

the PITCH

PITCH study

Predictors Influencing The Change in Health Status
of Elderly in Community Care

A 12 month research project exploring the health status of
clients receiving community aged care packages.

Predictors Influencing The Change in Health Status of Elderly in Community Care (PITCH)

**A prospective longitudinal observational
study.**

FINAL REPORT

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EXECUTIVE SUMMARY

The PITCH (Predictors Influencing The Change in Health) research project was initiated in mid 2006 through a partnership between Bapcare (BC) and the Department of Epidemiology & Preventive Medicine, Monash University. The PITCH study is a prospective longitudinal observational study over 12 months for BC clients and carers located in Victoria on CACP, EACH and EACH Dementia packages of care. The study examined the health status of individuals receiving care packages and monitored the change in health status of clients and carers over a 12 month period. The primary end-point of the study, change in health status, was defined as a composite of a) death, b) a move to residential care, c) a drop of 2 points on any measure of independent daily living or d) new onset dementia.

- Five hundred and fifty randomly selected clients were invited to participate of which 61% attended for baseline study visits (n=334)
- At baseline,
 - 61% of clients had carers of which 63% reported high levels of carer strain
 - 26% of the population reported positive for dementia
 - 55% reported depression (16% severe and 39% mild)
- At 6 months, 74% of participants (n=248) completed questionnaires and at 12 months, 57% (n=190) completed questionnaires. No statistically significant changes in health instrument measures were found at 6 months.
- Between baseline and 12 months, based on overall instrument scores, there was
 - no deterioration in physical and mental health
 - increased cognitive function
 - social networks were sustained and there was a changed pattern of health service utilisation when clients increased to EACH packages
 - no increase in carer strain and reduced carer strain for rural participants
- Over the 12 month study period, 87% of participants (n=292) were included in the final analysis. These participants included those who were able to be followed up (ie completed questionnaires, moved into residential care or did not survive).
- 13% (45) did not survive 12 months and 17% (57) moved to residential care
 - Significant factors associated with clients not surviving or entering residential care included:
 - Age (OR: 1.05; 95% CI: 1.02-1.09)
 - IADL measured physical ability (OR: 0.74; 95% CI: 0.62-0.88)
 - GDS measured depression (OR: 1.07; 95% CI: 1.00-1.14)
 - 3MS measured cognitive ability (OR: 0.97; 95% CI: 0.95-0.99)
 - Medical diagnosis of cardiovascular disease (OR: 1.66; 95% CI: 0.93-2.96)
- 44% (146) reported a change in health status over 12 months
 - Significant factors associated with the change in health status over 12 months included
 - Age (OR: 1.04; 95% CI: 1.01 – 1.07)
 - Rural location (OR: 0.56; 95% CI: 0.33 – 0.93)
 - High socio economic status (OR: 0.83; 95% CI: 0.67 – 1.02)
- Depression and lower socio economic status were factors associated with an increase in package type over 12 months

These findings inform service providers, consumers and funding agencies of the health status and changes in that status over 12 months in recipients of packaged care programs. This information will be useful in developing strategies to enhance the health and improve health related quality of life in this population.

INTRODUCTION

The aged population is expanding and many countries are facing one quarter of their population being over aged 65 in the next 20-30 years [1,2] . A global ageing society has encouraged stakeholders to think resourcefully about the changing needs of the elderly requiring community based services. Health service delivery approaches vary and one such approach is 'case management'. Case management has been shown to meet the care delivery requirements for ageing individuals with complex care needs [3-5]. Many case management programs aim to improve the coordination of necessary services for the client. Within such programs, the physical and mental health, social and community service interaction and carer strain are often focused upon. There is evidence in the literature showing factors related to demographics, physical functioning, emotional wellbeing, social support and carer strain can influence the requirement for individuals requiring higher levels of care [6-11]. The association of these factors with a specific health service delivery approach, such as case management, is valuable to determine the program's effectiveness or efficiency; however this cannot be achieved without first having an understanding of the individual clients' health status and changes over time.

Currently, in Australia, there are a range of case management programs, and the federally funded CACPS and EACH packages offer such support to elderly clients [12-13]. The information that is available through public documents focuses on service usage and service approach rather than health status of clients and carers [14,15]. This has resulted in a limited understanding of client populations. Health status as a predictor of movement between packages and the impact on carer strain also requires further research. The expectation is that care packages enhance the health related quality of life of clients, yet there is a lack of substantial evidence to support this hypothesis. Thus, a collaborative project was initiated between Bapcare Pty Ltd (BC) and Monash University Department of Epidemiology and Preventive Medicine. The aim of the collaboration was to develop a program to better understand the BC clientele in regards to this population's health status, caregiver strain and movement between levels of community aged care. This information could be used with a longer term view of identifying client needs in health related states and validating the service delivery model of packaged care.

