role**

Two male participants believed that diabetes had not contributed to their injuries. Abu-khaled rationalised his opinion by informing the researchers that his blood glucose level was not that high (around 140mg/dl), implying that he considered his blood glucose levels acceptable. Current recommendations suggest that people with diabetes should be supported to maintain their blood glucose levels close to the normal range (from 70 to 120 mg/dL ) (National Collaborating Centre for Chronic Conditions 2008).

*I do not think so, because diabetes is not high with me. When it becomes high, the highest it reaches is 140.*

Abu-khaldun was more succinct in expressing his viewpoint that diabetes had not contributed to his foot burn, but his doctor took extra precautions because he had diabetes, and there was evidence of infection.

*No, no, it has no role. I tried to do ablution, like any one wants to wash his feet. Diabetes has no role; but because I have diabetes the doctor took extra precautions. He (the doctor) was worried about my foot, he noticed infection, and then he hospitalised me.*

In contrast, other participants did know that diabetes had contributed to the acquired burn injuries even though they did not understand how it did so. Umm-Haitham mentioned that diabetes played a role in the acquired burn because her toes became like *"charcoal"*.

*Umm-Haitham: yes, it (diabetes) has a role. They (the toes) became like charcoal.*

However, when asked how diabetes contributed to her incurred burn injuries, Umm-Haitham replied “*I do not know*”. Similarly, Abu-waleed’s rationalisation for the complexity of his foot burn was not because the acquired burn was severe, but because of diabetes.

The thing what happened to me is not from the force (severity) of the burn or so. No, it is weakness, I have acquired from diabetes.

Distinctively, his reply, to the author’s question “*where has the weakness happened?*” was “*in the arteries, in the cells of my body, in the skin and such things*”.

Significantly, participants mentioned that lay people from younger generations (friends or sons) informed them that diabetes predisposes them to foot ulceration. However, it was obvious that participants lacked understanding about how diabetes contributed to their burn injuries. In this regard, Umm-Falah mentioned that her sons advised her that diabetes had effects on the feet. Yet, like Umm Haitham, she had no clear understanding of what the effects were.

*Umm-Falah: the sons used to say to me, take care mum. It has effects on the feet.*

*Umm-Haitham: I do not know, they say the blood is coagulated in the arteries .... the ladies talk*

Abu-Khaldun highlighted some of the discrepancies among different providers of diabetic foot care. Abu-khaldun mentioned that his feet were examined for possible loss of pain sensation when he sought care from a university affiliated hospital, which was not the case when he attended the local healthcare centre. Yet, Abu-khaldun stopped seeking care from the university hospital because of longer waiting times in comparison to the healthcare centre, which was, “*within two minutes.*”

## DISCUSSION

Our study sheds light on diabetic foot care services from the perspective of patients within the context of the Jordanian healthcare system. The ensuing discussion is structured to highlight the milieu of foot care provided in Jordan, paying special attention to foot screening and the importance of considering culturally oriented health education programs.

### Foot Screening

A common view provided by participants was that they were not aware that regular foot examination was necessary to identify early problems. Regular foot examination is considered an integral part of diabetes care because it is a strategy by which people at risk of foot ulceration can be identified and then directed to the appropriate level of care (Mayfield et al 2000; Singh et al 2005). In so doing, the incidence and severity of diabetes-related foot ulceration is reduced and therefore the costs associated with diabetic foot management. In fact, despite reported improvements in the awareness and adherence to foot screening, foot screening is still the most neglected part of diabetes care (Jeffcoate and Bakker 2005). Specifically, the reported improvements are from a few selected developed countries in which the projected targets remain unmet (Tapp et al 2004; US Department of Health and Human Services 2005).

Participants of this study reported that the providers of their care did not periodically screen patients’ feet and the provided diabetes care was limited to receiving the monthly stock of medication. Participants mentioned that they more often obtained information from younger family members or friends about diabetes and its complications rather than health care providers. Accordingly, a lack of understanding about diabetes and the risks associated was evident among the participants because their obtained knowledge was not from health

professionals. Indeed, the diabetes care provided, as the participants mentioned, was limited to medication supply, with no discussion or advice on diabetes control, management and avoidance of complications. Evidently, preventive diabetic foot care is poorly addressed in the Jordanian healthcare system, and patient education is not part of regular diabetes care.

The status of foot care services in developing countries is far from satisfactory because the concept of preventive foot care is either not adopted (Boulton et al 2005; Apelqvist et al 2008) or still in the initial stages, and diabetic foot care clinics are not accessible to all sufferers from diabetes (Apelqvist et al 2008). For example, diabetic foot care clinics have recently been established in Jordan (The National Centre for Diabetes Endocrinology & Genetics 2009) and are finding it difficult to manage the increasing numbers of Jordanians suffering from diabetes (Ajlouni et al 1998; Ajlouni et al 2007). Furthermore, the established clinics are mainly located in the capital city of Jordan, Amman; and therefore are not accessible to all people with diabetes, especially those living in other urban areas.

Demonstrating the lack of specialised foot care clinics, only one out of the seven participants (who was living in Amman close to a large hospital) received treatment from a specialised diabetic foot care nurse. However, that participant was not receiving preventive diabetic foot care. The point emphasised is that the participants were not practicing or seeking preventive diabetic foot care because of their beliefs and this could be attributed to the structure and culture of health practices in Jordan, where health promotion and disease prevention are not well implemented concepts. The Jordanian healthcare system is strongly focused on a culture of hospital care and practices that focuses on treating acute problems.

Such a culture is reflected in the fact that all the participants approached secondary healthcare facilities for the treatment of acute burn injuries. An important and disappointing issue which can be captured from participants' comments is that healthcare professional's lack of awareness about the seriousness of injuries that may be sustained by people with diabetes. Literature has documented that clinicians often do not pay enough attention to feet of people with diabetes (Bosseri 2002; De Berardis et al 2005). Indeed, the reasons for the lack of preventive diabetic foot care practices among the participants are consistent with those reported in the literature in terms of the variation and complexity of the reasons that can be related to the patients themselves, their healthcare providers and to the structure and the nature of healthcare delivery systems.

In summary, it is evident that both healthcare providers and patients do not pay enough attention to preventive practices of diabetic foot care. This finding is supported by the observation of the first author who visited the diabetic foot clinic (located in one of the study hospitals) several times. He noted the clinic function was limited to providing care to patients suffering from active diabetic foot ulceration and paying little or no attention to preventive measures to those without a history of foot ulceration.

Given the evidence obtained from this study, providers of diabetes care should work jointly with family members in order to tailor a personalised health education plan according to each patient's individual needs. The focus of education should extend to people in rural areas who often delay seeking healthcare. Considering the structure and culture of practice, it would be difficult to provide preventive care within such culture especially to those outside cities. Accordingly, stakeholders should be involved in efforts aiming to make preventive healthcare accessible to all people wherever they live. Since participants of this study considered younger members of the family as a source of information, the Jordanian healthcare system could consider utilising younger family members to promote the concept of preventive foot care practices among older people with diabetes living in rural areas.

## CONCLUSION

Similar to what is reported in the literature, our study found that both people with diabetes and health providers are not aware of the importance of preventive diabetic foot care. Additionally, the reported study highlights the need to adopt culturally oriented diabetes health education programs in which family members could be, utilised as caregivers and a resource of information to increase patients' awareness towards preventive foot care practices. Because this study has limited scope obtained results have limited application to selected settings.

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# The benefits of debriefing as formative feedback in nurse education

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## KEY WORDS

Debrief, formative feedback, formative evaluation, nurse education, teaching and learning methods

## ABSTRACT

### Objective

This paper explores the nursing literature to identify the educative process and essential features of debriefing.

### Setting

Nursing education settings: undergraduate, postgraduate and professional development in nursing and midwifery.

### Data sources

Studies of debriefing in nurse education were located in peer reviewed journals between 1990 and May 2010. Searches were made using keywords in six healthcare and one education database. Eleven nursing studies reporting education of individuals and six studies of teams were selected for inclusion; only one study provided learning outcome data. Hence, the literature was synthesised in a narrative form to include related studies.

### Primary argument

Formative feedback is important in experiential learning and is often applied in nursing in the form of facilitated structured debriefing. Debriefing is most commonly reported in relation to clinical skills development and as part of individual and team-based simulation training. Educational outcomes are dependant upon the skills of the facilitator in offering feedback in accordance with best practice. Although a key component of higher level education, there is a lack of published evidence with regard to the effectiveness of debriefing techniques in nurse education. A framework for debriefing practice is presented.

### Conclusion

Structured facilitated debriefing is an important strategy to engage students in learning and is essential in simulation training. Further research is warranted to fully understand the impact of the method in nurse education.

## INTRODUCTION

The 'debrief' is a common form of retrospective analysis of critical incidents in nursing and the health professions (Ireland et al 2008), but its potential for nurse education has not been fully recognised.

Debriefing has been described as a critical incident stress-reduction technique that includes structured stages of group discussion (Mitchell 1983). However, studies including a Cochrane review, have failed to agree on the overall value of the technique for traumatic stress reduction - although there may be some benefits (Rose et al 2002; van Emmerik et al 2002).

Studies also report brief-and-debrief techniques may enhance skills and improve the quality of patient care (Salas et al 2005). Debriefing is therefore an important strategy for teaching and learning in health care. It enhances learning opportunities and enables students to learn from their mistakes (Fanning and Gaba 2007). Didactic approaches to clinical education without debriefing approaches are unlikely to adequately prepare students for clinical practise because of a need to combine core knowledge with clinical skill (Tiwari 2005; Buykx 2011).

In recent years there has been a focus on experiential learning strategies that include debriefing techniques for this educative potential (Parker and Myrick 2010; Loyd and Koenig 2008; Agency for Healthcare Research and Quality 2000). Such techniques have become known as *performance* debriefing. There is a paucity of studies on the effectiveness of the method for teaching and learning.

