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Predictive Validity of Factors Influencing the Institutionalization of Elderly People with Psycho-Geriatric Disorders

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The predictive validity of certain items was tested with respect to their influence on the institutionalization of elderly people with psycho-geriatric disorders (n = 69). Twelve items measuring both the patient’s condition and the exhaustion around the patient were tested. Two outcome measurements were used, the first measuring the number of patients who were institutionalized after the end of 12 months and the second measuring the number of days at an institution during 12 months. The items “Exhaustion of spouse” and “Supervision need” showed the highest correlation with institutionalization and predicted institutionalization, better than items describing the degree of dementia.

Key words: dementia, psycho-geriatric disorders, predictive validity, institutionalization.

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The increasing interest in dementia care research has also focused on methodological problems in the field. Even though rating scales describing different clinical stages of dementia have been developed during the last few decades, leading to refined population descriptions, difficulties have arisen in the comparisons with older studies. Furthermore, the organization of care in a country as well as between countries differs, as does the number of resources available. For example, a fundamental question is whether a demented patient’s position in the caring system reflects the caring level he needs or is the result of a lack of resources at other caring levels. At an individual level, the outcome of dementia care does not depend only on the type and level of the brain damage, since the social course is also of vital importance and is not necessarily parallel to the progression of the organic damage. Due to these methodological problems, dementia populations need to be well defined. Fundamental baseline variables such as sex, age, diagnosis, nursing load, and degree of dementia are usually described without controversy. The psycho-social course of dementia is however more complex to study.

The interaction between the patient and his family, staff, or neighbours seems for example to be of importance to the outcome of care, and these complex relationships are difficult to translate into measurable variables and to apply to traditional matching procedures. For instance, Hirschfeld (1) concluded that the level of mutuality between the demented person and his/her spouse was a more significant factor than the degree of the dementia in the prediction of admittance to an institution. Colerick and George (2) also stressed the importance of the family’s caring capacity in the understanding of the patient’s current care situation. Thus, instruments including psycho-social factors influencing the course of dementia care are of interest.

The purpose of this study was to test how items reflecting the degree of psycho-social stress in the caring of demented patients could predict institutionalization. Furthermore, we wanted to compare these items with traditional baseline variables such as the level of cognitive decline and nursing load. We focused on the predictive validity, i.e. the accuracy of a test in relation to a certain outcome (3) and did not take into account the reasons for the caring situation. Factors such as heavy burden, bad coping, stress, weak social network, and low control often
Table I. The items.

<table>
<thead>
<tr>
<th>Score/Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>&lt;70</td>
<td>71-80</td>
<td>81-</td>
</tr>
<tr>
<td>2. Sex</td>
<td>Female</td>
<td>-</td>
<td>Male</td>
</tr>
<tr>
<td>3. Living alone</td>
<td>No</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>4. Physical nursing load</td>
<td>0-13</td>
<td>14-18</td>
<td>19-</td>
</tr>
<tr>
<td>5. Mental nursing load</td>
<td>0-13</td>
<td>14-18</td>
<td>19-</td>
</tr>
<tr>
<td>6. Inactivity</td>
<td>Low</td>
<td>Medium, can be activated</td>
<td>High, severe understimulation. Difficult to engage in activities</td>
</tr>
<tr>
<td>7. Supervision need</td>
<td>Low</td>
<td>Medium, some supervision necessary, but no serious episodes have occurred, can be left alone part of the day</td>
<td>High, serious episodes have occurred (forgotten stove, out in the cold, careless with fire). Cannot be left alone</td>
</tr>
<tr>
<td>8. Mini Mental State Examination</td>
<td>21-30</td>
<td>11-20</td>
<td>0-10</td>
</tr>
<tr>
<td>9. Exhaustion of spouse</td>
<td>Low</td>
<td>Medium, tired, but can cope with the situation</td>
<td>High, very tired, burnt out. Serious sleep disturbances</td>
</tr>
<tr>
<td>10. Exhausted relatives not living with the patient</td>
<td>Low</td>
<td>-</td>
<td>Exhausted, moderate to severe. Tired – very tired</td>
</tr>
<tr>
<td>11. Exhaustion of neighbours</td>
<td>Low</td>
<td>-</td>
<td>Exhausted. Complaints to the Social Service – Primary Health Care or Police</td>
</tr>
<tr>
<td>12. Exhaustion of staff</td>
<td>Low</td>
<td>-</td>
<td>Exhausted. Complaints to departmental heads. Unwilling to visit patients</td>
</tr>
</tbody>
</table>

create unsatisfying psycho-social conditions: they have been described earlier.

