In a study of 10 ICU patients, Weiss found that states of anxiety were especially evident during the initial phase of the disease, during dissemination and maximum intensity of paralysis. On the other hand, depressive symptoms were primarily noticeable during the phase of remission when the nadir had passed, but recovery had not yet begun.

Our hypothesis is that psychological distress and depression are not only restricted to patients who were admitted to an ICU and, furthermore, are also present after the acute phase. Previous reports have scarcely addressed this topic. A recent study of 42 patients showed decreased health status during the first 2 years but it did not cover psychological distress and depression. Some personal reports did show how individuals perceived their physical condition and experienced psychological distress and depressive feelings during the acute phase of GBS and during the process of rehabilitation. In one study (n = 10), anxiety and depression were reasons for persistent disability.

To test our hypothesis, our study was not confined to patients admitted to an ICU, but we systematically studied a larger group of GBS patients for the presence and course of psychological distress, depressive symptoms, and health status during the first year after GBS. Further, the perceived physical condition and its effects were also studied.

**METHODS**

**Subjects.** All patients participated at the Dutch centers of an international, multicenter, double-blind, placebo-controlled trial comparing treatment with intravenous immunoglobulin (IVIg) and placebo versus treatment with IVIg 0.4 g/kg body weight combined with methylprednisolone 500 mg/day for 5 consecutive days. All patients fulfilled the National Institute for Neurological and Communicative Diseases and Stroke (NINCDS) criteria for GBS. Further inclusion criteria were onset of weakness within 2 weeks and inability to walk independently for 10 meters. For our study the age exclusion criterion was <16 years. The patients from the
participating centers outside The Netherlands were excluded, because the testing material used was only available in Dutch. The patients signed a letter of informed consent for participation in the study. The protocol was approved by the medical ethics committees of the participating Dutch centers. Both local and academic Dutch hospitals throughout The Netherlands participated in the study.

At the time the aforementioned trial had reached its required number of patients, a group of 125 consecutive Dutch patients were available to participate in our study. Six were not willing to participate (1 for religious reasons), and 6 were excluded beforehand (3 had died, 2 were too ill to participate, and 1 suffered from a pre-existing handicap). Of the remaining 113 patients who agreed to participate, 23 were lost due to follow-up and 5 were omitted from the analyses because of insufficient data. Overall, 85 patients (68%) were included in the analyses.

The patients who participated were compared with those who did not complete our study or refused to participate. No difference was found with respect to age, gender, artificial respiration, or pharmacological treatment. However, the F-score at 12 months was significantly worse ($P = 0.04$) in patients who did not complete our study or refused to participate. Therefore, our results are probably positively biased.

**Method.** To measure the presence and the course of psychological distress, depressive symptoms, and health status during the first year after GBS, the patients received Dutch-validated self-administered instruments at 3 (T1), 6 (T2), and 12 (T3) months after the diagnosis of GBS. The instruments used were tested extensively in many studies and appear to be very reliable.9–11

The 28-item version of the General Health Questionnaire (GHQ-28) was selected because it is a commonly applied, valid, and reliable instrument for assessing a subject’s current mental state and the measure of psychological distress, which is the quantitative estimate of the individual’s degree of non-psychotic psychological disturbance.9 It consists of a list of 28 questions asking respondents to compare their recent condition to their usual state on a 4-point scale. The response scale may be scored as a Likert scale, ranging from 0 to 3, or as a dichotomous scale (0–1). The Likert scoring is advised for the subscales of the GHQ-28 and the dichotomous scale for the total score of the GHQ-28. A higher score indicates a worse result, that is, more psychological distress. The 28-item version used in the present study consists of four subscales (somatic complaints, anxiety and insomnia, social dysfunction, and severe depression), and each subscale has 7 items. Normal values for the Dutch population and values in a group who consulted a general practitioner with health complaints have been described previously.9 Eighty-five patients filled out the GHQ-28 completely at T1, T2, and T3.

The Center for Epidemiologic Studies Depression Scale (CES-D) was selected because it was specifically developed to assess depressive symptoms and is suited for use in a wide range of populations.10 The item score ranges from 0 to 3: the positively worded items are scored in the reverse. The item scores are added, resulting in a total score ranging from 0 to 60. A higher score means more depressive symptoms. A cut-off point of 16 is suggested to indicate depressive symptoms. Eighty-three patients completed the CES-D at T1, T2, and T3.

The patient’s health status is covered in the Sickness Impact Profile (SIP), which expresses physical, mental, and social functioning within the context of usual daily activities. As it was already used in long-term GBS patients, possible comparisons could be made. It is a multidimensional general health status instrument that measures the patient’s perception of behavioral changes as the consequence of changes in health status.11 The SIP is divided into 12 categories. Three categories (ambulation, mobility, and body care and movement) can be aggregated into a physical dimension (SIPFYS) and 4 (social interaction, emotional behavior, alertness, and communication) into a psychosocial dimension (SIPPSY). The SIP score is calculated using item weights that indicate the relative severity of limitation implied by each statement. The overall score (SIPTOT) is determined by adding the scale values for each indicated item within all 12 categories, dividing by the maximum possible dysfunction score for the SIP, and then multiplying by 100. A higher score indicates a worse general health status. Eighty-five patients completed the SIP at T1, T2, and T3.