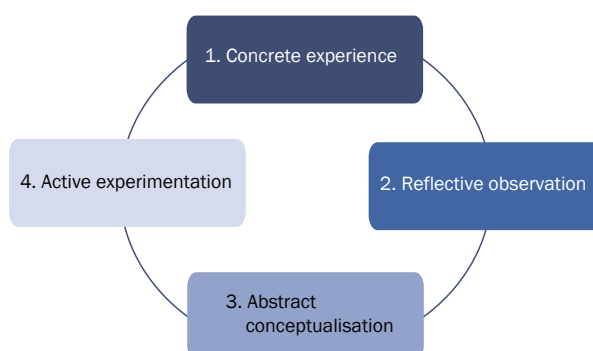
### Educational Theory

Individuals differ in their preferred learning style, requiring varied educational approaches with indications that exposure to familiar and unfamiliar teaching techniques will develop learning (Vaughn and Baker 2001). Different modalities and learning preferences have been described in adult education such as visual, visual/verbal, physical (kinaesthetic) and auditory reception (Neuhauser 2002). In addition, both formative and summative assessments enhance learning outcomes; either as a trigger for learning, or from assessment reflection and feedback (Boud and Falchikov 2006). However, assessment tasks should not be limited to 'surface' learning approaches such as the recall of facts, but should include deeper approaches that apply learning in the clinical or clinically simulated context (Tiwari et al 2005).

Learning generally takes place through a 'reception learning' process when "new meanings are obtained by asking questions and getting clarifications of old concepts and propositions and new concepts and propositions, heavily mediated through language" (Novak 2006: p3). This learning process has been described as an 'experiential learning cycle' of four stages by Kolb (1984) (figure 1). First, the learner has a concrete experience, followed by a reflective period to add meaning and perspective. Thirdly, abstract conceptualisations help develop understanding of actions and reactions in the light of previous knowledge. Lastly, the learner applies what has been learned to real situations and experiments with the knowledge. For example, a nurse may learn about the side effects of a prescribed drug through experiencing a patient's collapse; reflecting on the incident and assimilating the learning into work behaviours in the future.

The experiential learning cycle can be applied to numerous learning situations in health care.

**Figure 1: Kolb's experiential learning cycle**



### Debriefing for reflection

There is no universally recognised definition of debriefing for learning, broadly considered to be a facilitator - or peer - led discussion of events. This includes reflection and assimilation of activities into a learner's cognition that aims to produce long-lasting learning (Fanning and Gaba 2007). Debriefing requires a two way communication process between student and teacher. The process is not just feedback on performance but a communication process that draws out performance explanations and enables students to develop strategies to enhance future performance. Well constructed debriefings lead to positive reflective outcomes (Byykh et al 2011). Debriefing is particularly important following formative assessment, as the opportunity to improve performance prior to summative assessment remains. It can assist reflective activity in the second phase of Kolb's cycle. For example, by reflecting on performance, structured debriefing sessions will highlight progress (Shute 2007).

Although formative feedback is regarded as critical for learning in higher education (Quality Assurance Agency for Higher Education 2006), there is no clear best practice route and many approaches have been adopted with a variety of outcomes (Shute 2007). Processes of debriefing include oral feedback following observation of skills (Tiwari 2005) for example after Objective Structured Clinical Evaluations (OSCE) (Rentschler et al 2007), replay of videoed skills performance (Minardi and Ritter 1999) and in on-line assessments of quizzes and reflective reports (Richardson 1995). Debriefs may be facilitated by teachers, learner groups, peers, or through self-assessment, with a variety of effects (Perera et al 2008; Crowe and O'Malley 2006; Glynn et al 2006; Hargreaves 2004).

### Aim

This paper aims to critically explore the contemporary literature on debriefing as an educative method and to answer the questions:

- i. In what fields of nursing education is debriefing being utilised for learning?
- ii. What effect does debriefing have on learning?
- iii. What are the features of debriefing that are indicative of best practice?

Searches were made of electronic databases for publications in peer reviewed journals in English between 2000 and May 2010. The databases included Medline Ovid, ProQuest, Cinahl Plus, PsychInfo, PubMed and ERIC. Multiple searches were conducted using strategies appropriate for each database, with combinations of keywords that included: debrief, learning, formative feedback, formative assessment, facilitated feedback, experiential learning and nursing. Research reports involving pre-registration and professional level (post-graduate) continuing education in nursing were included, with a focus on debriefing for clinical outcomes. Quantitative and qualitative designs that reported studies of debriefing educational approach or effect (such as pre-test and post-test survey) were included. Primary and secondary studies (such as a review) were eligible. Studies of debriefing for administrative management purposes were excluded owing to the stated focus on clinical learning.

**Table 1: Included studies and their outcome**

Study	Design and sample	Assessment and analysis	Outcome
Birch et al 2007 (UK)	Randomised controlled trial using simulation with debrief in team training of hospital obstetric staff (n=36:6 teams of 6- medical/ midwives).	Evaluated knowledge, team performance pre-post training and after three months by survey; simulation measure included debrief.	Trend towards performance improvement with simulation and debrief with inadequate sample to reach significance.
Bambini et al 2009 (USA)	Quasi-experimental repeated measures survey of baccalaureate nursing students' simulation training with debrief for post-partum care (n=112).	Self-reports of confidence and self-efficacy to perform post partum nursing tasks analysed by t-tests.	Students' reports indicated a significant increase in each of the skills after a simulation training session with debrief although no separate data was collected on debriefing.



**Table 1: Included studies and their outcome, *continued...***

Study	Design and sample	Assessment and analysis	Outcome
Brown and Chronister 2009 (USA)	Quasi-experimental case-control study using simulation versus usual education in an electro-cardiogram course with nursing students (n=140).	Self-reported critical thinking and confidence scales.	Critical thinking and confidence scores were significantly higher after simulation education with debriefing.
Bryans 2004 (UK)	Quasi-experimental multi-method study to examine client consultation practice of registered nurse community health visitors (n=15).	Simulation/debrief, interview and observation with no details of analysis given.	Multi-methods including simulated interviews with debriefing were useful for evaluating nurses' communication and health visiting practice.
Chen et al 2007 (Canada)	Quasi-experimental post-test qualitative/quantitative surveys after high fidelity simulation training with debrief, of paediatric ICU team to implement new equipment (n=27).	Post- simulation with debrief, a group debriefing interview was used to examine team response to new equipment (a paediatric resuscitation cart system) and self-reported survey of end users used to assess satisfaction.	High-fidelity simulation is effective in introducing new equipment systems in the PICU by facilitating application for the end-user.
Cziraki et al 2008 (Canada)	Quasi-experimental post-test: quantitative and qualitative survey to improve hospital Rapid Response Team functioning, especially communication (n=29: medical/nursing).	Communication skills training with multiple educational strategies including simulation and feedback was assessed via self-reported survey (no separate assessment of debriefing) and ward staff feedback.	Self-rated evaluations report positive team communication training outcomes and ward staff (users) report communication improvement after training.
Dine et al 2008 (USA)	Experimental prospective randomised trial to assess CPR training using simulation with verbal debriefing versus simulation with automated feedback from equipment, in registered nurses (n=65).	Change in CPR performance quality was objectively assessed in repeat simulations.	Verbal debriefing showed greatest improvements in performance of CPR depth and rate (36%; p=.005) compared to automated feedback from machines.
Hogg 2009 (UK)	Quasi-experimental post-test evaluation of a scenario for simulation education for registered nurses for safe blood transfusion practice (n=6).	Qualitative evaluation via focus group and by survey questionnaire.	Simulation with debrief was effective for teaching safe transfusion practice in a non-threatening realistic workplace environment.
Kuiper et al 2008 (USA)	Quasi-experimental prospective evaluation of clinical training plus simulation with debriefing in pre-registration senior nursing students (n=44).	Exploration of Outcome Present State (OPT) Model worksheets use by students for recording a clinical case & then student survey of reflection after simulation with debrief.	Descriptive findings support use of OPT and simulation with debriefing by staff for enhancing students' didactic learning.
Mikkelsen et al 2008 (Norway)	Quasi-experimental qualitative evaluation of 21 second year nursing students' perception of teaching technique for infection control skills: scenario-based study groups with and without teacher and simulation training.	Three student focus groups.	Scenario-based simulation training with teacher feedback via debrief was preferred.
Norris 2008 (UK)	Quasi-experimental post-test cross-sectional survey of obstetric emergency training for student midwives in groups of 6 (n=23).	Self-report survey of one-day training course without validated instrument; Descriptive analyses (details of methods not provided).	Simulation enabled students to put theory into practice and to practice in a safe environment.
Papaspyros et al 2010 (UK)	Post-test: quantitative survey (chart audit: n=115) and staff interviews (multi-professional cardiac theatre team) (n=15) re brief and de-brief theatre system.	Descriptive analyses (methods not given) for problematic and non-problematic theatre cases and counting of adjectives in staff interviews.	Staff were positive about briefing/debriefing process and its contribution to patient safety.

**Table 1: Included studies and their outcome, continued...**

Study	Design and sample	Assessment and analysis	Outcome
Rosenzweig et al 2008 (USA)	Quasi-experimental pre-test post-test survey of acute care nurse practitioner students after a communications skills course (for difficult communications) with simulation and structured debrief.	Students' self-reported confidence and perceived skill: before, after and after a further four months using a written survey; analysed by non-parametric statistics.	Students' perceived confidence and perceived skill improved significantly both immediately and after four months (all: $P < 0.001$ ) although no separate data was given for effect of debriefing.
Scherer et al 2007 (USA)	Experimental pre-test post-test controlled intervention using simulation with debrief versus clinical seminar for registered nurse-practitioner students (n=23).	Self-reports of cardiac care knowledge, confidence, teaching quality were collected via survey.	Simulation with debriefing had similar outcomes to the control group- with no data on debriefing as a separate variable.
Weinstock et al 2005 (USA)	Descriptive post-test survey of critical incident training for hospital paediatric medical/nursing staff with simulation education incorporating debriefing techniques.	Self-reported survey of value of education for paediatric emergencies.	An in-hospital simulation suite was able to offer regular team and individual training to the nursing/medical workforce that was regarded positively by participants and was cost-effective.
Wisborg et al 2006 (Norway)	Quasi-experimental pre-post test (survey) of hospital Trauma Teams (registered nurses, physicians) (n=1237).	Questionnaires before/after a two-simulation team training course (simulation plus structured debriefing). Comparative statistics were given.	Positive learning was self-reported, especially from nurses: n=793 nurses reported significantly higher met expectations of training, compared with physicians and others.