MATERIAL AND METHOD

Population

The study is part of a project in the city of Sundsvall in the county of Västernorrland in northern Sweden aiming at the evaluation of new types of care for patients with dementia. 81 non-institutionalized patients in different stages of cognitive decline and dementia and primarily judged as suitable for Day Care and Group Living were included in the study. According to a diagnostic schedule, the diagnostic procedures were made by geriatricians and one of the authors (AW), a general practitioner working with dementia care. The level of mental impairment was classified by means of the Global Deterioration Scale (GDS) (4), which consists of seven levels. Level one implies no cognitive impairment, levels two to four are stages of cognitive decline before the definite dementia diagnosis, and levels five to seven are stages of clear dementia.

Items studied

Twelve items were studied, providing a multi-dimensional aspect of the psycho-geriatric conditions of the patients (Table I). Eight of the items are related to the patient himself: age, sex, living situation, physical nursing load, mental nursing load, inactivity, supervision need, and Mini Mental State Examination (MMSE) (5). MMSE is an established measure of cognitive capacity. The physical and mental nursing load of the patients was classified according to a local nursing load scale, the Y-scale (Y is the administrative letter of the county of Västernorrland, where the study was performed), regularly used by district nurses during 10 years (6). The convergent validity of the Y-scale versus Katz' ADL-index is high (7). The other four items rate the...
Predictive validity of factors influencing the scoring, "All items", was calculated as the highest scoring on any item of each patient (i.e. if a patient is scored 3 for one of the items but 1 for the other, his general score is 3).

**Outcome measurements**

The study concerned a period of 12 months for each patient. The predictive validity of the items was put to the test concerning two measurements of institutional care:

1: was the patient institutionalized by the end of the 12 months? no/yes.

2: Number of days in institution during the 12 months.

The correlation coefficient between the outcome measurements was 0.82. The statistics were performed by Chi-square test (outcome measurement 1) and Breakdowns with ANOVA (outcome measurement 2) for the significance test between the scores of the items. The institutionalization predictability was tested with a non-parametric correlation test (Kendall's rank correlation coefficient). The statistical computer program Quest (8) was used for the analysis of data. Quest compensates for ties when the non-parametric tests are performed.

**RESULTS**

The population is presented in Table II. Of the initially included 81 patients, 12 died during the study period, giving a mortality of 15%. The surviving 69 were analysed. The mean age was 77.7 years, 55% of...
the patients lived with spouses, and there were more females than males (59% v. 41%). Dementia of Alzheimer Type (DAT) was the most common diagnosis (43%). 27 patients (39%) of the study population were institutionalized after the end of the 12 months and the mean time in institution was 98 days. The results of outcome measurement 1 are seen in Table III and of outcome measurement 2 in Table IV. The strongest relationships (p < 0.001) in both measurements were between institutionalization and “exhaustion of spouse”, “supervision need”, and “mental nursing load”. However, “living situation” and “physical nursing load” were poorly correlated with institutionalization. Most patients with very exhausted spouses were institutionalized within a few weeks after being analysed. The non-parametric correlation tests (Table V) showed the highest r-values in the following items: “exhaustion of spouse”, “su-
Predictive validity of factors influencing the institutionalization of dementia patients

Age and sex
That age and sex had no prognostic effect on institutionalization in this study agrees with Drachman at al. (10). The tendency for the institutionalization rate to be higher among the younger patients is probably a consequence of the more severe course of dementia among these patients.

Living alone and supervision need
Living alone has been regarded as a heavy risk factor for institutional care (11). The presence of a spouse seems to differentiate between those who remain in an institution and those who can return home from the institution (12). "Living alone" did not correlate in our study with institutional care as an isolated factor, and this was also found by Greene and Timbury (13). However, if "living alone" was combined with "supervision need", the predictability was high, noticed also by Gilleard et al. (14).

Informal support is known to be a confounding factor influencing the outcome of care (15), and a personal kind of backup might explain some of the contradictory results in the literature.

