

When Post Traumatic Stress Disorder (PTSD) is compounded by dementia ...



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BACKGROUND

Throughout history Post Traumatic Stress Disorder (PTSD) has been known by various names but the symptoms are described in similar ways. Studies of veterans of the war in Vietnam estimate that 15% to 30% have had some post-war experience of PTSD. It has been estimated that in Australia in 2005 around 52,000 people will be diagnosed with dementia and the majority of these will occur in later life.

PTSD is a psychiatric condition that can follow life-threatening experiences or witnessing events that directly threaten lives, such as occurs in active military service. Nightmares, flashbacks, sleep disorders and feelings of alienation related to a past life-threatening event can persist long after the event and can erode the person's ability to cope with everyday life. In later life, the effects of PTSD can be further compounded by mental confusion related to organic brain syndromes such as alzheimer's disease which conflate flashbacks with normal memories. When typical physical responses to PTSD include agitation, wariness and sleeping problems combine with natural responses to adrenalin production it means that symptoms experienced by the confused person with PTSD can be significantly exaggerated. The potential for challenging behaviours to emerge as a result of PTSD compounded by dementia is ever-present and when it occurs, creates considerable difficulty for the resident and all involved in ensuring safety and care.

Established therapeutic approaches to PTSD require cognition and the use of pharmacotherapy to reduce the effects of traumatic memories. However, success with established cognitive therapeutic approaches to relieve PTSD in the presence of advanced age and dementia is not possible. But the fact remains...these brave, elderly veterans still need help in an environment that promotes dignity and optimal independence. In other words, they need nursing care.



Research question

To identify associations between care, treatment, support and protection areas of clinical interest for this cohort, and recorded nursing interventions used to assist elderly veterans with PTSD compounded by mental confusion related to organic deterioration of the brain.

Methodology

Data mining, a technique for finding and describing structural patterns in data and generating descriptions of what has been discovered. Waikato Environment for Knowledge Analysis (WEKA) provides a set of analytic tools and techniques that enable data mining and testing suitable for handling complex and large data sets.

Two WEKA techniques were applied to the data set:

- Association rules** ie. Predictive classification of attributes generate rules based on associations in the data providing instances of coverage (support) and accuracy (confidence). Researcher judgement is needed to identify those rules that best apply to the variable being analysed. In this study WEKA Apriori association technique was used.
- Decision trees** ie. Classification tree which can be pruned in terms of confidence interval selected and the number of folds used to grow the decision tree. In this study the WEKA J48 unpruned tree was used with confidence levels ranging from 0.93-1.0.

Table 1: Profile of sample cases (n=8)

Age:	Range = 79-91 years	Mode = 81 years		
Birthplace:	Metro = 3	Regional = 3	Rural = 1	Remote = 1
Family support:	Nearby = 6	Distant = 2		
Pre-service education level:	Qualification certificate = 5	Leaving certificate = 3	Trade = 1	Profession = 1
Theatres of war:	Vietnam, Europe, Papua-New Guinea, Asia-Pacific, Australia			
PTSD	} PTSD + Dementia	n = 8		
Dementia				
Depression			n = 3	
Disability	Disability (TPI)	n = 5		
Substance use:	Alcohol = 3	Tobacco = 1	Other = 0	
Time in residential care:	Range = 3mths - 5 yrs	Mode = 1 yr		
Care level:	Range: CAT 3 - CAT 6	Mode: CAT 3		

Table 2: Intervention outcomes - based on admission and current data (% cases)

	Improved	No change	Deterioration	Total (n=8)
Sleep	25.0	62.5	12.5	
Agitation	62.5	37.5	12.5	
Aggression	37.5	25.0	37.5	
Mental health	37.5	37.5	25.0	
Communication	62.5	25.0	12.5	
Relationships	62.5	25.0	12.5	
Body Wt	12.5	75.0	12.5	
Safety risk	37.5	0.0	62.5	
Independence	0.0	75.0	25.0	
Effects of pain on ADL	37.5	37.5	25.0	
Bladder management	25.0	75.0	0.0	
Bowel management	50.0	50.0	0.0	100.0%