## RESULTS

Examination of title and abstract of 101 papers located in the search resulted in 17 nursing papers being selected for inclusion (table 1). The remainder were either non nursing studies, reported curriculum development, other types of formative assessment, or were reports. Of the selected studies, debriefing was an *element* of teaching that was not assessed independently, except for one study that provided debriefing education outcome data (Dine et al 2008). Consequently, there was a lack of information about the effect of debriefing on learning. Six of the nursing papers reported team-based studies (listed in table 2) and described research that *included* debriefing approaches, such as evaluation of a simulation training day. Eleven nursing studies (listed in table 3) reported on education of individuals using strategies that included debriefing. Given the scarcity of evidence about impact of debriefing, in order to answer the research questions the literature was synthesized in a narrative form with a focus on debriefing practices. Additional evidence from research in other professions (eg. medicine) was included to inform responses to the research questions.

### Debriefing of teams

*Debriefing* has been incorporated into teaching techniques to develop the knowledge, skills and attitudes of various work groups, including nurses (Papaspoulos et al 2010; Cziraki et al 2008; Birch et al 2007; Chen et al 2007; Wisborg et al 2006; Weinstock et al 2005) and a range of other medical professionals (table 2). It can be used for training as a professional development tool and as debriefing following a critical incident (Papaspoulos et al 2010). Examples of team work groups and debriefing context are given in table 2.

**Table 2: Team debriefing in healthcare teams**

Study	Work group	Topic focus
Birch et al 2007	Hospital obstetric staff: midwives, medical staff	Obstetric emergency drills using simulation and debrief
Chen et al 2007	Paediatric ICU staff: medical and nursing	High-fidelity simulation training and debrief to implement new equipment (a paediatric resuscitation cart system)
Cziraki et al 2008	Hospital Rapid Response Team: team leads, medical and nursing professionals	Communication skills training using simulation to improve team function
Papaspyros et al 2010	Cardiac Theatre Team: surgeons, nurses, anaesthetists, theatre assistants	Routine brief-debrief: techniques to enhance patient safety
Weinstock et al 2005	Hospital Paediatric Staff: critical care fellows, nurses, respiratory therapists, paediatric house staff	Hospital-based paediatric staff education for paediatric emergency simulations incorporating debriefing techniques
Wisborg et al 2006	Hospital Trauma Teams: registered nurses and physicians	Trauma team training with structured debriefing following hospital based simulation

The medical team debriefing literature tends to focus on high risk environments such as operating theatres (Papaspyros et al 2010), emergency department trauma teams (Wisborg et al 2006; Weinstock et al 2005) and intensive care or medical emergency teams (Cziraki 2008; Birch et al 2007). Debriefing was commonly employed during the training of teams using mannequin-based simulation techniques or partial task trainers that enable repeated practice without risk to patients (Decker et al 2008). Such processes may enable development of skills and knowledge (Lambert and Glacken 2005) and will be paramount in feedback to emergency teams when combined with formal ratings scales (Cooper et al 2010a). Each of the six studies in table 2 reported positive learning outcomes for simulation training that incorporated various feedback and debrief techniques although without reports of debriefing effect alone.

Adults learn best when they are actively engaged; when the learning is problem centred and meaningful to their life situation and when they can immediately apply what they have learned (Fanning and Gaba 2007). Simulation education utilises these principles by creating replicated real-life scenarios for team practices. Essential parts of the 3-step simulation process include briefing, simulation and debriefing with academic support (Cant and Cooper 2010) using either computer-based high fidelity mannequins, standardised patients or alternatively, peer review learning and low fidelity simulation (Wisborg et al 2006).

Debriefing can stand alone as an educative method for clinical practice. Papaspyros et al (2010) utilised a daily team brief-and-debrief routine in the operating theatre that aimed to enhance overall teamwork. Nursing and medical staff prepared for surgery by sharing information about cases and planning. Daily debriefing enhanced team cohesion through socialisation and learning and improved quality by identifying recurring problems. Further, brief-and-debrief may offer informal learning opportunities for new staff members as elements of this form of learning mirror the mentoring and supporting role intended of critical incident debriefing. For example, when nurses and medical staff in the United Kingdom were debriefed after failed paediatric resuscitation attempts, Ireland (2008) reported that their main aim was to resolve medical, psychological and emotional issues.

In medicine, Edelson et al (2008) reported positive outcomes for cardiac resuscitation team performance. This used debriefing review of actual cardiopulmonary resuscitation (CPR) performance transcripts obtained from CPR-sensing and feedback-enabled defibrillator equipment. Medically-qualified team members were

debriefed for 45 minutes with two to four recent CPR attempts using this audio-visual feedback and further periodic debriefs. The study showed an improved initial patient survival rate for the debriefed group and significantly improved performance data compared with historical controls. Medical staff also reported improved understanding of the resuscitation guidelines, a higher comfort level, and improved leadership skills.

### Debriefing for individual learning

Debriefing is used in a diverse set of nursing curricula covering topics such as ECG interpretation, anaesthetics and blood transfusions, midwifery and cardiac emergencies at all educational levels (table 3). Studies describe a variety of feedback techniques including face to face, numeric and graphical transcripts of performance from equipment, video conferencing, or video replay. Timely, quality feedback is essential with active student participation (Bienstock et al 2007). Video review, therefore, offers opportunity for the clinical event to be paused, enabling 'in the moment' performance evaluation for students' reflection.

**Table 3: Debriefing in nursing studies**

Study	Target group	Topic focus
Bambini et al 2009	Bacclaureate nursing students	Post-partum nursing care training using simulation with debrief
Brown and Chronister 2009	Senior bacclaureate nursing students	Electrocardiogram interpretation course including simulation and debrief
Bryans 2004	Registered nurse community health visitors	Community nurses' health visiting expertise assessed via simulated interviews with patient actresses, a debrief interview and observation
Dine et al 2008	Registered nurses	Learning CPR skills through simulation with audiovisual feedback and face to face debriefing
Groffman et al 2007	Registered nurse anaesthetist students	Trainee nurse-anaesthetist performance with simulation and debrief
Hogg 2006	Registered nurses in hospital	Developing safe blood transfusion practices through simulated ward exercises with debriefing
Kuiper et al 2008	Pre-registration nursing students	Debriefing with a clinical reasoning model during high fidelity patient simulation
Mikkelsen et al 2008	Second year nursing students	Infection control training using scenarios and debriefing
Norris 2008	Student midwives	Emergency midwifery training including simulation and debriefing
Rosenzweig et al 2008	Nurse practitioner students	Training to conduct 'difficult communications' using simulation and structured debrief
Scherer et al 2007	Registered nurse- practitioner students	Cardiac event training using clinical simulation and debrief

### Effectiveness of debriefing for learning

Although debriefing is used in numerous studies of nurse education (often in combination with simulated learning), only one study was identified that reported on the effect of debriefing *in nursing*. Dine et al (2008) tested various methods of debriefing following simulated cardiopulmonary resuscitation (CPR) skills education for 65 registered nurses in a randomised intervention study. All participants completed three CPR trials. In the second round, a 'feedback' group received automated audiovisual feedback from defibrillator equipment during their CPR performance [screen-based measurements of chest compression rate and depth from an accelerometer and a force-detection sensor on the machine]. A 'debriefing' group received a short verbal debriefing on their performance immediately after it. Both groups improved their CPR performance but only the verbal debrief group showed significant improvement in compression depth. Participants in both groups

received a subsequent face to face debriefing using a transcript of their CPR effort from the equipment: both numeric and graphed analysis of performance. Each was counselled on how to improve their performance to meet current CPR guidelines. There was significant overall improvement in performances of both groups when assessed by depth and rate of chest compressions in a simulated CPR after verbal guidance was given. Therefore, it appears that the mode of debriefing chosen affects nurses' learning and a combination of verbal face to face and real-time audiovisual feedbacks are optimal.

In medicine, Morgan et al (2009) conducted a randomised controlled trial of 58 anaesthetists' simulation-based training with or without debriefing. Six months later, participants who had received face to face debriefing performed significantly better than those who did not receive an interactive debrief.

Furthermore, some studies in medicine and nursing based on simulation *together with* debriefing have shown improvement in knowledge and/or skills using this approach when compared to didactic methods of learning. Of 11 studies that reported on the learning of individuals (in table 3) all reported positive overall learning outcomes with only one (Dine et al 2008) showing a statistically significant improvement and this result was facilitated by use of objective measures of effect. The result, however, concurs with other studies of simulation/debrief in medicine (Deering et al 2004). In these studies the effect of debriefing is confounded by assessment of simulated practice, so the efficacy of debriefing alone for learning is uncertain.

### Effective debriefing techniques

The success of debriefing for learning depends on the facilitator's role; it requires training in applicable debriefing techniques. Thus, a framework for effective debriefing from the Advanced Life Support Group of the Resuscitation Council (UK) (Mackway-Jones and Walker 1999) is presented. The authors have utilised this framework in nursing studies with positive learning outcomes (Buykx et al 2011; Cooper et al 2010b). Key requirements include a teaching plan, attention to the physical environment, setting the mood for the learner, managing the dialogue, and implementing a succinct summary and closure. A learner's reflection on their actions is key to their learning experience, being guided (not driven) by the facilitator (Fanning and Gaba 2007). The core principles and key facilitator skills are summarised in table 4.

**Table 4: Core principles and stages of a performance debrief**

Debrief stage	Education requirement	Core principles
<b>1. SET -</b> Preparation	Facilitator development and training Environmental (appropriate facilities) Preparation of learner- suggest plan and objectives of the debrief	Timely Constructive Non-judgmental Based on direct observation of scenario
<b>2. DIALOGUE -</b> The debrief	Describe the event Analyse the event Application of the event (how did the views formed match the event and relate to the learner's experience?)	Application of 'Beefburger Technique' (good - bad - good in final 'closure') 1. Learner indicates what went well 2. Facilitator adds key positive performance points 3. Learner indicates key points for improvement 4. Facilitator adds additional points
<b>3. CLOSURE -</b> Final summary and take home message	Facilitator answers any final questions Summarise the key learning points	Any questions, then- Facilitator summarises good points and points for improvement and final key positive performance issues. [Avoid questions right at end of the session as these may deflect attention from key issues]

Source: adapted from Mackway-Jones and Walker, 1999.

