

Cause-specific mortality among Veterans with serious mental illness lost to follow-up

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Abstract

Objective: Although reduced care engagement has been linked to increased mortality for persons with serious mental illness (SMI), there have been limited investigations into specific mortality causes for this group. This study evaluates the effects of care disengagement on mortality cause and time until death in Veterans with SMI.

Method: A total of 3300 Veterans with SMI lost to Veterans Affairs care for more than 1 year were contacted by providers who attempted treatment reengagement. Fisher's Exact Tests evaluated associations between mortality cause and reengagement status, and a Cox proportional hazard model evaluated the association between reengagement and survival.

Results: During the study, 146 (4.6%) patients died. A lack of reengagement was associated with increased noninjury death [odds ratio (OR)=1.64], increased cancer-based mortality (OR=4.76) and an average of 97.4 fewer days of life.

Conclusions: Care reengagement may support medical care management and reduce preventable medical mortality for Veterans with SMI. Published by Elsevier Inc.

Keywords: Serious mental illness; Cause-specific mortality; Lost to care; Care reengagement; Time until death

1. Introduction

Persons with serious mental illness (SMI; schizophrenia, bipolar disorder, other psychotic disorders) experience early mortality, in part due to care discontinuity [1]. In response to this, the Veterans Affairs (VA) healthcare system recently implemented an outreach program for Veterans with SMI lost to VA care with the goal of reestablishing treatment. Initial evaluations of this program indicated that the majority of targeted Veterans were

reengaged into treatment and that reengagement was associated with a sixfold reduction in mortality [2]. Nonetheless, specific causes of mortality among Veterans with SMI lost to care have not been examined. Such information can inform care transitions and design interventions aimed at reducing the excess mortality experienced by this population [3].

2. Methods

A cohort of Veterans with SMI ($N=3300$) developed by Davis et al. [2] was used in this analysis. These Veterans were (a) last treated in fiscal year 2005 or 2006, (b) lost to care for at least 1 year and (c) targeted for reengagement. Patient mortality status and cause of death were updated to December 31, 2009, using the National Death Index (NDI). Using the

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Table 1
Mortality cause comparison by Veterans reengaged status, FY07–09 (N=3300)

Variable	Not reengaged (N=1750)		Successfully reengaged (N=1550)		OR	95% CI	P value
	N	%	N	%			
Cause of death							
Injury death	11	0.63	5	0.32	1.96	0.68–5.56	.31
Noninjury death	84	4.80	46	2.97	1.64	1.14–2.38	.007
Cardiovascular disease	31	1.77	21	1.35	1.32	0.75–2.27	.40
Malignant neoplasms	21	1.20	4	0.26	4.76	1.61–14.29	.001
Accidents/suicides	11	0.63	5	0.32	1.96	0.46–4.35	.31
Chronic low respiratory disease	9	0.51	4	0.26	2.00	0.61–6.67	.27
Infectious disease	8	0.46	5	0.32	1.41	0.46–4.35	.58
Other organ failure	5	0.29	3	0.19	1.47	0.35–6.25	.73
Other chronic disease	5	0.29	2	0.13	2.22	0.43–11.11	.45
Other/missing cause of death	3	0.17	3	0.19	0.88	0.18–4.35	1.00
Alzheimer's disease/dementia	2	0.11	4	0.26	0.44	0.08–2.44	.42
Still alive by 2009	1655	94.57	1499	96.71			

CI, confidence interval.

Centers for Disease Control and Prevention's classification system, we categorized deaths as injury- (e.g., suicide or homicide) or non-injury-related to facilitate a separate examination of the most common causes of mortality. Fisher's Exact Tests evaluated whether reengagement was associated with increased risk of cause-specific mortality. Additionally, Cox proportional hazard models assessed the association of time until death with reengagement status and patient variables. Finally, the association between reengagement and time until mortality for patients who died during the study was evaluated using an independent-samples *t* test.

3. Results

One hundred forty-six (4.6%) Veterans died between September 1, 2007, and December 31, 2009. Patients not

reengaged (N=1750) were more likely to have died from non-injury-related causes [4.80% vs. 2.97%; odds ratio (OR)=1.64, *P*=.007] than those reengaged (N=1550; Table 1). The most common cause of death among both cohorts was cardiovascular disease, with nonsignificant differences in risk (1.77% not reengaged vs. 1.35% reengaged, OR=1.35, *P*>.05), followed by malignant neoplasms, for which non-reengagement was associated with increased risk of death (1.20% vs. 0.26%, OR=4.76, *P*=.001).