Nursing load
A high physical nursing load often correlates with institutional care. This was not confirmed in our study. Smyer (16) and Wachtel et al. (12) also found that an impaired mental state discriminated, but not impaired physical health. The divergent experiences might be explained by the fact that in the natural course of dementia, psycho-social and mental nursing load factors are usually the main problems during the first years: they often lead to institutionalization. The impact of the physical nursing load appears usually in the later stages of dementia.

Spouses
The "exhaustion of spouse" item was an important factor in forecasting institutional care and showed higher correlation than indicators of the degree of the dementia (mental nursing load and MMSE). This agrees with Hirschfeld (1) who noticed that "high mutuality from within the relationship" was the most significant factor in preventing institutional care. Smyer (16) compared an institutionalized population with a community sample and found that the family's ability to care for the patient was the strongest discriminant factor. However, Gillett (17) suggested that "stress" in spouses did not in itself explain the outcome. The reasons for the "spouse

DISCUSSION
Methodological aspects
Many rating scales are non-weighted, i.e. all items are graded equally (for instance 1–4) even if some items are more influential than others. Nursing load scales, often used in the planning of the care of the elderly, are frequently non-weighted. These non-weighted scales are more easy to use, especially when distributed in great numbers in daily clinical practice. They are usually more reliable, but at the same time they are more rough due to the identical scoring interval and range, and often they have lower validity.

One way of weighting is to define a range of scores, for instance 1–7, and then to weight the maximum score. That implies that some items could have a maximum score of seven, other items could have a maximum score of five and three, depending on a different importance for the outcome. Another way of weighting is to use a more floating setting of points, for instance based on time-studies. With this approach, the points of different activities vary a lot because of the results of the time-studies. The Y-scale (6) is a point-based scale.

It is sometimes questioned whether the patients' position in the caring system depends on the actual need for care or is a result of the lack of resources at other caring levels. In Sundsvall, the care for the elderly has been differentiated for many years. Various research studies have been performed (9) and we consider this question of inappropriate caring level to be of minor importance in the interpretation of the data.

The results
The items showed differences in the ability to predict the outcome of institutional care.
effect" were probably more complex. Factors difficult to measure such as relationships and emotions between spouses were probably confounding elements. Hirschfield (1) also focused on this in her paper.

Cognitive impairment
Not surprisingly, the level of cognitive impairment showed a significant correlation with institutional outcome. Low MMSE scores (less than 10 points) predicted institutionalization, as also found by Reisberg et al. (4) in a study of the GDS scale.

The results indicate that weighting with more than three alternatives could have been used since there were differences in the ability of the items to predict institutionalization. One alternative could have been a weighted scale with three defined levels (1–3–5) and possibilities for intermediate scores (2–4). The most influential items (exhaustion of spouse, supervision need, mental nursing load) could have a maximum of five and the other items a maximum of two or three.

The question arises of how long the predictability lasts. Lieberman and Kramer (18) studied both cognitive and psycho-social factors during one year and found that the caregivers' stress situation predicted institutionalization while cognitive measurements did not. Drachman et al. (10) found that some measurements of cognitive function ("picture completion" and "digit symbol") predicted institutionalization during a five year period, but other measurements such as "orientation" did not. The predictability of a severely impaired function is probably good in both a short (one to two years) and a long (five to ten years) period since the natural course of the disease has a great impact. The predictability of the outcome of patients with more mildly impaired functions is probably valid over a shorter period. However, in a longer period the influence of other diseases, both chronic and acute, might drastically change the health status of an old person. A period of one year, as in our study, seems to be a suitable length of time. In the planning of dementia care this may be regarded as a short period of time. It is worth using instruments with good predictability during a shorter period and repeating the measuring annually, instead of using instruments with bad predictability during longer periods (several years).

The number of patients who died during the study period was small (twelve). However, "living alone" and great "supervision need" were correlated with death (p < 0.05). Some other studies have focused on the predictability of death as a measurement, but contradictory results have been presented. Müller et al. (19) found that bad memory and disturbed orientation predicted death in a five-year period, while Kay et al. (20) found that the predictability only lasted for a two-year period.

When baseline data are presented in other types of dementia projects, the results of this study can be used, thus broadening the population description. However, the caring situation of non-institutionalized dementia patients is complex, and this field also needs qualitative and semistructured methods in the future.

REFERENCES

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