METHODS: The PITCH (Predictors Influencing The Change in Health) Project

Study Design

The PITCH Project was developed as a longitudinal observational study over 12 months for BC clients and carers located in Victoria. The study included clients on Community Aged Care Packages (CACP), Extended Aged Care at

Home (EACH) and Extended Aged Care at Home for the Dementia population (EACH Dementia) packages of care and their carers. Participants were invited to participate in a health assessment at three time points - baseline, 6 months and 12 months following study entry.

Study Objectives

The **primary objectives** of the study were to

- a) describe the current health status of clients receiving CACP and EACH (including EACH Dementia) packages of care through the BC service organisation,
- b) determine the level of carer strain associated with caring for clients on BC packages of care,
- c) determine the change in health status of BC clients over 12 months duration;
- d) determine the predictors (risk factors) associated with change in health status over the 12 month period

Secondary objectives of the study were to;

- a) determine the differences in client characteristics based on living in rural and metropolitan settings;
- b) determine the predictors (risk factors) associated with movement between packages of care (CACP, EACH, EACH Dementia);
- c) determine the change in health instrument measures over the study period

Participants

At the initiation of the PITCH project, 935 clients (635 CACP and 252 EACH) were receiving packages through the BC service. The service is divided into eight geographic regions. A cluster random sample, proportional to size, of 550 subjects was drawn stratified by package type. The sample size was based on determining the health status of the population (based on SF36 responses) to be within 5% of the unknown population parameter.

Inclusion/Exclusion Criteria

Subjects of either gender were considered for participation in the study if they met the following criteria:

- over 18 years of age
- have an aged related illness / condition as determined by the Aged Care Assessment Team
- capable of and willing to give informed consent or allow a carer to consent and participate on their behalf
- after consultation with the client and carer, the Care Manager and Program Manager's professional opinion (using the Competency to Consent Checklist/Screening Assessment) was that the client's ability to provide informed consent is suitable for participation.

Clients were excluded from participation in the study if;

- they or a carer as informant could not provide informed consent; or
- after consultation with the client and carer, the Care Manager and Program Manager's professional opinion was that the client's ability to provide informed consent is not suitable for participation.

In order to maximise the response rates, data was collected from two sources depending on the mental status of randomly selected subjects. Clients with diagnosed dementia at study entry¹ had responses collected from carers as informants where carers provided consent. The carers who acted as informants completed the IADL, SNS and GDS questionnaires. Otherwise, clients provided direct responses to health survey instruments.

Screening, Randomisation and Subject Identification

Study participants were screened via a screening checklist by the Program Manager using existing BC records to determine if they meet inclusion or exclusion criteria. The Care Manager reviewed the list of eligible clients with the Program Manager and when in agreement, the Care Manager provided a list of eligible clients to the Data Management Centre. A cluster random sample, proportional to size was then drawn stratified by package type. The Care Manager received a list of clients back from the Data Management Centre to gain consent from to participate in the study.

The potential participants were contacted by the Care Manager either in person, by telephone, email or letter and a mutually convenient time was established to gain consent. At this initial contact, an Explanatory Statement on the PITCH study was provided to determine whether the client is agreeable to the study. If agreeable, a Consent Form was provided and an appropriate signature attained. A witnessed signature was also required due to the vulnerable nature of this client group which was the carer in most circumstances. For clients who could not provide written informed consent, carers were asked to participate in the study and fill out amended questionnaires on behalf of the clients. There was an option for a legal guardian to provide written agreement on the client consent form on behalf of the client. A carer was then asked to consent to participate in the study and answer questions on behalf of the client. Likewise the carers were asked to consent to participating in a questionnaire to determine levels of carer strain over time. For the clients' participation, an appointment was arranged to begin filling out questionnaires and carers were asked to be present for EACH (Dementia) clients. The completion of questionnaires was conducted at multiple sessions to minimise the time and burden. When the data sheets were filled out, they were mailed back to the Data Management Centre.

¹ World Health Organisation's International Classification of Diseases (2003) describes dementia as: a syndrome due to disease of the brain, usually of a chronic or progressive nature in which there is disturbance of multiple higher cortical functions, including memory, thinking, orientation, comprehension calculation, learning capacity, language, and judgement. Consciousness is not clouded. The impairments of cognitive function are commonly accompanied and occasionally preceded by deterioration in emotional control, social behaviour or motivation. This syndrome occurs in Alzheimer's disease, in cerebrovascular disease, and in other conditions primarily or secondarily affecting the brain."

