Life expectancy following psychogeriatric reactivation

1. Introduction

The mortality rate of psychogeriatric patients with cognitive function disorders (e.g. delirium, dementia, Korsakov, amnestic and other cognitive disorders) is higher than that of the normal population (1-3). Apart from the somatic pathology, cognitive dysfunctions often occur in conjunction with psychiatric function disorders, e.g. mood and behavioural disorders (4-8). These disorders are not only related to a decreased quality of life and the need for long-term care, but also to a diminished life-expectancy (9-13). In order to identify patients who may potentially benefit most from specific intensive interventions aimed at reducing the negative effects of the psychiatric function disorders, it is of clinical interest to determine prognostic indicators which may predict survival in these psychogeriatric patients. In order to optimize medical decision making, it is clinical relevant that patients who may benefit form intervention programmes are immediately identified (on admission).

In this clinical-empirical exploration the first objective was to estimate the life expectancy of patients having participated in the psychogeriatric reactivation programme. The second objective was to identify prognosticators of survival on admission.

2. Patients and methods

2.1 Patients

Psychogeriatric reactivation was tailored to psychogeriatric patients primarily suffering from mild (or very mild) to moderate cognitive function disorders. The patients were referred to the programme by ambulant mental health care services. The inclusion criteria for this study were: (1) classified within the following DSM IV categories: dementia, amnestic disorder, other cognitive disorders and delirium; (2) psychiatric function disorders (≥ 1); (3) referral for admission; (4) participation in (and discharged from) the reactivation programme, and (5) aged 65 or above.

The exclusion criteria for participation in the reactivation programme were: (1) severe psychiatric function disorders (e.g. acute psychosis); (2) severe cognitive function disorders (Global Deterioration Scale, GDS >6), and (3) (life-threatening) somatic comorbidity.

With regard to the probability of survival, we compared our patient group to a reference group of community-dwelling elderly people, matched by age and gender. For this purpose we used life expectancy tables for age and gender categories, produced by Statistics Netherlands (CBS), which are based on research into population stratifications.

The regular independent referral committee for admission to nursing and residential homes decided whether the reactivation programme was suitable for the patient. Furthermore it determined whether after discharge, referral to a residential home was feasible.
2.2 Psychogeriatric reactivation

Psychogeriatric reactivation spans the fields of psychiatry and nursing-home medicine (15). The reactivation programme (duration 3 to 6 months, in a 15-bed unit) comprised intensive interdisciplinary interventions involving treatment, rehabilitation, nursing, welfare and support of the caregiver system. Treatment was mainly directed towards improving psychiatric function disorders and somatic comorbidity. Rehabilitation provided training in life skills necessary after discharge. The interventions were adapted to refractory cognitive disorders. Furthermore, the patients’ social condition was optimised by welfare and family support.

The therapeutic team consisted of a psychogeriatrician, a clinical psychologist, music-/psychomotor-/creative therapists, a physiotherapist, an occupational therapist, a speech therapist and a dietician. The nursing team was trained in supportive strategies and techniques (e.g. cognitive training, behavioural therapy techniques, rehabilitation and a medication programme). The welfare activities (provided by a welfare worker, clergyman, social worker and volunteers) focused on social activation and social participation, aiming to maintain the patients’ new (or regained) ability to function autonomously. The support of the caregiver system was provided by the clinical psychologist and the nursing team. Staff members from all disciplines were trained to conduct the intensive and integrated reactivation programme.

The reactivation process was characterized by three consecutive phases: (1) observation and control of dominant psychiatric function disorders and somatic comorbidity, particularly disorders and morbidity detrimental to vital functions; (2) achieving, regaining or stabilizing the psychosocial abilities required for autonomous functioning and the enhancement of well-being and finally (3) preparing the patient for discharge.

2.3 Design

This was a prospective, clinical-empirical study. Of the 102 patients who participated in the psychogeriatric reactivation programme section of the psychiatric-skilled nursing home ‘DrieMaasStede’, Schiedam, the Netherlands from 1989 to 1995, 75 met the selection criteria of this study.