A self-administered questionnaire was sent to the patients at T3.12 The survey contained questions about their discharge from one hospital to another hospital, to a rehabilitation center, or to home. Six questions dealt with the physical condition at homecoming and at 12 months. In these questions the patients were asked if they perceived sensory or motor residua in the face/chest, arms, and legs and, if present, the extent. The patients could indicate whether no residua were present (score = 0); present in hands only (score = 1); present in hand and fingers (score = 2); or present in arm, hand, and fingers (score = 3). The answers to the 6 questions on the physical condition at homecoming and at 12 months were combined to form, respectively, the homecoming index.
and the 12-month index. The index scores, running from 0 to 18, were divided into three groups: normal or mild (sum score 0–6); moderate (sum score 7 to 12); or serious (sum score 13–18). Furthermore, the patients were asked to appraise the disruptive effect of the sensory and motor residua of face, arms, and legs only at 12 months, not at homecoming. The possible answers ranged from not present (score = 0); noticeable but not really annoying (score = 1); moderately annoying (score = 2); to seriously annoying (score = 3). The answers formed the disruption index. The index scores were again divided into three groups, to conform to the 12-month index and the homecoming index. The patients were also asked about the presence of muscle ache and cramps.

Physical Assessment. Physical recovery was assessed using the Hughes disability scale as the functional score: good recovery (no F0) or minor F1 neurological symptoms and signs and capable of running); moderate recovery (able to walk more than 10 meters without assistance but unable to run F2); or severe residual signs (able to walk 10 meters across an open space with help F3), or bed or chair bound [F4]).13 Furthermore, general patient data, such as age, gender, admission to a rehabilitation center, pharmacological treatment received, and artificial respiration, were available. As far as was known no serious other health conditions were present.

To prevent any possible bias, data on the F-score, pharmacological treatment, and artificial respiration were obtained once patients completed all self-report measures.

Statistical Analysis. Analysis of variance (ANOVA) for repeated measures was used to analyze the course of psychological distress, health status, and depressive symptoms during the first year. Student’s t-test was applied to analyze whether differences existed in psychological distress, depending on several variables such as gender, treatment, use of artificial respiration, and admission to a rehabilitation center. Differences in age were tested with one-way ANOVA.

In order to determine whether GHQ-28, CES-D, and SIP scores differed depending on the level of disturbance according to the homecoming index, the 12-month index, and the disruption index, a Kruskal–Wallis statistical analysis was performed. This test was also used to determine whether GHQ-28, CES-D, and SIP scores were different, depending on the F-score at T3. For this the patients were divided into three groups depending on the level of recovery according to the F-score, as described earlier.

The statistical analyses were performed using SPSS (version 10.1) for Windows.

RESULTS

General Information. The group of 85 patients who completed the GHQ-28 formed the basis of our study. There were 46 men (54%) and 39 women (46%), ranging in age from 16 to 88 years. At entry, 27 patients scored F3, 53 patients F4, and 4 patients F5. At the nadir, 20 patients were ventilator-dependent. Treatment with IVIg/placebo was received by 43 patients, and treatment with IVIg/methylprednisolone was received by 42. In 27% of the patients, a positive serology for Campylobacter jejuni was found. At T3, good recovery was found in 71 patients, moderate recovery in 11 patients, and 2 had serious residual signs (1 missing).

Course. The course of psychological distress (GHQ-28 and subscales), health status (SIPTOT, SIPPSY, and SIPFYS), and depressive symptoms (CES-D) are shown in Table 1.

The GHQ-28 was completed by 85 patients. At 3 months, psychosocial distress was elevated overall compared with normal values.9 However, it improved significantly and normalized at 6 months. Only social dysfunction still showed a mild disturbance. Remarkably, the subscales of anxiety and severe depression showed normal or even better than normal values throughout the year.

At 3 months, depressive symptoms, as assessed with the CES-D using a cut-off point of 16, were present in a higher percentage of patients than in a healthy population.10 This also improved significantly from 3 to 6 months, and normalized at 6 months.

The health status showed significant improvement both from 3 to 6 and from 6 to 12 months, due mainly to the positive changes of the physical subscale (SIPFYS). The SIPPSY only improved from 3 to 6 months. At 12 months, its score was still lower than values reported for patients who visited a general practitioner with health complaints.11

Outcome at 12 Months. At T3, patients with a good physical recovery, as assessed with the F-score, showed a better health status and less psychosocial distress than patients with moderate recovery or with serious residua. In particular, social dysfunction was more disturbed in less-recovered patients (Table 2). No relation was found between physical recovery and depressive symptoms.