Baseline Assessment

Baseline assessment involved the client responding to questions in three broad areas; Physical and Mental health, Social and Community Service Interaction and Carer Strain. The following questionnaires were utilised for each area;

Physical and Mental Health: Health Status, both physical and mental, assessment consisted of

- Client Profile Questionnaire. Participant demographics and general client profile were collected.
- SF-36 Health Survey. This questionnaire provides an assessment of the physical and mental health domains and has been widely used in studies in the elderly [16].
- Instrumental Assessment of Daily Living (IADL). The IADL is a physical function questionnaire that is utilised in geriatric clinical practice [17].
- Geriatric Depression Scale (GDS). The GDS is a questionnaire that provides an assessment of depression in three categories; no depression, mild or severe depression [18, 19].
- Modified Mini-Mental Scale (3MS). The 3MS is a validated questionnaire to assess cognitive function and impairment [20, 21]. The 3MS has been used in a number of large interventional studies on the elderly population [22-24].

Social and Community Service Interaction: This was assessed by completing the following questionnaires

- Duke Social Support Index (DSSI). The DSSI questionnaire aims to identify the level of social support that the participant has in their lives [25]. The abbreviated (11 item) DSSI was used in this study as it measures social support and the use of health related services across four dimensions: social networks, social interaction, subjective support and instrumental support. Higher scores indicate lower levels of loneliness and better supports.
- Social Network Scale (SNS) assesses the utilisation of professional services and life style activities. This measure was developed to incorporate different components of older peoples' social networks within an Australian context [26].
- Ageing Perceptions Questionnaire (APQ). The APQ was developed to assess individuals' perceptions of the impact of their own ageing. The APQ indicates personal views about what it means to get older [27]. The questionnaire has demonstrated reliability and validity and its use is based on the view that self-perceptions of ageing may have an affect on outcomes over time, and the possibility that health service delivery approaches such as case management may have an impact on these perceptions.

Carer Strain: This was assessed by using the

- Carer Strain Index (CSI). The CSI measures caregiver strain in relation to the care they are providing to the client. Higher CSI scores indicate a greater level of strain, and were scored from 0-100.[28].

The questionnaires chosen in this study were selected on the basis of widespread use in clinical and research programs for elderly people and in most cases, validation in elderly cohorts.

Follow-up Measurements

The above battery of tests was repeated at 6 and 12 months following entry into the study.

Outcome Definition “Change in Health Status”

Change in Health status is defined as the composite of the following endpoints;

- a) Death
- b) Movement into a residential care facility
- c) Loss of 2 points in an independent activity of daily living
- d) New Onset Dementia, defined as a 3MS score of 77 or less.

Data Management and Statistical Analysis

All participant case record forms were developed using Teleform Ver10™. Data were collected by BC case managers following participation in a training program related to study procedures. Data were sent to the Data Management Centre at Monash University for entry and verification. Data queries were generated and returned to case managers for validation.

All data were entered into a Microsoft SQL database. All data were de-identified and access to the database was available only to certified project staff.

Baseline analysis utilised descriptive statistics to report on frequencies and percentages for categorical data and means \pm standard deviation or medians for continuous variables. Group comparisons were made using Chi Square or independent t tests for categorical and continuous data respectively.

Follow-up data analyses included those who participated at baseline, 6 and 12 months. For each scale, baseline and follow-up (12 month) scores were compared using descriptive statistics. For continuous data, paired t-tests (or the non-parametric equivalent for non-normal data) were used to detect changes between baseline and follow up scores. For categorical data, Chi-square analyses were performed. Regression analyses (logistic) were used to identify independent baseline predictors of change in health status over 12 months. For interpretation purposes, a p-value of less than 0.1 indicates a

trend and a p-value of less than 0.05 indicates that the test is statistically significant.

Ethical Considerations

This study was conducted in accordance with Monash University Human Ethics Approval.

At the first screening visit, the Care Manager explained to each potential subject the aims, methods, anticipated benefits and potential hazards of the study and any discomfort and inconvenience it may entail. Subjects were informed that they are entirely at liberty to abstain from participation in the study and would be free to withdraw consent to participate at any time. All participants were provided with an appropriate Information Sheet relating to the study and the Care Manager can answer any queries. If the client indicated a willingness to participate in the PITCH study, he/she was asked to sign the appropriate Consent Form. The Care Manager formally witnessed the subject's signature on the Consent Form.

Confidentiality

All subjects were allocated a unique study number. The code of study numbers was kept separate from the study data sheets, on which the subjects were identified by their study number and initials. Study data was accumulated in computerised databases in which subjects were only identified by their study numbers. In any publications relating to the study, only group and subgroup data will be presented and no individual data will be identified.

RESULTS

The PITCH study was conducted in three phases between July 2005 and September 2007. The official data collection points were Phase 1 (Baseline): 3rd July – 24th Sept 2006, Phase 2 (6mths): 1st Jan – March 2007 and Phase 3 (12 months): 9th July – 30th Sept 2007.