2.5 Assessments

On admission, the patients’ gender, age, marital status and country of origin were recorded (16). The patients’ clinical status was assessed in terms of their prevailing functional and diagnostic characteristics (17,18). The functional characteristics consisted of the Global Deterioration Scale (GDS, range: 1-7), the Help Index (HI, range: 0-12) and Activities of Daily Life (ADL, range: 0-5) (19,20). The diagnostic characteristics were assessed by two experts (a psychogeriatrician and a clinical
psychologist), who completed a standardised Functional Assessment List (FAL) based on the DSM-IV and ICD-9. The FAL comprised five domains: general details, cognitive function disorders, psychiatric function disorders, somatic comorbidity and (caregiver) social system (21).

2.6 Procedure

Both the general and the functional data (HI, ADL) were routinely registered (16). After thorough examination of the patients’ medical records (22) a psychogeriatrician and a clinical psychologist completed both the FAL and the GDS. The decision procedure was as follows: in the case of disagreement, the two experts attempted to reach consensus through discussion. If consensus could not be reached, the lack of consensus was recorded. Details of the duration of treatment and of location after discharge were recorded for each patient, following their discharge from the reactivation programme. Data concerning the deaths of participants were gathered by telephone and by consulting the Registry of Births, Marriages and Deaths.

2.7 Statistical analyses

To be able to compare survival rates after discharge, the study patients were divided into an ‘independent’ group being discharged home or to a residential home with restricted support and a ‘dependent’ group being discharged to a nursing home.

We used the Kaplan-Meier test for equality of survival distributions to make comparisons between the survival curves of the ‘independent’ group, the ‘dependent’ group and the reference group of community-dwelling elderly people. A log rank test was used to test the difference of survival distributions. Significance was set at \( p < 0.05 \) (two-tailed).

To identify prognostic characteristics for survival after discharge, the Cox regression analyses were applied first to each individual variable (general, functional and diagnostic characteristics of the patients) assessed on the five domains. For efficiency reasons these results are not presented in this article. In the joined analyses of functional as well as diagnostic characteristics, characteristics with \( p < 0.10 \) (two tailed) in the separate analyses were entered simultaneously (backward elimination method). Next, in the combined analyses both functional and diagnostic characteristics meeting the \( p \)-values \( < 0.05 \) (two tailed) were entered in the Cox regression analyses (backward elimination procedure). Regarding the explorative nature of this study the \( p \)-value was fixed at 0.05 (two tailed). The separate, joined and combined Cox regression analyses were adjusted for gender, age and type of discharge to facilitate estimation of their prognostic value.
The adjusted hazard ratio (HR) was used to measure performance. The more HR diverges from 1.0, the higher the prognostic value. A HR lower than 1 means a lower probability of death. All estimated parameters are presented with their 95% confidence intervals (CIs).

3. Results
Seventy-five patients participated in this study. Their mean age was 80 (range: 65-92; SD=6.74), 25% were men and 75% were women. In terms of marital status, 75% were single. The median duration of treatment was 122 days (range: 19-410). Of the 75 patients, 29% were discharged to a nursing home (‘dependent’ group; N=22) and 71% home or to a residential home with restricted support (the ‘independent’ group; N=53). Of the ‘independent’ group, 26% went to their own home, 70% to a residential home with restricted support and 4% went elsewhere.

3.1 Survival after discharge
The HR ratio for the ‘independent’ group of patients was 0.31, which implies that the estimated probability of survival is 3.2 times higher (1/HR) than that for the ‘dependent’ group. Statistical analysis showed that the medians of the three groups differed (log rank test=152.04; d.f.=2; p=0.00). The 95% CIs showed no overlap between the three groups (median_{nurs}=13 months; 95% CI: 3 to 22; median_{ind}=35 months; 95% CI: 25 to 45; median_{ref}=95 months; 95% CI: 74 to 116).

3.2 Prognostic characteristics for survival after discharge
Of the general details, only gender (HR=3.07; 95% CI: 1.61 to 5.85) appeared to be significant; the probability of survival after discharge was three times higher for women than for men. Age was of no significance, nor were marital status and country of origin.
3.3 **Joined regression analyses of functional characteristics**

The patients’ average score on (GDS) was 4.2 (SD=1.3). The average scores on the HI and ADL were 3.5 (SD=2.7) and 2.4 (SD=1.7), respectively. In the joined Cox regression analyses for functional characteristics, adjusted for gender, age and type of discharge (see Table 1), only GDS was significant. Thus, patients who scored higher in GDS had a lower probability of survival than patients who scored lower.