However, as was noted earlier, adult learners learn in different ways. Debriefing in nurse education often applies to skills or task-based learning related to individual's current knowledge or skill. The educational literature suggests that debriefing may assist a low-performing student by allowing revision and thereby improve performance, rather than benefiting more proficient students (Shute 2007). Nevertheless, Draycott et al (2008) argue that one reason formative feedback assists learning development is because it avoids high anxiety levels of students created by more formal summative feedback or examinations. In summary, it is likely that debriefing techniques improve professional practice at all levels and in many contexts, improving clinical skills and competence. The evidence to date is, however, not substantial.

## CONCLUSION

Formative debriefing and feedback processes enhance experiential learning and are an essential component of simulation training. However, to improve learning facilitator skills are essential in accordance with best practice.

Debriefing techniques are incorporated into a broad spectrum of curricula including individual and team training for clinical and critical events. The process is essential following critical events in clinical practice, but should also be incorporated into programs of learning following formative and summative assessments. Benefits will be realised in clinical skills and simulation based learning and teaching, whilst debriefing and feedback techniques are also likely to benefit individuals and teams in approaches such as case-based and problem-based learning. However, the clinical impact on patient care of debriefing as learning for nurses has not been measured to date. To this end, further research is warranted to fully establish educational applications and the short-term and long-term effect of the educational approach.

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# Implementation of the nurse practitioner role within a Victorian healthcare network: an organisational perspective

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## KEY WORDS

Nurse practitioner (NP), conceptual model, advanced nursing practice, improving service delivery, professional issues, and organisational sustainability.

## ABSTRACT

### Objective

This paper presents a discussion of the development of a framework to implement and sustain the nurse practitioner (NP) role within one health service designed to strengthen the capacity of the health system and which could be readily transferable to other health services.

### Setting

Eastern Health (EH) is a multi-campus tertiary health care organisation servicing a population of approximately 800,000 people in the east and outer eastern suburbs of Melbourne, Australia. EH is committed to advancing the nursing profession and exploring innovative, research based models of practice that are responsive to the needs of the community it serves.

### Primary argument

The Framework documents the processes of providing a new career pathway for advanced practice nurses that incorporates education and training, and utilises current evidenced-based practice guidelines to define and promote the scope of practice.

### Conclusion

Strong organisational support to facilitate interdisciplinary and multidisciplinary learning opportunities assists integration of the NP role into the healthcare team. Role clarity will assist interprofessional teams to understand and value the role NPs provide.

## INTRODUCTION

The role of the Nurse Practitioner (NP) has developed both internationally and more recently in Australia, in response to the need to enhance client outcomes (Donald and McCurdy 2002; Horrocks et al 2002; Venning et al 2002). The NP role is an innovative model of care which allows senior experienced clinical nurses to expand and extend their scope of practice beyond the traditional nursing role. The NP role includes utilisation of nurses' advanced skills and knowledge, and 'extends current clinical nursing practice, is advanced, with a strong foundation in knowledge, skills and competencies' (DHS 2000). The role may include, but is not limited to, the direct referral of patients to other health care professionals, prescribing medications and ordering diagnostic investigations (ANMC 2006).

The NP role is based on collaboration, with a NP in Victoria being defined as a 'registered nurse educated for advanced practice who is an essential member of the interdependent healthcare team and whose role is determined by the context in which she or he practices' (DHS 2000). There is a strong foundation in evidence-based advanced clinical practice, benchmarking with international best practice. Research and leadership in clinical practice, together with new models of managing patient flow, improving efficiencies in health resources and access to health services are hallmarks of the role. Nationally, the Productivity Commission's Report (PC 2006) has highlighted the need to maximise the skills and expertise of the available workforce and has cited the NP model of practice as facilitating increasing service delivery and workforce demands.

Congruently, Eastern Health (EH) identified the NP role as a practice model with potential to improve health service access, offer greater diversity in services, increase flexibility in models of health care delivery, better manage and coordinate health care provision, and improve the career structure for advanced clinical nurses.

Recruitment and retention of nurses is widely recognised as an ongoing challenge across health services. Development and implementation of the NP role is an innovative strategy that will assist in alleviating some of the workforce issues. Following the release of recommendations of the report '*Victorian Nurse Practitioner Project: Final Report of the Taskforce*' (DHS 2000), the Department of Human Services, through the Nurse Policy Branch, commenced funding projects aimed at developing a framework which would support the NP model of care in a range of Victorian healthcare settings. This work identified key areas where the role of the nurse practitioner could augment existing services through improved access to health services and enhanced patient flow through the organisation.

This paper presents a discussion of the development of an organisational wide framework to support the expanded scope of practice of NPs across EH. Careful planning prior to implementation of the NP role is a critical step towards successful and seamless integration of this new role into existing health services.

## DISCUSSION

An organisational review was conducted by the EH Multidisciplinary NP Steering Committee to assess the impact of the NP role within the Emergency Department prior to progressing the role within other clinical streams.

Participation in the Department of Human Services (DHS) funded Emergency Department NP Project led to implementation of the NP role across two emergency departments within EH. Consistent with studies undertaken of the NP role at other Victorian Emergency Departments (Considine et al 2006; Jennings et al 2008) evaluation of the role at both EH emergency departments demonstrated reduced patient waiting times and length of stay in the EDs, along with high levels of patient satisfaction. EH was subsequently granted further funding by DHS to employ a Project Officer to develop a service plan at an organisational level to support the sustainable implementation of the NP role across EH.

The results of the ED NP project highlighted six key findings. First, it was imperative to have a consultative, collaborative approach in the implementation of the NP role and strong organisational leadership that provides the impetus to progress the role (Hurlock-Chorostecki et al 2008).

Second, medical input was crucial to the advanced learning requirements of the role (Hurlock-Chorostecki et al 2008). In the Emergency Department Project, input and support from senior Emergency Department physicians advanced the role of the NP and scope of practice in the Emergency Department setting.

Third, the need to develop a formal education and training framework for use by NP candidates (NPC), which incorporated group-learning approaches which maximise learning opportunities was recognised.

Fourth, the role needs to be actively promoted within clinical settings, so that there was increased awareness of the role among health professionals, to ensure acceptance and support. Information packages were developed which will be part of the EH orientation package for all new medical and nursing staff.

Fifth, role clarity before and during implementation will assist team members in understanding and valuing the role, thus easing integration of the role into the multidisciplinary team. Finally, EH considered role consistency in multi campus organisations was important for transferability of positions within the organisation. The role would need to allow for local variations, according to particular service delivery needs. Resource availability in different sites might focus on particular aspects of scopes of practice, but essentially the model of care should encompass agreed scopes of practice that are discipline specific across EH.

### **Service Plan Development**

A consultation of key stakeholders was conducted across the organisation, which determined that the preferred organisational NP model of care would be a service demand driven model. It was imperative that the model be aligned with the EH Strategic Plan and be a complimentary service and add value to service delivery, over and above existing nursing roles. It was also considered crucial that the NP be a member of the multidisciplinary team to enable improved access to health services, reduce the number of patient presentations and by early intervention, improve patient outcomes.

Specific service areas identified as potential areas that would benefit from a NP service were new and developing services such as the Renal Service, service areas with current and predicted growth, such as Oncology, Palliative Care and the Mental Health Program and the three Emergency Departments across the organisation.

Liaison with multidisciplinary teams within those designated areas was undertaken to raise awareness of the role and initiate dialogue to determine the level of knowledge and support for implementation of the NP role within the specialty group. Of primary consideration was the need to establish the availability and willingness of medical personnel to provide the level of education encompassed within the NP clinical internship. Of additional importance is the need to establish knowledge levels of nurse's extended scope of practice within the broad range of health professionals operating with a discipline specific team.

An analysis of clinical streams determined whether a discipline specific NP model of care would add value to existing service delivery by utilising two organisational flow charts, developed as part of the EH Service Plan (2006).

The Exploration of Implementing a Nurse Practitioner Position flow chart was developed to assist clinical streams to identify differences between the NP role and other advanced practice roles, and how NP extensions to practice assisted the role and improved service delivery and patient outcomes. The flow chart outlined each step to be considered in the process from an educational, organisational and clinical stream perspective.

It was required that all stages outlined on the flow chart are undertaken by prospective NPCs. This ensures medical support has been identified and formal approval at nursing executive level and the EH NP Steering Committee for the candidature has been sought and obtained.

Similarly, the Development of Extended Scope of Practice Guidelines flow chart, with timeframes specified for each stage of the development process was available for utilisation by clinical streams. EH requirements are that scope of practice guidelines are discipline specific, must be evidence based and reflect current best clinical practice and define the NPs scope of clinical practice. Clinical Practice Guidelines that apply to health practitioners across a multidisciplinary team within a clinical setting may facilitate risk management, reduce variation in practice, and assist in defining clear and concise referral pathways. The rigorous organisational approval process outlined in the flow chart aims to ensure safe and effective patient management.

Nurses Board Victoria (NBV) no longer requires NP Clinical Practice Guidelines as a requirement of endorsement. Following the submission and review of this article the Australian Government has implemented national registration for nurses and midwives, as a result of this change the Nurses Board of Victoria has been absorbed into the Australian Nursing and Midwifery Board of Australia (ANMC).

Once clinical streams identified the need for a NP role, a rigorous NPC selection process was necessary. EH was guided by the International Council of Nurses (ICN) definition of NP and by the ANMC (2006) definition of advanced practice, which are used to benchmark the minimum standards of advanced practice for acceptance as a NPC. A multidisciplinary committee, including the EH Chief Nursing Officer, the specific campus Director of Nursing, a senior medical consultant and other members of the interdependent team relevant to each specific discipline, will undertake selection of candidates once the submission process is completed. EH acknowledges nurses may begin academic preparation towards a NP career path; however the organisation is clear this does not constitute an organisational responsibility to offer employment to the individual as a NP, without completion of the submission process.