NOTE: Classes of outcomes were compared with target variables based on comparisons with residents' recorded

Table 3: Interventions associated with areas of clinical interest (WEKA Apriori associations per case reviewed, expressed as probabilities of association)

	Sleep	Agitation	Aggression	Mental Health	Communication	Relationships	Body Wt & Function	Safety Risks	Independence	Pain etc affecting ADL	Bladder Management	Bowel Management
Pharmaceutical (p=0.31-1.0, N=8)												
• Routine analgesia	0.37	0.75	0.56	0.87	0.56	0.87	0	0.56	0	0.87	0.87	0.81
• Psychotropics	0.31	0	0	0	0	0	0	0	0	0	0	0
• Sedatives	0.31	0	0.37	0	0	0	0	0.56	0	0	0.62	0
NOTE: While other medication groups (antidepressants, NSAID, SSRI, antihypertensives and antibiotics) were in use, WEKA Apriori associations with target variables were absent.												
Nursing intervention (p=0.31-1.0, N=8)												
• Physical / ADL support	0.37	0.69	0.31	0.56	0.31	0.62	0.62	1.00	1.00	1.00	0.56	0.25
• Emotional support	0.81	0.31	0.50	1.00	0.94	1.00	0.12	0.50	0.62	0.69	0.56	0.19
• Assist, administer care	0.62	0.44	0.69	0.87	0.87	0.87	0.37	0.44	0.87	0.12	0.62	0.44
• Distract, reorient, redirect	0.37	1.00	0.75	0.19	0.44	0.50	0.12	0.37	0.75	0.19	0.69	0.44
• Protect, safety	1.00	0.69	0.25	0.12	0.62	0.12	0.62	0.19	0.62	0.44	0.31	0.25
NOTE: These intervention groups were suggested by the WEKA J48 decision tree as being associated with the target variables, based on the appearance of these classes in the cases reviewed.												
Food and nutrition (p=0.12-0.93, N=8)												
• Assist / prompt/prepare	0.12	0.93	0.75	0.44	0.12	0.87	0.37	0.87	0.81	0.62	0.37	0.37
Activities program (p=0.25-1.0, N=8)												
• Physical stimulation	0.50	1.00	0.62	0.75	0.75	0.75	0	0.75	0.62	0.75	1.00	1.00
• Social stimulation	0.50	0.62	0.50	0.50	1.00	0.87	0.75	0.62	0.75	0.75	1.00	1.00
• Mental stimulation	0.75	0.50	0.37	0.50	0.50	0.75	0	0.37	0.50	0.75	0.50	0.25
NOTE: Scores are based on inclusion of the activity and intervention goal. Cases (n=8) and variables (n=180) do not permit generalisations to be made beyond the cases reviewed.												

CONCLUSION

Nursing therapeutic interventions for elderly veterans with PTSD and dementia can reduce periods of physical agitation, relieve anxiety, stabilise sleep patterns, treat depression if present and promote maintenance of normal body weight. The efficacy of nursing interventions and approaches to care, treatment, support and protection was clearly demonstrated in this study. Interventions that reduce stimuli for agitation, aggression and risks to safety establish an environment that is calm and comfortable for residents. For residents with PTSD such interventions enable physical health to recover and be maintained with adequate rest, interesting things to do, good food intake and sleep.

In this pilot study, therapeutic interventions analysed in terms of their links with health outcomes for the cases examined clearly demonstrate the highly complex nature of nursing approaches in this practise context. Yet it has been shown through this research that a restraint-free environment that respects individual dignity and independence is possible, as is involvement of people with challenging behaviours in a range of activity programs which promote rest, relationships and mental health.

The WEKA data mining tools helped to identify patterns of association between interventions and treatment outcome variables in order to generate a model useful in clinical decision making. Even though the sample is quite small (n=8) and the list of variables quite extensive (n=180) WEKA was able to mine the data effectively, generating associations that were not initially obvious. Consequently, more extensive trialling of data mining techniques in nursing and aged care inquiry will be undertaken.



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