3.4 **Joined regression analyses of diagnostic characteristics**

In the joined Cox regression analyses for diagnostic characteristics adjusted for gender, age and type of discharge, patient characteristics for the prognosis of survival after discharge were identified within the four domains: cognitive function disorders, psychiatric function disorders, somatic comorbidity and adequacy of the caregiver system.

Of the patients 7% were suffering from delirium, 32% from Alzheimer’s disease, 33% from vascular dementia, 10% form Korsakov dementia and 18% belonged to mixed and not otherwise specified categories. The survival time was relatively short for patients with more severe characteristics of a cognitive function disorder (‘cognitive syndrome’). Unexpectedly, no specific DSM IV diagnostic category except delirium (HR=3.02; 95% CI: 1.02 to 8.89) had any significant prognostic value in the separate analyses.

With respect to psychiatric function disorders, we measured the following characteristics on admission: 88% of all patients had one or more characteristics...
Table 1. The hazard ratios of patient characteristics - assessed on admission - for survival after discharge from a psychogeriatric reactivation programme, adjusted for gender, age and type of discharge (d.f.=1).

<table>
<thead>
<tr>
<th>Characteristics at intake</th>
<th>N</th>
<th>HR</th>
<th>SeHR</th>
<th>95% CI for HR</th>
<th>P ((&lt;))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Joined analysis of functional characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gender ((m=1, f=0))</td>
<td>19</td>
<td>2.45</td>
<td>1.37</td>
<td>1.33 to 4.52</td>
<td>.01</td>
</tr>
<tr>
<td>age</td>
<td>75</td>
<td>1.00</td>
<td>1.02</td>
<td>0.95 to 1.05</td>
<td>.97</td>
</tr>
<tr>
<td>type of discharge</td>
<td>75</td>
<td>0.48</td>
<td>1.40</td>
<td>0.25 to 0.94</td>
<td>.04</td>
</tr>
<tr>
<td>GDS</td>
<td>75</td>
<td>1.91</td>
<td>1.20</td>
<td>1.35 to 2.70</td>
<td>.001</td>
</tr>
<tr>
<td><strong>Joined analysis of diagnostic characteristics</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gender ((m=1, f=0))</td>
<td>19</td>
<td>3.43</td>
<td>1.37</td>
<td>1.84 to 6.39</td>
<td>.001</td>
</tr>
<tr>
<td>age</td>
<td>75</td>
<td>0.98</td>
<td>1.02</td>
<td>0.93 to 1.03</td>
<td>.36</td>
</tr>
<tr>
<td>type of discharge</td>
<td>75</td>
<td>0.98</td>
<td>1.44</td>
<td>0.48 to 2.00</td>
<td>.95</td>
</tr>
<tr>
<td>‘cognitive syndrome’ (^6)</td>
<td>66</td>
<td>1.20</td>
<td>1.08</td>
<td>1.03 to 1.40</td>
<td>.02</td>
</tr>
<tr>
<td>paranoia</td>
<td>15</td>
<td>2.17</td>
<td>1.42</td>
<td>1.09 to 4.33</td>
<td>.03</td>
</tr>
<tr>
<td>urogenital pathology(^7)</td>
<td>37</td>
<td>2.01</td>
<td>1.27</td>
<td>1.26 to 3.22</td>
<td>.01</td>
</tr>
<tr>
<td>cardiopulmonary pathology(^8)</td>
<td>45</td>
<td>1.53</td>
<td>1.17</td>
<td>1.13 to 2.08</td>
<td>.01</td>
</tr>
<tr>
<td>inadequate caregiver system(^9)</td>
<td>45</td>
<td>0.55</td>
<td>1.33</td>
<td>0.32 to 0.97</td>
<td>.04</td>
</tr>
<tr>
<td><strong>Combined analysis of diagnostic and functional characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gender ((m=1, f=0))</td>
<td>19</td>
<td>3.07</td>
<td>1.39</td>
<td>1.61 to 5.85</td>
<td>.001</td>
</tr>
<tr>
<td>age</td>
<td>75</td>
<td>0.97</td>
<td>1.03</td>
<td>0.92 to 1.02</td>
<td>.28</td>
</tr>
<tr>
<td>type of discharge</td>
<td>75</td>
<td>1.00</td>
<td>1.45</td>
<td>0.49 to 2.06</td>
<td>.10</td>
</tr>
<tr>
<td>GDS</td>
<td>75</td>
<td>1.58</td>
<td>1.20</td>
<td>1.09 to 2.27</td>
<td>.02</td>
</tr>
<tr>
<td>paranoia</td>
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<td>2.19</td>
<td>1.41</td>
<td>1.11 to 4.30</td>
<td>.03</td>
</tr>
<tr>
<td>urogenital pathology</td>
<td>37</td>
<td>1.83</td>
<td>1.27</td>
<td>1.13 to 2.96</td>
<td>.02</td>
</tr>
<tr>
<td>cardiopulmonary pathology</td>
<td>45</td>
<td>1.56</td>
<td>1.17</td>
<td>1.14 to 2.12</td>
<td>.005</td>
</tr>
<tr>
<td>inadequate caregiver system</td>
<td>45</td>
<td>0.59</td>
<td>1.33</td>
<td>0.34 to 1.03</td>
<td>.07</td>
</tr>
</tbody>
</table>