EH considers two years to be a reasonable timeframe for a NP candidature and would expect candidates to seek endorsement as a NP after that period.

### **Nurse Practitioner (NP) Clinical Internship and Training**

The NP role is a new and evolutionary model of care within Victorian health care settings. The Masters academic preparation of the role is well established. EH also recognised that a generic clinical internship program, which is structured to provide context specific flexibility will add value to the academic preparation of individuals.

Masters courses for NPs are approved to ensure students graduate demonstrating ANMC national competencies for NPs (ANMC 2006). Successful completion of their Master's enables NPCs to apply to the Australian Health Practitioner Regulation Agency (APHRA) for endorsement as a NP.

An organisational based internship model can assist the NPC to meet the overarching ANMC national competencies, facilitate the clinical experience required by as part of the Masters and support acquisition of clinical competencies identified by the organisation as part of the scope of practice of a discipline specific NP model of care.

The focus of the clinical internship is to ensure that the NPC has well developed clinical skills in the areas of advanced clinical assessment, diagnostic skill and knowledge, pharmacology knowledge, demonstrated competence in medication management, knowledge of treatment options, research abilities and advanced clinical leadership, and to assist in preparing for endorsement. Medical support, clinical teaching and mentorship are crucial to advancing the clinical and leadership skills required for endorsement.

The aims in developing the EH model were to provide a framework for a generic NP Clinical Internship that has applicability in a range of clinical settings across EH, when the multidisciplinary groups are determining their appropriate clinical learning requirements, and for use at other Victorian health care facilities, if required. Another aim was to enhance interdisciplinary and multidisciplinary learning opportunities between health professionals and refine and improve the framework developed for the ED NP Clinical Internship. Lastly, the generic clinical internship is structured to provide for context specific flexibility.

A clinical internship candidature providing a multidisciplinary team approach allows for a range of resources to be utilised in NP education and training. This model facilitates a range of learning opportunities between health professionals, including nursing, medical, pharmacy, pathology radiology, and physiotherapy. These include case conferencing and monthly review of ordered diagnostics with a senior pathologist and radiologist.

Specifically, participation in the development, implementation and evaluation of a generic framework for an EH NP clinical internship will facilitate collaboration with clinical disciplines to establish team level of knowledge of the extended and expanded scope of practice of NPs. It will enhance role clarity within a clinical setting and facilitate a coordinated approach to developing discipline specific scope of practice guidelines. A Canadian nursing workforce study similarly identified that role clarity assists in promoting interprofessional practices (van Soeren and Micevski 2001). In turn, the linkages between the NP clinical internship and the academic preparation required for the role will be consolidated. The framework aims to foster willingness and availability of appropriate medical personnel to provide the level of education and training required for a NP clinical internship and identifies reciprocal learning opportunities with comparative clinical settings across and within organisations.

A generic program template has been developed in consultation with NPs, NPCs and multidisciplinary stakeholders. The program has been divided into six stages with completion timeframes for each stage and embraces advanced skills and professional development, inclusive of competency assessments and support provided by clinical coaches and mentors. Medical support for the clinical internship is demonstrated by the encouragement offered to Emergency Department NPCs to participate in shared learning opportunities with HMO education and training sessions relevant to the NP scope of practice.

This innovative clinical education model utilises an interdisciplinary and multidisciplinary approach that maximises learning opportunities for NPCs within a staged, competency-based clinical internship framework. The generic and Emergency Department clinical internships provide a framework which can be used by other clinical streams to determine the clinical education and learning requirements of NPCs within that clinical stream.

As well as supporting the clinical requirements of the role, EH acknowledges that a professional internship, which supports the non-clinical components of the role, such as writing for publication, clinical auditing and report writing should be available to NPCs. In Canada, this allocation of time to scholarly work, teaching and research recognises this aspect of NP work 'value adds' to the care of the patient, the organisation and the healthcare system (Micevski et al 2001). The EH NP Education and Research Working Party has been formed to ensure that NP clinical education and training and research activities are supported by staff with appropriate expertise in clinical teaching and research. Mentoring and support of the non-clinical aspects of the professional internship will be provided by one of the nurse academics within the EH/Deakin University Research Partnership.

In future, as the role is implemented in various clinical settings across the organisation, EH will support formation of a NP Collaborative Group to provide an organisation-wide forum for endorsed NPs and NPCs to convene on a regular basis, to discuss and address issues relating to the role.

The suite of tools has been developed for organisational implementation of the NP role including Exploration of Implementing a Nurse Practitioner Position, Development of Extended Scope of Practice Guidelines, position descriptions and the programs for generic and Emergency Department clinical internships (Eastern Health 2006).

### **Management of Organisational Risk**

Adequate organisational resources need to be allocated to implement the NP model of care. Consideration of organisational barriers to implementation need to recognise that the clinical education and training program is resource intensive and, at present, relies on the goodwill and commitment of other health professionals. Over time it is envisaged that as more NPs are endorsed they will assume the roles of clinical coaches and mentors to upcoming NPCs. Backfilling the NP role to allow for completion of both clinical and non-clinical aspects of the role may place additional demands on already stretched nursing resources.

Acceptance from the clinical team and a well-developed model of care will facilitate role integration. Without this, there is a risk that NPCs could experience feelings of isolation. NPs require well defined organisational reporting pathway. Presently, while NP numbers are small, EH has determined that clinical reporting will be to the medical mentor and operational reporting will be to the campus Director of Nursing.

Succession planning minimises risk to service delivery by ensuring a NP service is non-reliant on a sole or limited number of practitioners, should an incumbent leave. EH will continue to identify potential NPCs in organisational priority areas and provide motivated senior clinical nurses with opportunities that fulfil advanced practice nursing career pathways.

Rigorous evaluation will underpin implementation of NP services within EH to ensure the role is fully utilised within each clinical setting and consistent with service demands. Monitoring of the NP model of care will determine whether the NP service experiences unpredicted or uncontrolled growth, leading to practitioner burnout. It will also determine the number of inappropriate referrals to the service. Scrutiny is necessary to ensure scope of practice is not limited by restrictive or under developed scope of practice guidelines. Monitoring also ensures NP compliance to the multidisciplinary team instigated scope of practice.

Evaluating defined referral criteria ensures referrals are appropriate and demonstrate increased service demand. Increasing NP workload may indicate the need for additional resources or a review of the model of care. Clear role definition and well managed patient flow will ensure patient care is directed to the most appropriate member of the health care team, and reduce risk of overlapping of nursing roles, such as the Clinical Nurse Consultant (CNC) and the NP.

### **CONCLUSION**

EH has demonstrated an organisational commitment to implementing the role of NP by participating in the DHS Emergency Department NP Project, which led to establishment of the role in the Emergency Departments at Box Hill and Angliss Hospitals.

Development of the EH Service Plan allowed the organisation to prioritise further clinical areas that fulfil the organisational criteria for potential implementation of the NP model of care. A centralised approach is outlined in the Service Plan which will facilitate implementation of the role within EH.

While EH recognises the organisational requirement for capacity building the nursing workforce across all sites to meet future community needs, and is keen to explore innovative and evidence based models of practice which enhance patient care, the organisation has determined that successful and sustainable roll-out of the NP role is contingent on an organised and timely approach that is congruent with the EH Strategic Plan.

Currently, the Department of Health has provided EH with funding to support NPCs in both Stroke and Renal Streams, and work is underway towards implementation of the NP role within the Oncology and Palliative Care Streams. Box Hill Hospital has two endorsed Emergency NPs and two Emergency NPCs in its staffing profile.

The NP role is a new and evolutionary model of care within Victorian health care settings. Role clarity and raising the profile is a prerequisite to acceptance of NPs by the health care workforce. EH will continue to monitor the progress and evolution of the model and consider its application within clinical settings according to demonstration of future organisational need for the role. Realistically, EH anticipates it will take five years for the role to be fully established within the organisation in such a way as to demonstrate both efficiency and quality patient outcomes.

EH recognises that the organisational framework which resulted in successful implementation of the NP role in clinical settings within the organisation may have applicability and transferability to other healthcare providers, and would therefore like to share the organisational findings and the organisational tools developed and utilised in the process, as outlined in this paper.

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# Flexible delivery: on-line versus bottom-line

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## KEY WORDS

nursing education, flexible delivery, on-line learning

## ABSTRACT

### Objective

In using a flexible delivery of learning approach to nursing education, and taking into account the globalisation of education, this research argues that universities need to consider and take into account both the positive and negative aspects of this decision.

### Setting

Tertiary educational settings

### Subjects

All undergraduate/postgraduate students

### Primary Argument

As nursing education is undergoing some significant changes this study argues that universities must be prepared to adopt some changes to harmonise with the needs of learners, the major stakeholders and to remain financially competitive in the marketplace.

### Conclusion

These arguments need to be considered using the backdrop of what might be described as the globalisation of education and universities need to respond to the challenges that flexible online learning presents. Flexible delivery for nursing education may need to proceed forward with a degree of caution because financial considerations shouldn't be a determinant of pedagogical quality.



## INTRODUCTION

Education is not static; learner and teacher diversities co-exist in a technologically evolving environmental society making it impossible for education to remain a stable and unchanging pedagogical entity (Brown et al 2008; Dixon et al 2005). Contemporary adult education sits in a fast paced, high speed era where there is no clear demarcation between distance education and traditional learning modes which can make it difficult for both the teacher/facilitator and the learner (Spitzer and Perrenoud 2006). Moreover, the notion of distance education often conjures a crude intermixed version of the contemporary offerings of both flexible and online formats (Burd and Buchanon 2005; Hudson 2003). Adult education has become a commodity and as such must incorporate the needs of the students whilst maintaining cost effectiveness (Nelson 2008). Clearly, the needs of the students are often subjugated at the hands of the purse strings with financial considerations overriding good teaching practice. Flexible or multi-modal delivery is commonplace across university curricula these days and this paper seeks to consider some of the modes and adapted content changes which this new style entails. Online or e-centred learning is considered with regard to its role with increasing flexibility for contemporary adult learners and accepts changing pedagogies and the incorporation of a range of generational learning packages now on offer and also a myriad of changing multigenerational nursing student demographics (Stanley 2010). Across this broad spectrum this paper examines some of the advantages and disadvantages of flexible and online delivery from both the learner and teacher perspectives within the context of tertiary nurse education in some university settings.