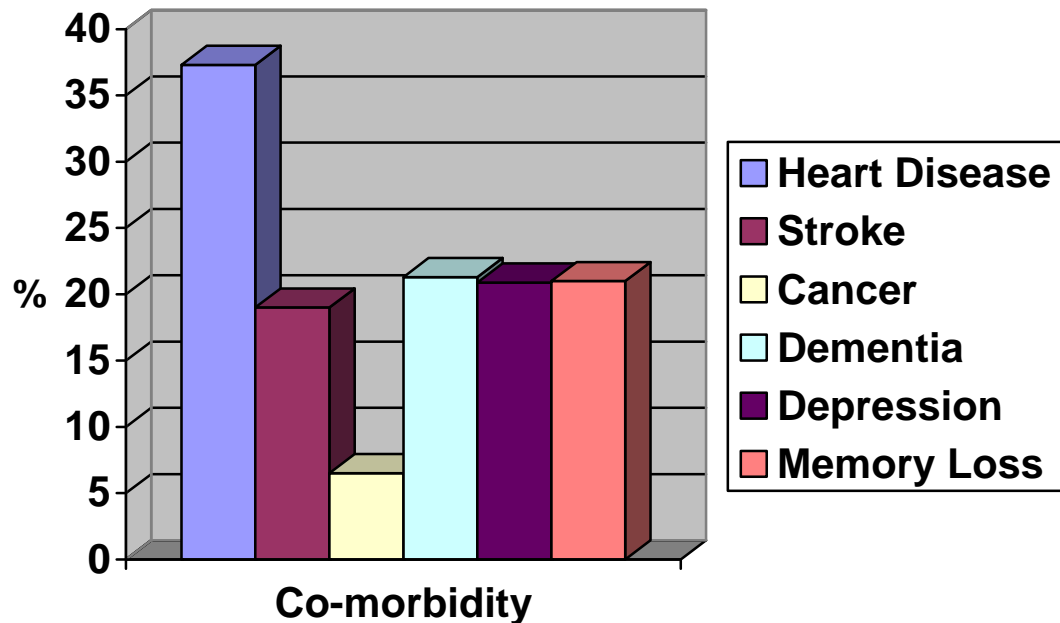
Baseline Characteristics

Of the 550 BC clientele approached to participate in the study, 334 attended a baseline visit (60.7%). 70% of the cohort were receiving CACP, 28% receiving EACH and the remainder receiving EACH dementia packages. Due to this small group, EACH Dementia data were included in those receiving EACH packages.

37% of participants were male and the mean age was 81 ± 8 years. 61% had carers. As a group, 95% were Caucasian, 70% born in Australia and had been receiving BC packages for 1.0 ± 0.6 years. 30% were from rural

locations. Figure 1 illustrates the prevalence of co-morbid conditions in the PITCH population. Heart disease was the major co-morbid condition with high levels of depression and dementia being reported.

Figure 1: Prevalence of co-morbid conditions in the PITCH population



Health Status

The baseline health status characteristics of the PITCH cohort are shown in Table 1.

Table 1: Baseline Health Characteristics of the PITCH population

<i>Health Measure</i>	<i>CACP</i>	<i>EACH</i>	<i>P value</i>
SF 36 - Physical	32.6 ± 9.8	26.2 ± 9.3	0.0001
- Mental	50.5 ± 11.2	48.8 ± 12.6	0.38
IADL Score	72.5 ± 19.2	42.2 ± 22.2	0.000
GDS	4.6 ± 3.3	7.8 ± 3.8	0.000
3MS	81.6 ± 12.9	78.4 ± 17.6	0.17

Recipients of EACH packages were less physically able (significantly lower SF36 physical component and IADL scores) than those receiving CACP packages. In addition, significant increased feelings of depression were reported in EACH recipients however there was no significant difference in

cognitive function levels between the groups. There were no differences in health measures between rural or metropolitan CACP or EACH recipients.

Social and Community Service Interaction

At baseline, the mean social support index (DSSI) score was 79.63 indicating a relatively good level of social support overall with 75% of clients scoring 70 or higher. There were no significant differences between package type or locations in relation to social support. The SNS utilisation scores appeared relatively low with a mean of 26 (scored 0-100) and there were no statistically significant differences between package types. Whilst for both service and social interaction was slightly higher in metropolitan locations, the differences were not statistically significant.

A summary of positive and negative perceptions of the consequences of ageing are shown in Table 2. There were no statistically significant difference for APQ scores between CACPS and EACH clients with total scores of 60.9 ± 7.0 and 60.3 ± 7.1 respectively, $p=0.58$.

Table 2: Summary of Baseline Ageing Perceptions. Each subscale ranges from 0-100.