\(^1\) \(N=\)number of patients; \(^2\) \(HR=\) hazard ratio; \(^3\) \(Se_{HR}=\)standard error of hazard ratio; \(^4\) \(95\%\)CI=95\% confidence intervals; \(^5\) \(P=\)significance level; \(^6\) i.e. memory-, orientation-, praxis- and language dysfunctions; \(^7\) i.e. prostate, urogenital, and kidney morbidity; \(^8\) i.e. decompensatio cordis, arrhythmias and conduction disturbances, hypertension, and pulmonary morbidity and \(^9\) i.e. no children and/or partner-relational problems.

of an emotional disorder (e.g. 76\% of depression, 28\% of fear or panic disorder and 20\% of paranoia). Additionally, we identified one or more characteristics of a personality disorder in 48\% of our patients. The joined Cox regression analyses for diagnostic characteristics showed that only paranoia was an unfavourable prognostic factor for survival after discharge. No other characteristics of emotional and personality disorders or coping style were of significant prognostic value. Characteristics of depression met a borderline significant value only in the separate analyses (HR= 2.05; 95\% CI o.09 to 4.24). In terms of somatic comorbidity, the degree of urogenital and cardiopulmonary pathology was a significant value for the probability of a relatively short survival. In this explorative study, common neurological disorders such as Parkinsons’ disease and cerebrovascular accident were neither in the separate analyses nor in the joined analyses of diagnostic characteristics of prognostis value.
An inadequate caregiver system on admission, i.e. having no caring spouse and/or children, was the only significant prognostic social factor for the probability of a relatively long survival.

3.5 Combined Cox regression analyses

The combined Cox regression analyses adjusted for gender, age and type of discharge showed that general, functional and diagnostic characteristics that were of prognostic significance for survival after discharge from the reactivation programme. Gender (men; HR=3.07), GDS (HR=1.58), paranoia (HR=2.19), somatic comorbidity (in this case: urogenital and cardiopulmonary pathology: HR=1.83 and 1.56 respectively) were not of prognostic significance. An inadequate caregiver system was the only factor in the analyses that may indicate a better prognosis (HR=0.59), though being borderline significant. The combined Cox regression model was able to account for 32% of the variance.

4. Discussion

First of all it has to be notified that the character of this study was explorative. That is the reason why the phenomenon of multiple testing was not taken into account. This limits the validity of the statistical inferences of this study. Therefore, we have presented the 95% CIs as well. In addition, there is a limitation to this explorative study due to the absence of a control group.