## CONTEXT OF LEARNING

Nursing education in Australia has undergone much change, the value of which is currently the subject of much government and public debate (Warelow and Edward 2009; O'Keefe and Armitage 2007). In 1984, the Commonwealth Government initiated a staggered nationwide abandonment of the apprentice model of nurse training and replaced it with what is often seen as the formalised, even legitimised educational package delivered within the tertiary sector (Holmes 2005). These reforms were in-line with global changes, and in response to nursing labour shortages which are still occurring and a general dissatisfaction with learning outcomes from the then apprentice model of training (DEST 2006; Koh 2002; Stanwick and Humphries 1995). One of the major complaints about the 'block' delivery of hospital based nurse training was that it failed to integrate well the theory with practice (Gassner et al 1999) and placed the discipline of nursing outside of the university setting of which all the other disciplines were party. As a sequel to this entry into the tertiary sector more recent national reviews of nursing education, among other literature findings (Blackman et al 2007), shows that the level of clinical competence at degree completion for nursing is seen as concerning (in DEST 2006). The challenge for nurse educators therefore is to ensure that fundamental clinical skills are transferred from the realm of theory to practice in order to address the market demand for 'work ready' nurses. That said, the ability of graduate nurses to integrate theory into practice has been an ongoing issue in nursing for decades (Morgan 2006). This 'hit the ground running' philosophy seems at odds with the caring and compassionate ideals which are paraded within the foundational rhetoric of nursing and is often used as a 'catch cry' in advertisements from both the university sector and graduate hospitals in their recruitment of potential applicants. The university system contends that the graduate year allows students to consolidate their theoretical skills in a supportive environment and gives graduates the opportunity to apply their skills to practice and the dilemma here is that there is only really one day between being a student (where one can ask) and being a registered nurse (where one has to answer) and this application has therefore a myriad of individual and institutional obstacles. Clearly, on-line learning can teach facts but the provision of nursing skills is of course in the application and delivery, which is usually learnt by watching, mirroring and doing with others. The movement away from face to face teaching and learning by flexible delivery can therefore be problematical here.

## PATHWAYS

Many universities address some of these educational issues by increasing the availability of their courses to those learners who may not have previously considered or undertaken tertiary education by providing a mentorship role within their programs to support new applicants. Many sites create multiple study pathways which widen the available scope and options of prospective applicants and also allows for multiple exit levels (Ellis and Hartley 2004). These multiple delivery pathways are a workable example of tertiary institutions endeavouring to address the pathway options but also by doing this, address labour shortages in nursing by providing recognition of prior learning (RPL) status or advanced standing and pre-graduate exiting qualifications and opening up labour recruitment and retention issues (DEST 2001). The changing demographics of the learner and their location to the academic facility are also encompassed with flexible delivery options. Similarly, a learner's previous experience and knowledge are encouraged and valued, meaning that students do not have to be assessed on content where they have already demonstrated their competence. Adult learners appreciate this recognition as the length of the course is decreased as is the financial cost and this process is overseen by registering authorities. Offering advanced standing has additional benefits for the university as it in many ways attracts students to enrol with them. Mekwa (2000) argues however, that the use of RPL is not without contention. There can be a considerable variation of standardised content delivery and assessment practices across the registered training organisations where learners have attained their original qualification. These inequalities make moderation of applications difficult and can result in an uneven distribution of fail grades for written pieces of work amongst learners. Those students can be admitted to university courses and not be successful in their studies as their presumed existing knowledge is not up to the required entry or competency standards. These failures exact an emotional and financial cost to the learner and can be quite significant with the university reputation affected negatively and ultimately the funding threatened and the potential for the brand being damaged. Clearly, a pecuniary consideration over pedagogical quality is problematic.

Offering a flexible structure of delivery is of benefit to students who for whatever reason are opting out of study or who wish to convert existing credit points into a qualification; learners can gain a lesser qualification prior to completing the bachelor of nursing degree (DEST 2001). Many university students gain an assistant in nursing (AIN) qualification after one year of study, and an enrolled nurse qualification after three semesters or two years of study (depending on the university/location) (DEST 2001; Gibbs 1999), although these will change under the newly formed regulatory authority. This provided the learners with an opportunity to gain employment in the field they are studying thus negating some aspects of the theory – practice gap (Gassner et al 1999). For those students who are unable to commit to further study, the provision of multiple exit levels ensures their time of study has produced a useful vocational qualification and can be built on if they choose at a later date (DEST 2001).

The use of technology (specifically the internet) has had an enormous impact on being able to offer flexible delivery at many tertiary sites (University of Ballarat 2009; Nelson 2008; University of Queensland 1999). Many authors make the clarification that flexible delivery does not necessarily equate with the use of technology (Jeffries 2003; Evans and Smith 1999; Misko 1994). Interestingly, Nelson (2008) posits that most online learning environments can actually be quite inflexible to student needs when offering rigid assessments and learning outcomes that are teacher centred or when broadband options are required for sending large mega-pixel DVD clips across distance to country students. The use of technology however, can be a worthy complimentary adjunct when delivering flexible teaching (Dixon et al 2005). The adjunct should be complimentary to the program rather than instead of.

In many sites nursing lectures no longer require compulsory attendance. Providers of education are beginning to understand that students require, indeed demand, this increased flexibility in attendance and still be able to maintain the role of being a learner (Dixon et al 2005; University of Queensland 1999). Lectures are presented in multi-modal formats; face to face, podcast, streaming and via illuminate live. This is obviously a significant shift from the more didactic 'chalk and talk' methods which many lecturers have difficulty moving away from. Students who are unable to physically attend lectures can still receive all of the information provided to the students who attend lectures (University of Ballarat 2009; SCU 2006). An appreciation of the learner's needs which appears to be advanced by a flexible learning pedagogy is required with many learners needing to fulfil the multiple roles of full-time student, parent and paid employee or care giver (Fisher and Baird 2005; Kirton and Greene 2002). All of these roles have pecuniary considerations attached and this appears to be significant across the on-line learning format. By commodifying education and the requirement by the university system to seek full fee paying revenue streams has meant that to balance the books the university sector may have lost some of its educational focus. The fee paying revenue is mostly from international students who despite completing ESOS (Education Services for Overseas Students) requirements add a significant dimension to the classroom setting from both a cultural and educational perspective but who get lost in many ways across any sort of flexible delivery arrangement. Many fee paying students have a range of educational and pastoral considerations mostly to do with translation, articulation and providing the salience of a point in English. This often requires the tuition of both on and off campus materials in a different and often an abridged way. This encourages tuition to be pitched to the mean rather than the top of the intellectual calibre of the group.

On a more positive note and by considering this point from another perspective, the availability of lectures regardless of geographical proximity to the university has created the opportunity for multi-campus; each capable of delivering the same content in real time. This not only potentially boosts student enrolments given the larger catchment area; it also negates student appeals of inequality in content delivery.

## **CONTENT DELIVERY**

Some universities or faculties within universities differ in their core beliefs about how content should be delivered. The very fact that all courses do not deliver the same content in itself increases flexibility for students; widening options for students is an attribute of flexible delivery in terms of increasing learner control (Burd and Buchanon 2004; Evans and Smith 1999). Some universities offer content in a traditional didactic form of teaching whereas competing universities prefer the problem based approach to education. The purpose of this paper is not to weigh into the debate about which pedagogy or teaching style is superior but to acknowledge that these differences exist, serving to provide learner choice and thus flexibility in the method of content delivery.

All students need to have significant skills in self-directed study and time management skills for all forms of learning and this is significant as more university programs are now being delivered on-line and essentially a good part of the course studied at home. This can be especially so for problem based learning programs whereby the lecturer begins to facilitate the student learning and also becomes an active learner themselves. This facilitation rather than teaching role is a direct corollary to flexible learning. Within andragogy theory, content is learner centred and the student attributes of learner responsibility are well placed within problem based learning formats and interestingly are seen as a necessary requirement in flexible and online delivery (Wiesenberg and Stacey 2005; Waight and Stewart 2005).

## ONLINE LEARNING

Technology can play a significant role in flexible learning. The number of complete or partial courses being offered in an online learning format has increased globally over the past decade (Peters 2000). Indeed some universities give online learning such importance they have adapted a strategy where every degree contains at least one completely online unit/course (Taylor 2002). The quality of some online programs being offered is being questioned by some authors with the literature suggesting that if the content is poorly executed, they are of little educational worth (Nelson 2008; Wiesenbergs and Stacey 2005) or value. Furthermore, Kirton and Greene (2002) raise the point that online does not necessarily equate with flexibility. When structured learning times are removed and learners need to self-regulate their time, it is clear that not all students are able to do this successfully. Management of time, study, employment and social life with community engagement responsibilities are not done particularly well by the majority of ex school leavers.

Before considering the positive and negative aspects of online learning, it is important to define, in the context of this paper, what 'online' incorporates. Many tertiary sites are using learning management systems (LMS) such as black board (or Moodle) to assist with the management of materials available to students (University of Ballarat 2009; SCU 2006; Lewinson 2005). These are described as user friendly formats from both learner and teacher perspectives. Within a unit specific site, learners are able to access whatever the teacher wants them to access; this ranges from an entire unit's content or staggered and time-released content delivery. The resources range from PDF files and power point presentations to voice files (in varied formats) and video, YouTube/DVD links. Usually there is an area provided for either formal discussion or learner 'chatting'. The possibilities of presented resources seem only restrained by their availability and teacher capabilities of using the technology. There is also the option for the teacher to monitor student contact hours and to ascertain how much any given student has interacted with the on-line materials.