After adjusting for patient factors [4] (Table 2), reengagement was associated with increased time until death [hazard ratio (HR)=0.65, *P*=.02], resulting in an average of 97.4 (S.D.=236.1) additional days of life among reengaged Veterans (*P*=.02). Shorter time until death was also associated with being older (45–64 vs. <45: HR=3.76, *P*=.002; 65+ vs. <45: HR=16.25, *P*<.0001), being unmarried (HR=1.62, *P*=.03) and increased medical comorbidity

Table 2
Cox proportional hazard model: association between reengagement status and survival adjusting for patient factors^a

Variable	β	S.E. β	HR	95% CI	P value
Reengagement status	−0.44	0.18	0.65	0.45–0.93	.02
Age					
45–64 vs. <45	1.32	0.43	3.76	1.61–8.78	.002
65+ vs. <45	2.79	0.45	16.25	6.78–38.94	<.001
Female gender	0.05	0.35	1.05	0.52–2.10	.89
African–American race	−0.08	0.34	0.93	0.48–1.80	.82
Rural status	−0.15	0.35	0.86	0.43–1.73	.67
Marital status (married)	−0.48	0.22	0.62	0.40–0.95	.03
Service connected disability status (+70%)	0.38	0.20	1.46	0.99–2.15	.06
Medical comorbidity					
Charlson 1, 2 vs. 0	1.00	0.20	2.73	1.85–4.02	<.001
Charlson 3+ vs. 0	1.68	0.28	5.36	3.08–9.31	<.001
Homelessness status	−0.07	0.22	0.93	0.60–1.45	.75
Distance to VA medical center (+50 miles)	−0.01	0.21	0.99	0.65–1.50	.96
PTSD diagnosis status (has PTSD)	−0.06	0.31	0.95	0.51–1.75	.86
SUD status (has SUD)	0.20	0.20	1.22	0.82–1.81	.33

PTSD, posttraumatic stress disorder; SUD, substance use disorder.

^a Hazard ratios were adjusted for age, gender, race, rural location, distance from nearest VA medical center, marital status, disability status, Charlson medical comorbidity score, PTSD diagnosis, SUD diagnosis and homelessness.

(Charlson=1 or 2 vs. 0: HR=2.73, $P<.001$; Charlson=3+ vs. 0: HR=5.36, $P<.001$).

4. Discussion

This study represents the first attempt at evaluating cause-specific mortality in patients with SMI lost to ongoing treatment. Reengagement was associated with reduced risk of noninjury mortality, specifically mortality from cancer. This finding is noteworthy given that potential improvements in functioning and lifespan can result from adequate cancer treatment [5,6], and is consistent with research that identifies cancer as a leading contributor to excess mortality in persons with SMI due to underscreening and fragmented provider contact [7]. It is likely that care disengagement presents additional barriers to adequate screening and early treatment initiation that increase the lethality of cancer in persons with SMI. Reengagement was independently associated with increased survival even when considering medical comorbidity, age and psychiatric diagnosis. Moreover, increased survival associated with reengagement (97 days) is notable given the relatively short (21 months) follow-up period.

Differences in mortality rates relative to previous work with this cohort [2] are partially due to the use of different mortality tracking sources (NDI, which is continuously updated based on legally required State Health Department death certificates vs. Beneficiary Identification Records Locator Subsystem and Social Security Administration Death Index, which are voluntary reporting systems). Hazard ratios greater than 1.5 emerged for several mortality cause comparisons, but did not meet statistical significance. It is unknown if these represent group differences that did not materialize due to a lack of power or are the result of random sampling variation. Non-reengagement may be associated with increased medical severity that contributed to mortality but was not captured by patient variables. Further investigation will hopefully clarify these issues.

Overall, these findings, along with those of Davis et al. [2], suggest that reengagement-based outreach efforts for

Veterans with SMI may improve survival, particularly for those with medical conditions. Increased survival with care reengagement may be largely due to medical care follow-up, an aspect often overlooked due to a focus on psychiatric pathology in this group. Currently, the VA is nationally implementing the reengagement program, SMI Re-Engage, under VHA Directive 2012-002. The present study findings will further inform this program's implementation.

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