Subscale	Mean
Consequences Positive (higher scores indicate strong belief that ageing has positive consequences)	72.95
Consequences Negative (higher scores indicate strong belief that ageing has negative consequences)	75.20
Control Positive (higher scores indicates more perceived control over positive experiences/outcomes associated with ageing)	75.57
Control Negative (higher scores indicates more perceived control over negative experiences/outcomes associated with ageing)	31.38
Emotional Representations (higher scores indicate negative emotional responses to ageing including anxiety, depression, fear and anger)	50.77

Carer Strain

61% of participants reported having a carer of which 90% were either, wife, husband or daughter. The mean score overall was 57.6, and scores above 53.8 indicates a high level of carer strain. At baseline 114 carers (63%) had levels of carer strain above 53.8. Carers of EACH recipients reported significantly higher levels of carer strain than CACP (mean scores of 66.0 ± 22.7 versus 49.6 ± 27.4 respectively). This was particularly the case in metropolitan areas, with metro EACH carers averaging 25.5% more strain than metro CACP carers.

6 months Follow-up.

Of the 334 participants who participated at baseline, there were 305 (91.3%) clients who were followed up at 6 months and 248 completed questionnaires. Twenty four participants (7%) had died and 33 (10%) had moved to residential care.

Health Status

Changes in the health measures at 6 months are shown in Table 3.

Table 3: Changes in key health measures in 248 participants followed up 6 months after study entry.

<i>Change in Health Measure</i>	<i>CACP</i>	<i>EACH</i>	<i>P value</i>
SF 36 - Physical	0.18 ± 7.82	3.35 ± 9.7	0.064
- Mental	1.53 ± 10.61	0.67 ± 12.47	0.70
IADL Score	-2.65 ± 13.22	-4.46 ± 15.5	0.37
GDS	1.71 ± 18.44	-2.44 ± 19.73	0.142
3MS	0.75 ± 9.49	-0.60 ± 8.34	0.48

There were no significant changes in health instrument measures at six months in those participants

Social and Community Service Interaction

Analyses of differences in DSSI scores over time found that while there was a slight decrease in the overall mean (79.63 to 78.91), this was not statistically significant. Also there was no relationship between changes in DSSI scores and changes in package level, or between urban/rural locations, or type of package.

At 6 months, there were no statistically significant changes in the overall SNS 'utilisation of activities' mean score (from 26.8 to 26.0). Clients on EACH packages at baseline were more likely to increase their utilisation of activities

(mean = 0.4) compared to clients on CACP packages at baseline who decrease their utilisation of activities (mean = -1.2). However, clients who were on an EACH Dementia package at baseline increased in activity utilisation (mean=0.62) more than EACH and CACP clients. Clients in rural locations increased their utilisation of activities (mean = 0.2) compared to clients in metropolitan areas who decrease their utilisation of activities (mean = -1.1).

Over 6 months, there was no change in the overall means for the APQ sub-scores. There were no statistically significant differences between changes in these means over time across package types or locations.

Carer Strain

At 6 months, the proportion of clients reporting high levels of strain reduced from 65% at baseline to 55% at 6 months, however the change was not statistically significant.

12 months Follow-up

After 12 months, there were 292 (87.4%) who were followed up and 190 completed questionnaires. Forty five people had died (13.5%) and 57 (17.0%) had moved to residential care.

Health Status

Table 4 illustrates the change in health status for participants completing 12 months assessment.

Table 4: Changes in key health measures in 190 participants followed up 12 months after study entry

Test	Mean (Baseline)	Mean (12 month)	Mean Change	95% CI	P
Physical and mental health					
SF 36 physical	32	33	-0.8	-3.3; 1.8	0.55
SF36 mental	52	53	-0.6	-3.2; 2.0	0.66
IADL	71	71	0.1	-5.0; 5.3	0.95
GDS	35	33	2.3	-2.8; 7.4	0.37
3MS	84	87	-3.0	-5.9; -0.2	0.04
Social and community service interaction					
SNS	29	29	0.6	-1.4; 2.6	0.55
DSSI	80	81	-0.8	-3.7; 2.1	0.60
APQ	61	61	-0.1	-1.6; 1.5	0.93
Carer strain					
Carer Strain	59	54	4.4	-3.9; 12.7	0.29

Overall, there was a non-significant increase in physical and mental function at 12 months (p=NS). There was a trend for an increase in physical function for EACH versus CACPS participants (p=0.09); however no change in mental

function score between groups was observed. No differences in physical function scores were observed for rural compared to metropolitan areas. After 12 months, there was no significant differences in IADL score overall, and while EACH participants recorded a lower IADL at 12 months than CACPS participants, the difference was not significant.

Emotional wellbeing for the group as measured by the GDS did not change over 12 months (Table 4), however EACH participants had a greater reduction in depression score at 12 months than CACPS participants ($p=0.04$). Those that changed packages from CACPS to EACH had higher levels of depression at 12 months but this was not statistically significant. At 12 months, 66% of participants remained in the same depression category (either normal, mildly depressed, severely depressed), 18% were more depressed and 16% were less depressed. There was no statistically difference between CACPS and EACH, metro or rural or increase in package type.