The title on-line learning does not identify 'learning' as being specifically from the students' perspective intentionally. This term also recognises that educators are required to participate and continually create these online environments, and as such often become the learners also (Burd and Buchanon 2005). Caplan (cited in Wiesenbergs and Stacey 1999) agrees that teachers need to be skilled in information technology and attempt tasks normally undertaken by IT technicians such as a web developer and program designer. Indeed, Burd and Buchanon (2005) concede that up to seven information technology employees should be utilised to successfully plan an online course. Many researchers have acknowledged the need for up-skilling to occur though most discussion is focussed on altered pedagogical strategies specific for online use (Wiesenbergs and Stacey 1999). This need for training could be viewed as a disadvantage of online delivery from a financial perspective although universities are seeing the long term benefits of this investment and, from recent reports Australian universities are willing to spend money in the area of professional online development and online course development (SCU 2006; Taylor 2002). The hidden costs may well be the continued need to update the materials, the need to use evidence-based practice which at first glance would seem a minimal exercise but experience and anecdotal evidence suggests this imposition is significant.

In the literature, online learning is not readily associated with developing clinical skills for nursing. Much of the online technology used in nursing courses has been to deliver core faculty units (broader health units) whilst leaving clinical or practical units to be delivered face to face. A disadvantage of online learning in the case of practical subjects is that it is difficult for the students to gain the practical experience they would get from a clinical skills laboratory (Taylor 2002). Technology allows for the educator to demonstrate a skill with audio and supply written resources – all of which can be downloaded by the student. The problem remains however that the learner is still not in an environment to practice the skill themselves although the use of manikins is now becoming quite commonplace. This is in many ways a financial solution to a quality problem.

Some researchers discuss the value of a blended delivery method to combat these disadvantages (Wiesenberg and Stacey 2005; Taylor 2002). That is a mixture of face to face and online learning. Teaching course content therefore is considerate of expected learning outcomes and learner needs (Burd and Buchanon 2004). In the context of nursing, this could mean that the theory is delivered online and the practical components remain in a face to face mode. Discussion forums are then utilised for students to have any questions addressed and share experiences. Dixon et al (2005) contend that it is important for students to develop a sense of community and trust in a face to face environment before the expectation of critical discourse online is placed upon them.

The use of discussion boards or rooms varies in their purpose and also the amount they are used (Lewinson 2005). Forums are arranged by the teacher (or facilitator) and students participate to varying degrees. Participation can be linked to an assessment item or can be used to help create a social learner community (Lewinson 2005; Fisher and Baird 2005). Lewinson (2005) contends that this type of discussion forum use is typical when working from a cognitive or social constructivist framework. Garrison et al (2000) argue that online discussion is a useful learning tool as it allows for participation in a purposeful dialogue between learners. Distinct from verbal communication however, online communication allows time for reflection and analysis of the discourse. The use of reflection as a learning tool features strongly in nursing education and is linked with the development of critical thinking skills (Burton 2000). Garrison et al (2000) argues however, that there is not a strong body of empirical evidence to support this notion. Another positive aspect of online discussions is the enhancement of the learning community. Students are less likely to feel disengaged from each other and peer to peer support is common (Dixon et al 2005). Participation however is time consuming and students are likely to become dissatisfied if they experience technical difficulties which is common (Fisher and Baird 2005).

A disadvantage of learning in this text based asynchronous environment however is that the loss of non-verbal cues can interrupt and confuse the message being conveyed leading to misinterpretation of ideas (Garrison et al 2000). It is important in the beginning phase of forum discussion for the facilitator to identify their role which, depending on the purpose of the forum, can either be minimal or equal to that of the learner (SCU 2006). In an attempt to negate potential problems, the facilitator must establish ground rules for appropriate learner participation – this is sometimes referred to as ‘netiquette’ (SCU). Novel terms such as this are being accepted into contemporary language and can be an indication of the large presence of online learning.

Given the high propensity of on-line learning being introduced into under and postgraduate coursework, participation with online learning is to be expected – regardless of learner diversity or preference. It is reasonable to predict that, as with traditional modes of delivery, online learning favours some learners over others (Burd and Buchanon, 2004). Becker et al (2007) consider the culture of online learners and suggest that many older adult learners are not as comfortable using the technology as their younger counterparts. Some of the older learners would consider a course that has a high level of online learning a disadvantage. An advantage of online learning for this learner group is that they tend to be more comfortable with self direction, group work and in sharing personal thoughts (Becker et al 2007; Waight and Stewart 2003). Dixon et al (2005) add that adult learners appreciate the flexibility of asynchronous online learning. Whilst the younger cohort of students may be more computer savvy, their acceptance of participatory group work may be less than their older counterparts; this relates to confidence in their own experience and knowledge.

Nelson (2008) proposes that the potential flexibility offered by the online environment should serve to address the issues of learner diversity. Educators or facilitators can offer learning tools and assessments that accommodate the individual learner’s needs more easily than in a traditional classroom. A study by Becker

et al (2007) shows that despite variable preferred learning styles the generations of baby boomer, X and Y; overall do not significantly influence their preferences for online learning or the associated assessments.

## CONCLUSIONS

Education is changing (Dixon et al 2005). Universities must adopt these changes to harmonise with the needs of learners, major stakeholders and to remain competitive in the marketplace (DEST 2006; Kirton and Greene 2002). Globalisation of education has arrived and universities must respond to the challenges that flexible online learning presents (Nelson 2008). Evans and Smith (1993) contend that the provision of flexible delivery should afford increased control for the students with regard to access to subject matter and also, the way and time in which the content is delivered. The use of advanced standing and multi-level exit qualifications provides nursing students with increased study options and are examples of universities being flexible in the mode of delivery (DEST 2001). This flexibility (in part) has the flow on effect of reducing labour shortages. Online learning is growing quickly and whilst some universities have moved more readily than others, there is a general caution to ensure that teachers receive adequate professional development to maximise the possibilities this form of learning has to offer (Taylor 2002) and this may involve a period of transition for the more traditional teachers. Various studies show a general learner acceptance of online delivery and learning and despite some learner diversity and the range of cautious acknowledgement by didactic traditionalists on-line input appears here to stay (Becker et al 2007).

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# A culture change in aged care: The Eden Alternative™

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## KEY WORDS

The Eden Alternative™, ageing, aged care, culture change

## ABSTRACT

### Objective

The purpose of this article is to provide an overview of the values that The Eden Alternative™ represents. The benefits, challenges and potential risks, associated with implementing this model for culture change will also be discussed.

### Setting

Currently, 36 residential aged care facilities in Australia and New Zealand have implemented The Eden Alternative™. Alzheimer's Australia has recently adopted The Eden Alternative™ in two Western Australia respite centres to advance care practices.

### Primary argument

The Eden Alternative™ is a model for culture change in aged care that aims to enrich the lives of all who live and work in residential aged care facilities. Children, animals and plants enliven the environment and create an atmosphere reminiscent of home. The Eden Alternative™ promotes human growth in aged care environments and strives to empower and enable older people to fulfil their right to construct and pursue meaningful lives.

### Conclusions

In the United States of America (USA), The Eden Alternative™ is associated with numerous benefits, including reductions in the total number and type of medications used by residents, (i.e. a decline in mind and mood-altering drugs); reduced infection rates among residents; improved levels of sociability among residents; reduced levels of boredom and feelings of helplessness among residents, and improved staff retention rates. However, these findings need to be interpreted cautiously due to lack of information about, and limitations in, study designs. Further research is needed in Australia to establish the impact of this model for culture change on residents and nurses who live and work in these facilities.



## INTRODUCTION

Residential aged care services are an integral component of the accommodation and support systems available for frail elderly or disabled older people who are unable to live independently at home. As of June 2009 there were 2,783 residential aged care facilities (RACFs), providing a total of 211,345 places, offering low or high level care, and short-term respite care services (DoHA 2009). While only a small proportion (6%) of older persons reside in RACFs at a given point of time, the lifetime probability of a person entering a RACF is high: a person aged 70 has a 37% chance of needing high level aged care during his/her life (Rowland et al 2002). On average permanent residents spend about 148 weeks in RACFs (AIHW 2009).

By 2008 people aged 65 years and over constituted 13% of the population, representing a total of 2.8 million Australians (ABS 2009). In 2016 this figure is expected to increase to 16% of the population when the majority of the post-war 'baby boom' generation reaches retirement. It is estimated that by the year 2042 almost one quarter (24.2%) of the total population will be aged 65 years and over, by which time the requirement for aged care places is expected to have risen three-fold (Australian Government Productivity Commission 2008).

Population ageing has significant implications for the provision of aged care services; not least is the capacity of the workforce of aged care nurses to respond to the care needs of the projected number of older Australians. Registered nurses have been leaving the aged care sector in large numbers, citing job dissatisfaction, stressful work conditions, and an unsupportive workplace as reasons for leaving the sector (Moyle et al. 2003; Pearson and Nay 2002). Managers of RACFs consistently report problems with attracting and retaining younger nursing graduates (DEST 2002).

The aged care sector is also under pressure to provide a range of innovative and contemporary models of aged care that preserve an individual's sense of personal autonomy and decision-making. Older people (particularly baby boomers) have expressed a strong preference for alternative forms of aged care and accommodation, and a greater ability to exercise control over where they live and the nature and quality of services they will receive (Benevolent Society 2008; McCallum 2000). According to Kendig and Duckett (2001, p. 67) "ensuring consumer responsiveness and satisfaction is going to be an increasingly important component of the next generation of aged care policy".

Perhaps the greatest challenge facing the aged care sector is its capacity to ensure the right of all older people in RACFs to a fulfilling, purposeful life. The United Nations Principles for Older Persons (UN 2007) acknowledges that 'older persons should be able to pursue opportunities for the full development of their potential'. Aged care facilities focused on resident-directed care and improvement in quality of life of residents foster opportunities for older people to live up to their highest potential.

## BACKGROUND TO THE EDEN ALTERNATIVE™

RACFs have traditionally been viewed as places of long-term treatment and therapy dominated by the medical model that values efficiency, consistency and hierarchy of decision-making (Roshier and Robinson 2005). Since the 1990s some RACFs have abandoned this medical approach to aged care and replaced it with a more humanistic model. The movement away from an institutional model of aged care to one that accepts resident-directed care as the guiding or defining standard of practice is part of a culture change that is positively impacting the provision of aged care services in Australia and around the world. The Eden Alternative™ is one example of a culture change model that aims to promote autonomy and self-determination, and emotional and social wellbeing, as attainable goals for aged care residents. The Eden Alternative™ is affiliated with the USA Eden Alternative through licensing arrangements, and indirectly to other similar organisations established throughout the world. (When 'The Eden Alternative™' is used in this article it refers to the model for culture change outlined in the ten principles.)