As expected, the probability of survival of the ‘independent’ group (being discharged home and to residential home) was higher (1/HR=3.2) than that of the ‘dependent’ group (being discharged to a nursing home). The data agree with the results of previous studies conducted in this field (23-26). The difference in survival between the ‘independent’ group (median=35 months) and the community-dwelling reference group (median=95 months) highlights the frailty of psychogeriatric patients suffering from cognitive function disorders in conjunction with psychiatric function disorders. This is in accordance with findings reported in the literature (1-3,13,27,28). As the 95% CIs of the median survival of the two reactivation groups did not show any overlap, the conclusion seems justified that they differed definitely. In the experimental phase of the intensive interdisciplinary programme it is from an ethical perspective important to select those patients who may benefit for a longer period from potentially favourable effects. Later on, if the effects hopefully have been proven to be favourable for this group of patients, further experimental research is ethically justified for psychogeriatric patients with a short(er) life expectancy, as well. Therefore, it is of high clinical interest to have an instrument to identify those patients who may benefit most from the psychogeriatric reactivation programme. Consequently, it is necessary to determine prognosticators of increased survival. Valid prognostic models may enable
clinicians to evaluate the outcomes of treatment of psychogeriatric patients following different kinds of intervention programmes and therefore improve medical decision-making (18).

On admission, women had a higher life expectancy than men. This is in accordance with findings reported in the literature (9,13,29-32). It is of clinical interest that, despite the wide range (mean 80; range 65-92 years), age was not of prognostic value for survival after discharge. So, age is not a relevant criterion for inclusion into the programme. This is supported by the findings of Mölsa et al. (33) in a community-based epidemiological investigation. In a previous study concerning the identification of prognostic characteristics for discharge, age was also non-significant (14), in contrast to studies by Alem et al. (9), Cohen-Mansfield et al. (10) and Koopmans et al. (31) on the survival of psychogeriatric patients after their admission to programmes in (non-psychiatric-skilled) nursing homes. This may be explained by differences in the effect in population characteristics as well as differences in the effect of the applied programmes or both.

According to the literature, high scores on HI and ADL have negative implications for survival (9,10,31,32,34). In the joined Cox regression analyses of functional characteristics, these characteristics turned out to be nonsignificant. A probable explanation is that GDS is a more powerful overall prognostic measure than the isolated HI and ADL.

Characteristics of a cognitive function disorder are of prognostic value for survival. In the elderly, they have been linked to a higher mortality risk, irrespective of age, education and somatic illnesses (1,3,28). The ‘cognitive syndrome’, which in our study comprised memory, orientation, praxis and language dysfunctions, was of significant prognostic value. The less patients suffered from a cognitive function disorder, the higher the probability for survival. The ‘cognitive syndrome’ was no longer significant in the combined Cox regression analyses. GDS, a functional measure for cognitive function disorders, was prognostically more powerful. GDS is a good candidate as inclusion criterion for cognitive function. In this study, all specific diagnostic classifications of cognitive function disorders according DSM IV were of no prognostic significance for survival after discharge; except for delirium (HR=3.02), though only in the separate analyses. This is in line with Mölsa (33), but in contrast to the findings of Koopmans et al. (31,35). In a previous study, delirium was a powerful negative prognostic factor for discharge from the reactivation programme (14). For future research it is to consider to exclude patients suffering from a deliriant episode from the reactivation programme.

With regard to psychiatric function disorders, many studies emphasize the importance of recognizing and treating non-cognitive function characteristics (4-6,8,36-40). Actually, they are considered to be more suitable for intervention. In our study paranoia, assessed on admission, was identified as the only psychiatric
function disorder that appeared to be prognostically significant for survival after discharge from the reactivation programme. The literature on this subject shows that the majority of patients, irrespective of hospitalization, with paranoid disorders have a poor prognosis (41). The inclusion of overtly paranoid patients in the reactivation programme should be made with great care. Another option is to adjust the programme more to paranoid patients. The most common psychiatric disorder in the elderly, late-life depression, together with dementia and physical dependency, is associated with mortality in continuing care for geriatric inpatients (11,12). Late-life depression associated with cardiovascular disease results in a mortality rate after discharge that is 2.6 times higher than the expected mortality rate (42). Surprisingly, in this study (with 76% of the patients showing characteristics of depression on admission), the HR of depression was 2.05, with a borderline significant value only in the separate analyses. Unexpectedly, the combined Cox regression analyses did not identify any depressive characteristic as risk factor for survival after discharge. In order to measure effects of the reactivation programme on depressive symptoms, it is of clinical importance to assess symptoms on admission as well as at discharge. Competing prognostic factors, particularly paranoid and cardiovascular characteristics, may also be of interest.