On average, the EACH participants had a lower 3MS score at 12 months compared to baseline while CACPS participants had a higher 3MS score at 12 months compared to baseline however, these differences were not statistically significant.

Twenty one percent of participants had 3MS diagnosed dementia (3MS less than 77) at baseline compared with 12% at 12 months ($p=.04$). This was the only statistically significant health status change during this time period. The finding most likely signifies a learning effect over a relatively short duration of follow up. Eighty four percent of participants did not change 3MS dementia category, 6% showed new dementia and 10% improved in 3MS dementia category. There was no statistically difference between CACPS and EACH, metro or rural or increase in package type.

Social and Community Service Interaction

DSSI scores remained stable over 12 months, however EACH participants had less of a change in social support than CACPS participants. Those that changed packages from CACPS to EACH had lower levels of social support based on the DSSI scores (p -NS) and those in rural areas had more of a change in social support over 12 months compared to metropolitan areas (p =NS)

The overall activities calculated through the SNS remained the same over 12 months (Table 4) however, those that changed from CACPS to EACH or EACH Dementia had lower overall levels of activity ($p=0.02$). In terms of specific service utilisation, participants who increased package type tended to increase the utilisation of the following services; physiotherapy ($p=0.01$), occupational therapy ($p=0.04$), nursing and community health services ($p=0.11$), and respite service ($p=0.07$).

At 12 months, ageing perceptions remained constant, however EACH participants perceived ageing as having less of a negative consequence than CACPS participants at 12 months ($p=.05$).

Carer Strain

Whilst overall levels remained the same, carers in rural locations tended to report less strain than metropolitan carers ($p= 0.09$). There was a statistically significant decrease in carer strain category for rural participants at 12 months compared to metropolitan (36% versus 11% respectively; $p = 0.03$). 75% of participants remained in the same carer strain category (low level –less than 7/13, versus high level -score of 7/13 or more), 18% decreased their carer strain category and 7% increased their carer strain category. There was no statistically difference between CACPS and EACH, or increase in package type.

Change in Health Status

After 12 months, in addition to the 45 people who had died (13.5%) and 57 (17.0%) who had moved to residential care, 26 participants dropped by 2 points on the IDAL scale (8.9%) and 18 (6.6%) had developed new onset dementia defined as a MS score <77. Overall 146 of the 334 participants (43.7%) reached the ‘Change in Health Status’ outcome definition within 12 months.

Table 5 illustrates baseline factors associated with change in health status after 12 months. Increased age, a lower IADL score, increased levels of depression, a lower 3MS score were significant univariate predictors of change in health status at 12 months. The presence of previous cardiovascular disease was associated with a reduced health status at 12 months ($p=0.09$).

Table 5: Univariate predictors of death or entry into residential care

	OR (Odds Ratio)	95% (Confidence Interval)	CI	P value
Age	1.05	1.02; 1.09		0.00
Sex	1.38	0.84;2.26		0.21
SES	0.86	0.70; 1.07		0.19
Location	0.73	0.43; 1.24		0.24
SF 36 physical	0.99	0.96; 1.02		0.46
SF36 mental	0.98	0.96; 1.01		0.15
IADL score	0.74	0.62; 0.88		0.00
GDS	1.07	1.00; 1.14		0.05
3MS score	0.97	0.95; 0.99		0.01
DSSI	0.97	0.90; 1.05		0.46
Carer Strain	1.00	0.99; 1.01		0.68

Medical diagnosis of heart attack	1.00	0.69; 4.26	0.24
Medical diagnosis of stroke	1.05	0.51; 2.18	0.89
Medical diagnosis of cardiovascular disease	1.66	0.93; 2.96	0.09
Medical diagnosis of depression	0.91	0.45; 1.82	0.79

Table 6: Univariate predictors of death or entry into residential care or decrease in IADL of 2 or more points or new onset of 3MS diagnosed dementia

	OR (Odds Ratio)	95% CI (Confidence Interval)	P value
Age	1.04	1.01; 1.07	0.01
Sex	1.10	0.68; 1.78	0.69
SES	0.83	0.67; 1.02	0.07
Location	0.56	0.33; 0.93	0.02
SF 36 physical	1.01	0.98; 1.04	0.60
SF36 mental	0.99	0.96; 1.01	0.31
GDS	1.02	0.96; 1.09	0.46
DSSI	0.96	0.89; 1.03	0.24
Carer Strain	0.99	0.98; 1.00	0.13
Medical diagnosis of heart attack	1.34	0.54; 3.31	0.52
Medical diagnosis of stroke	1.59	0.79; 3.23	0.20
Medical diagnosis of cardiovascular disease	1.54	0.88; 2.71	0.13
Medical diagnosis of depression	1.24	0.64; 2.41	0.53

When considering the hard end-point of death or a move to residential care alone, age remains a significant predictor (Table 5). Living in a rural setting appears to favour survival as does a higher socio-economic status.