Dr William Thomas, the USA geriatrician who founded The Eden Alternative™ in 1991 aspired to create a human habitat to eliminate loneliness, helplessness and boredom from the lives of residents in aged care facilities, which he argued were the ‘plagues of ageing’ that account for the bulk of their suffering. He believed that “every creature has a habitat in which it thrives, and one in which it withers. Human beings wither in institutions” (Thomas and Johansson 2003, p.282). Dr Thomas wanted to transform long-term care and enliven the environment with children, animals and plants to create an atmosphere reminiscent of home. He developed an approach, based on ten principles (table 1) to enhance the quality of life aged care residents by incorporating companionship, a sense of purpose, variety and spontaneity into their day-to-day experience.

The Eden Alternative™ is a not-for-profit organisation based on a philosophy of developmental ageing that recognises late life as an active phase in the ageing trajectory, in which individuals should have access to, and opportunities for, ongoing learning and personal growth and development (Thomas and Johansson 2003). This approach aims to create an environment in which older people are given opportunities to construct and pursue meaningful lives.

The Eden Alternative™ acknowledges the right of older people to a ‘life worth living’ (Thomas 1996).

**Table 1: The ten Eden Alternative principles**

- |  |
|--|
| 1. Loneliness, helplessness and boredom are the plagues of the human spirit              |
| 2. Close and continuing contact with children, animals and plants builds a human habitat |
| 3. Loving companionship is the antidote to loneliness                                    |
| 4. Giving and receiving care are the antidotes to helplessness                           |
| 5. Variety and spontaneity are the antidotes to boredom                                  |
| 6. Meaning is essential to human life  |
| 7. Medical treatment is a partner in care, not its master                                |
| 8. Wisdom grows with honouring and respecting elders                                     |
| 9. Growth is not separate from life  |
| 10. Wise leadership is the lifeblood of thriving   |

### **EDEN IN THE USA AND INTERNATIONALLY**

The Eden Alternative™ has become well-established in the USA, and since its inception almost 20 years ago at least 200 American aged care facilities have adopted The Eden Alternative™. The Eden Alternative™ has also spread globally, with Eden Alternative facilities in the United Kingdom and Ireland; European countries, including Germany, Austria and Switzerland; Scandinavian countries, including Sweden, Denmark, Finland, and Norway; Japan, and other countries.

### **EDEN IN AUSTRALIA AND NEW ZEALAND**

There are 36 RACFs (comprising religious, charitable and community-based not-for-profit groups and for-profit organisations) across Australia and New Zealand actively engaged in implementing The Eden Alternative™. Recently Alzheimer’s Australia implemented The Eden Alternative™ in two Western Australia respite facilities to improve the quality of life of people with dementia and their carers (Alzheimer’s Australia 2004).

### **BENEFITS ASSOCIATED WITH THE EDEN ALTERNATIVE™**

Robust, independent evaluation of this philosophy and model for culture change has not been a priority of Eden Alternative facilities. The purported benefits associated with The Eden Alternative™ have in general, been informed by data gleaned from residents’ records, quality indicators, staff observations and staff reports. Studies using this approach to data collection have shown that The Eden Alternative™ is associated with numerous benefits, including reductions in the total number and type of medications used by residents, (i.e. a decline in mind and mood-altering drugs); reduced infection rates among residents; improved levels of

sociability among residents; reduced levels of boredom and feelings of helplessness among residents, and improved staff retention rates (Bergman-Evans 2004; Sampsell 2003; Hamilton and Tesh 2002; Thomas and Stermer 1999; Thomas 1996, 1994).

In 2004, seven facilities in Michigan (USA) that had adopted The Eden Alternative™ reported an average staff turnover reduction from 72% to as low as 9%, the average being 15% (Steiner et al 2004). Another benefit to emerge from these facilities was fewer complaints about the quality of care from residents, staff and family. One study, conducted between 1996 and 1998, of Eden Alternative homes in Texas, found a 60% decrease in behavioural incidents, 57% decrease in pressure sores, 18% decrease in use of restraints, and 48% decrease in staff absenteeism (Ransom 1998). It is important to note that this study did not provide information about the study design.

Few empirical studies, comparing Eden Alternative facilities to traditional (or standard) aged care facilities have been conducted. One study funded by the New York State Health Department found that compared with a traditional nursing home, the Eden Alternative facility recorded a 50% decrease in infection rate, 71% drop in daily drug costs per resident, and a 26% decrease in nursing staff turnover, over a three-year period (Thomas 1996). Information about the method used to obtain the sample and to collect and analyse the data was also lacking in this study.

Another study (Bergman-Evans 2004) used the Geriatric Depression Scale and the UCLA Loneliness Scale (both validated instruments) to assess levels of loneliness, boredom and helplessness in Eden Alternative residents compared with a standard nursing home of comparable residents in terms of health, psychological and cognitive profile. There were statistically significant improvements in levels of boredom (33%→23%) and feelings of helplessness (38%→24%) in the Eden Alternative facility, one year after residents were admitted, compared with the control group (54%→61% and 54%→61%, respectively). There was a non-significant reduction in feelings of loneliness in the Eden Alternative residents. The proportion of residents who rated their health as very good to excellent increased in the Eden Alternative facility (19%→40%) compared with the control group (15%→23%) one year later.

Conflicting findings about the benefits to residents and staff in Eden Alternative facilities do exist. Coleman et al (2002) found that the introduction of The Eden Alternative™ was actually associated with adverse outcomes for residents in an Eden Alternative facility, compared with residents in a traditional nursing home. This study found that residents in the Eden Alternative facility had a higher rate of falls (31% compared with 17%, within a 30 day period), compared with the control. In this study the residents in the Eden Alternative facility were on average younger than those in the control facility (82.6 years of age compared with 88 years of age), with fewer impediments in relation to functional status (according to scores on an Activity of Daily Living scale). Quite possibly, the higher rate of falls in the Eden Alternative facility might reflect the increased risk of accidents and injuries among ambulatory, independent residents compared with the frailer, more sedentary residents in the control group. Whereas both facilities experienced staffing problems, the turnover of nursing staff was higher in the Eden Alternative facility, than in the control facility. Without information about the process used to induct, educate and support staff to implement the principles in the Eden Alternative, the reason for the higher staff turnover is unclear.

Much less is known about the benefits associated with the implementation of The Eden Alternative™ in Australia. One Australian RACF that implemented The Eden Alternative™ in 2000 observed major improvements to residents' happiness and independence (MacKenzie 2003). Residents in this facility reported higher levels of personal satisfaction because they were encouraged to take more responsibility for their own health care needs and wellbeing. Interestingly, many of the personal care staff in this facility pursued further qualifications and academic training in nursing and other health professionals, because they had developed a strong passion for working in the aged care sector.

## CHALLENGES AND POTENTIAL RISKS ASSOCIATED WITH THE EDEN ALTERNATIVE™

The implementation of The Eden Alternative™ is not without its difficulties. The Eden Alternative™ challenges traditional models of care and management because it is based on a whole-of-facility management system. It aims to empower the staff and place decision-making authority as close to the resident as possible. It ‘flattens’ the nursing organisation hierarchy and promotes a decentralised team method of care delivery that puts residents at the centre of the facility (Keane 2004; Barba et al 2002).

The integration of children, animals and plants in aged care facilities is associated with some risk of harm and injury to residents. Active, boisterous children might agitate some residents and the presence of toys and children’s games could pose a hazard and obstacle to safe ambulation of residents. Allergies to pets and plants (although rare) is another risk associated with this approach to environmental enhancement. Staff in Eden Alternative facilities need to ensure that residents are questioned about reactions to environmental antigens to identify those at risk of allergies. Consideration for residents with an aversion to or fear of animals also needs to be taken into account when facilities adopt The Eden Alternative™.

The successful implementation of this model requires good leadership and effective, stable management; strong teamwork; efficient communication systems; an investment in staff training and education about this philosophy; the capacity to provide appropriate care of pets and plants; a commitment to a person-centred care; and above all, a shared belief that older people are entitled to pursue opportunities for the full development of their potential (Steiner et al 2004; Barba et al 2002).

## IMPLICATIONS FOR FUTURE RESEARCH

Facilities that focus on building rewarding and collegiate workplaces that empower nurses and allow them to provide person-centred care positively contribute to the retention of nurses in the aged care sector (Cameron and Brownie 2010; Moyle et al 2003). Given that these are the same workplace features that characterise Eden Alternative facilities, an evaluation of the impact of this philosophy on nursing staff retention rates might assist efforts to recruit and retain more nurses in the aged care sector. To date no data exists about the experiences of Australian nurses or other health professionals working in these facilities.

The Eden Alternative organisation needs to develop a systematic approach, incorporating validated instruments, to evaluate the impact of this philosophy on the psychological and physical health profile of residents, compared with residents in traditional aged care facilities. Verifying the claim that the use of medication, in particular psychotropic drugs, is reduced in Eden Alternative facilities has important implications for the pharmaceutical costs associated with aged care.

## CONCLUSION

The Eden Alternative™ is an approach to aged care intended to combat the plagues of ageing –loneliness, helplessness, and boredom - by incorporating companionship, a sense of purpose, variety and spontaneity into the day-to-day experience of aged care residents. This philosophy and model for culture change has been adopted by aged care facilities throughout the world, including 36 facilities in Australia and New Zealand. The locus of decision-making is with the resident, which ensures the right of each resident to pursue opportunities for the full development of their potential. The Eden Alternative™ is associated with reductions in medication usage, reduced infection rates, improved levels of sociability, reduced levels of boredom and helplessness among residents, and improved staff retention rates. An evaluation of The Eden Alternative™ in Australian facilities is needed to establish the benefits and challenges associated with this philosophy and model for culture change in aged care.

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