Chronic somatic comorbidity on admission, particularly urogenital and cardiopulmonary pathology, was an important (negative) prognosticator of survival after discharge. In contrast, acute conditions, e.g. myocardial infarction, cerebrovascular accident, and pneumonia (determined on admission) were insignificant, which is not in line with the studies by Koopmans et al. (31) and Mölsä et al. (1986) but they do support that of Dijk (30).

The importance of the treatment of somatic comorbidity in a psychogeriatric reactivation programme is stressed, particularly since the chronic somatic comorbidity was also prognostically important for the probability of discharge from the programme (14).

The inadequacy of the caregiver system as a positive prognosticator for survival seems contradictory to findings from other studies. Coe et al. (43) observed that the presence of a support system is positively related to survival. In our study, the inadequacy of the caregiver system was probably related to a relatively early admission to the reactivation programme, before the deterioration of autonomous functioning was too far advanced (44,45), since patients with an inadequate caregiver system tended to have relatively low scores for ADL, HI and GDS.

The combined Cox regression model for patient characteristics on admission - adjusted for gender, age and type of discharge - accounted for 32% of the variance found in survival rates after discharge. The percentage that could not be accounted for might be attributed to factors after admission such as novel events occurring between admission to the reactivation programme and death. Among these factors may be the reactivation programme itself, major new life events (i.e. the death of spouse), new psychiatric disorders and new somatic comorbidity.
Considering the foregoing clinical reflections of the findings of this study combined with those of previous studies we recommend future research on the cost-effectiveness of intervention programmes on psychiatric function disorders in psychogeriatric patients. In the experimental phase, the following aspects have to be taken into account.

To construct a prognostic instrument for optimal decision making considering the estimation of the probability of survival after treatment, it is recommended to address five domains: general details, cognitive function disorders, psychiatric function disorders, somatic comorbidity as well as adequacy of the caregiver system. Characteristics of gender, delirium, GDS, paranoia, cardiopulmonary and urogenital pathology as well as adequacy of the caregiver system seem to be important candidate factors.

In addition to survival, it is of clinical interest to estimate the effects of the psychogeriatric reactivation programme to quality of life (i.e. quality adjusted life year, QALY’s) and the need for long-term care after discharge.

5. Conclusion

As the mortality rate of psychogeriatric patients is high and the prevalence of psychogeriatric diseases will increase more and more, comprehensive intervention programmes tailored to cognitive and psychiatric function disorders of these patients are urgently needed. The first objective of this exploratory study was to estimate life expectancy of patients having participated in the reactivation programme, the second objective was to identify prognostic characteristics assessed on admission for survival after discharge. The patients (N=75) were admitted to the programme when they were on the verge of losing their ability to function autonomously.

To be able to compare survival rates after discharge, patients were divided into an ‘independent’ and a ‘dependent’ group. The estimated probability of survival of the ‘independent’ group of patients was obviously higher (1/HR=3.2) than that of the ‘dependent’ group. The median survival period showed no overlap. This suggests that with respect to survival the two groups of psychogeriatric patients who participated in the reactivation programme differed definitely. It is of high clinical interest to identify on admission those patients who have a greater chance to benefit more from the potentially favourable effects of the intensive interdisciplinary psychogeriatric reactivation programme.

In the combined Cox regression analyses, general, functional and diagnostic characteristics of patients, assessed on admission, were identified as prognostically relevant for the length of survival after discharge.

Of the general details, it appeared that women lived longer than men whereas age was not of relevance. Regarding four other domains, patients’ survival was negatively related to GDS (cognition), paranoia, as well as to urogenital and cardiopulmonary pathology. An inadequate caregiver system was positively related to survival.
The development of a prognostic instrument is a prerequisite for optimal medical decision making for such intervention programmes, as is the analysis of cost-effectiveness. In order to draw firm conclusions, it is recommended that a large-scale study with a randomized, parallel-group design will be performed. Our research group have started such a research programme in July 2001.
References