An increased depression score and lower SES were associated with change in package type after 12 months (Table 6). Age remained a predictor.

Table 7: Univariate predictors of change in package type

	OR (Odds Ratio)	95% CI (Confidence Interval)	P value
Age	0.95	0.89; 1.01	0.12
Sex	0.65	0.17; 2.50	0.53
SES	0.61	0.34; 1.10	0.10
Location	0.84	0.22; 3.23	0.80
SF 36 physical	0.95	0.87; 1.04	0.26
SF36 mental	0.97	0.91; 1.03	0.29
IADL score	1.24	0.71; 2.16	0.44
GDS	1.18	1.02; 1.34	0.03
3MS score	0.97	0.92; 1.01	0.16
DSSI	1.02	0.83; 1.25	0.84
Carer Strain	1.01	0.98; 1.04	0.36
Medical diagnosis of heart attack	1.01	0.12; 8.40	0.99
Medical diagnosis of stroke	0.50	0.06; 4.03	0.51
Medical diagnosis of cardiovascular disease	0.76	0.19; 3.02	0.69
Medical diagnosis of depression	1.68	0.42; 6.79	0.47

DISCUSSION

For clients receiving community based care packages, almost one in two will experience a deterioration in health status over a 12 month period resulting in death, movement to a residential care facility, reduced physical ability or new onset dementia. This is the first report in Australia to document the rapid rate of change in health status of these individuals and to identify factors associated with this change.

Of the predictors of change in health, age and previous cardiovascular disease could be considered non-modifiable, however there may be opportunities to focus on the remaining predictors as targets for prevention and maintenance of health. Depression, cognitive function and physical disabilities may either be medically treated and/or improved through health service delivery approaches that provide support and assistance in these areas. From a disability perspective, self report of increased difficulty with an activity can identify early decline in performance measures and incident mobility disability [29, 30]. Limitations in or inability to perform ADL and mobility tasks can reflect the client's perception on their ability to perform in their own environment and correlate moderately with performance-based measures [31].

In comparison to a Finish study [32] (average age 81.2 ± 4.6 years, 74% female), BC clients have lower functioning ability. This Finish study found that those without dementia had an average IADL score of 85.00 ± 20.00 , while those with dementia averaged 45.00 ± 31.25 . These results illustrate that BC clients' ability to perform common tasks appears to be lower. This is confirmed by the findings for the SF-36 on physical function indicating that the BC client group has higher needs in relation to assistance with physical tasks than the average population.

The rates of depression found in this study were not dissimilar to other studies of comparable community-dwelling older populations in Australia [33] (average age 86.3 ± 6.9 years, 70.6% female) which found that 53.3% of the group met the screening criteria for depression defined by the GDS. This reinforces the concern that this group can benefit from interventions which reduce depression.

BC clients had a higher proportion of 3MS screened dementia compared to a study looking at 8,697 community-dwelling Canadians [34] (average age 75 ± 7.1 years, 59.3% females) who had higher levels of cognitive ability. Of the community-dwelling Canadians only 5.5% screened positive for dementia by the 3MS, which was significantly less than BC clients.

The level of social support, as measured by the DSSI, indicated that BC clients had varying levels of social support which increased slightly over the 12 months. In comparison to an Australian study [35] with women aged 70-75 (average DSSI score 85.33 ± 9.67) BC clients had lower social support.

Identifying individuals at risk at the commencement of the BC program may direct resources to better manage these conditions with the objective of maintaining the health of these individuals over the long term.

For those people not experiencing a change in health status over the 12 months, there were little or no changes in the health status indicators suggesting that recipients of care packages may be a dichotomous group – those who decline rapidly over twelve months and those who remain relatively stable. In the latter group, it may be important to ensure that current social and support networks are maintained and the health maintenance of carers of this group is recognised and addressed.

Care package recipients appear to have a positive outlook to ageing and this outlook did not change over the 12 months with the exception of an increase in the perception of negative consequences of ageing. When compared to an older Irish adults study [27] (average age 74.1 ± 6.8 years, 57% female), BC clients had similar perceptions about positive consequences and positive control in regards to aging. However, CACPS clients believed that they had less control over negative consequences than EACH which differed from the Irish study. These results suggest that there are opportunities for those administering care packages to play a particularly important role in helping

clients develop a more positive response to some of the negative consequences of ageing.

The level of carer strain in this study was found to be relatively high compared with another community-based study [36] in which 37% of carers had high levels of strain and in another study of stroke patients in which the level was 39.7% [37].

Where clients increased to a higher level package (ie from CACP to EACH), there was an overall decrease in lifestyle activities but an increased use of some nursing, community and allied health services. Importantly, it did not appear that those in rural locations utilised less services than their metropolitan counterparts suggesting that access to facilities may not be a major determinant of care provision in this group.

A recent double blind, placebo controlled randomised feasibility study, called ASPREE, involving 192 Australian elderly men and women (average age 76.2, 40.7% male; 59.3% female) and testing major adverse and cardiovascular events in the aged, found there were significant increases in systolic and diastolic blood pressures in the aspirin group and significant reductions in haemoglobin, blood glucose and abdominal circumference at 12 months [38]. Physical function decline, cognitive function scores and quality of life measures were included using the SF 36, 3MS, IADL and GDS. At 12 months, there were no differences between Aspirin and placebo groups in levels of depression, cognitive function or IADLS.

In comparison to the ASPREE population, PITCH participants had lower SF 36 scores (both mental and physical function), lower IADL, increased depression and lower cognitive function. These comparative results reiterate that the BC organisation is servicing clients with significant health concerns.

Limitations of this study are acknowledged. Though the loss to follow up was minimal, there could be additional methods to maximise participation. The 'Change in Health Status' definition included movement to residential care and the reality is that people move into residential care for multiple reasons other than simply change in health status (ie available beds, social circumstances, etc). The statistically significant change in health status for the cognitive ability test (3MS) could be due to the learning effect with the 6 and 12 months follow up rather than a cognitive improvement.

The PITCH study has shown that there is a high level of carer strain in this population and that strain is increased when participants require a change in package support. Carer strain is also increased with dementia or depression identified in the participant. As over 60% of these participants required carers who were predominantly immediate family members, strategies to improve or at least maintain the health status of carers may be as important as that of participants in this group.

CONCLUSION

The PITCH study has identified a number of key factors that are associated with a change in health status over a 12 month period in clients receiving community care packages. Routine assessment along with strategies to improve modifiable factors may influence the health and quality of life in this ever increasing segment of the population. The findings may also aid administrators and health policy planners in directing resources to key areas impacting on health outcomes in this group.

Glossary

3MS – The Modified Mini-Mental State Examination

Baseline Package – the Bapcare package type that the participant was receiving when the study commenced. Also refers to a statistical comparison testing whether the mean change in the instrument is different between the Bapcare package types at baseline.

BC – Bapcare

CACP – Community Aged Care Packages

Change in Package – A statistical comparison from the time of data collection at baseline versus 12 month testing whether the mean change in the instrument is different between the participants who increased in care versus those who stayed on the same package.

Carer – the individual who usually resides at home with the client or is in close contact with the client

CSI – The Caregiver Strain Index

DSSI – Duke Social Support Index

EACH – Extended Aged Care at Home

EACH Dementia – Extended Aged Care at Home (for Dementia population)

GDS – The Geriatric Depression Scale

IADL – Instrumental Activities of Daily Living

Increase in Package – A participant who increased in package of care from baseline to 12 months (i.e. client starting on a CACP package and changing to an EACH package, or changing from a CACP or EACH to EACH Dementia package). Please note that in the Predictor analysis section, an 'increase in package' can be any time between baseline and 12 months (ie from baseline to 6 mo, 6 mo to 12 mo, or baseline to 12 mo).

Location – Bapcare office locations. Also refers to a statistical comparison testing whether the mean change in the instrument is different between metropolitan and rural Bapcare office locations.

Non participant – Clients who completed the baseline data collection but were not able to participate at the 12 month data collection phase due to moving into residential care, moving out of the area, deceased or refused to continue.

Participant – Clients (or carers on behalf of clients) who have completed of at least one of the following forms at both baseline and 12 month data collection phases: Client Questionnaire, Carer as Informant for Client Questionnaire, or The Caregiver Strain Index.

PITCH – Predictors Influencing the Change in Health Status of Elderly in Community Care study

Sample loss – Classification term interpreted as those clients who no longer fit the criteria of participating in the study including moving out of the area, moving into residential care or becoming deceased.

SES – Socio Economic Status (see also SEIFA)

SEIFA - Socio-Economic Indexes for Areas (SEIFA). The SEIFA 2001 is a powerful analytical tool that enables you to investigate the socio-economic wellbeing of Australian communities and identify areas of advantage and disadvantage. Based on data from the 2001 Census, SEIFA 2001 consists of four separate indexes that each concentrate on a different aspect of the social and economic conditions in an area.

SF-36 – SF-36 Health Survey

Visit – the time at which the questionnaires were asked (baseline or 12 months). Also refers to a statistical comparison testing whether the mean score for the instrument has changed between visits (between the baseline and 12 month visits).

Withdrawal – Reason for no longer participating in the study due to 'refusal'.

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