At 12 months, 48% of the patients still mentioned that they suffered from muscle ache and cramps. These patients had significantly worse scores on psychological distress (GHQ-28),
depressive symptoms (CES-D), and psychosocial health status (SIPPSY). Remarkably, the physical health status (SIPFYS) did not differ significantly between the two groups (patients who suffered versus those who did not suffer from muscle ache and cramps) (Table 2).

At T3, the patients who perceived no or few physical residua (the 12-month index) showed significantly better scores in most scales than the patients with moderate or serious residua. The level of perceived disturbance at 12 months (the disruption index) showed the same effect. The homecoming index showed only a few significant results (Table 2).

Age, gender, treatment, artificial respiration, and rehabilitation in a center were considered as possible influencing factors. Age correlated with the CES-D at 3 months and SIPPSY at 6 months. Gender correlated with GHQ-28 at 6 months; females scored significantly worse. However, there were no consistent findings and none of the variables influenced the psychosocial functioning, psychological distress, or depressive symptoms at 12 months. Treatment with methylprednisolone was not a confounding factor. Patients who had been on artificial ventilation showed a significantly worse SIPFYS at each measurement time. Patients who had been to a rehabilitation center also showed a significantly worse SIPFYS at each measurement time and a worse total health status (SIPTOT) at T2 and T3.

**DISCUSSION**

**Psychological Distress.** GBS had a clear impact on psychological distress (GHQ-28), particularly in the first months. Three months after the onset of GBS, psychological distress was higher than normal, but it improved significantly at 6 months. Only social function was then still worse than normal.

Surprisingly, anxiety scores (according to the subscale of the GHQ-28) remained normal throughout the year, although other studies among ICU patients with GBS reported increased anxiety in the acute phase.¹² This difference in anxiety levels may have been partly related to their condition as ICU patients; our group consisted of a broader group of GBS patients. Perhaps it was also because our first measurement was at 3 months, and anxiety, which could be conceived as a fear of loss of “resources,” may already have

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**Table 1.** Course during the first year after GBS.

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>Norm¹</th>
<th>GP¹</th>
<th>T1–2</th>
<th>T1–3</th>
<th>T2–3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological distress (N = 85)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatic complaints</td>
<td>6.0</td>
<td>5.0</td>
<td>4.5</td>
<td>6.2</td>
<td>7.7</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Anxiety, insomnia</td>
<td>4.8</td>
<td>3.4</td>
<td>3.1</td>
<td>5.8</td>
<td>7.5</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Social dysfunction</td>
<td>9.6</td>
<td>7.8</td>
<td>7.4</td>
<td>7.0</td>
<td>8.0</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Severe depression</td>
<td>1.7</td>
<td>1.1</td>
<td>1.2</td>
<td>1.6</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall score</td>
<td>6.8</td>
<td>3.4</td>
<td>2.4</td>
<td>4.2</td>
<td>8.09</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Health status (N = 85)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>14.1</td>
<td>8.6</td>
<td>6.1</td>
<td>0.3</td>
<td>3.6</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>7.4</td>
<td>5.6</td>
<td>5.3</td>
<td>0.9</td>
<td>5.4</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Overall score</td>
<td>11.7</td>
<td>7.9</td>
<td>6.4</td>
<td>0.8</td>
<td>5.3</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Depressive symptoms (N = 85)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES-D</td>
<td>23%</td>
<td>12%</td>
<td>6%</td>
<td>12.7%</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ANOVA for repeated measures was used. Mean scores are shown (higher scores signify worse results).

*Significant improvement (P < 0.05).

¹Normal values⁹–¹¹ (for the CES-D, the percentage scoring worse than the cut-off point for depressive symptoms is given).

²Values for patients who consulted a general practitioner (GP).⁹,¹¹

**Table 2.** Significance of several variables for physical recovery at 12 months after GBS in relation to psychological distress, health status, and depressive symptoms at 12 months.

<table>
<thead>
<tr>
<th>Outcome (F-score) (N = 85)</th>
<th>Muscle ache and cramps (N = 83)</th>
<th>Homecoming index (N = 67)</th>
<th>12-month index (N = 71)</th>
<th>Disruption index (N = 70)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological distress</td>
<td>Somatic complaints</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Anxiety, insomnia</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Social dysfunction</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<tr>
<td></td>
<td>Severe depression</td>
<td>*</td>
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<td>*</td>
</tr>
<tr>
<td></td>
<td>Overall score</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Health status</td>
<td>Physical</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Psychosocial</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Overall score</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>CES-D</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Both the t-test (muscle ache and cramps) and Kruskal–Wallis were performed.

*Significance (P < 0.05) (the worse the outcome/index, the worse the scale); for instance, column 4, row 3: significant difference (*) was found between the groups with and without muscle ache and cramps. The group with muscle cramps had worse scores on somatic complaints.
normalized—which was reported in another study.\textsuperscript{2} Furthermore, the fear of recurrence was mentioned in personal reports, but that aspect is not actually discussed in the anxiety subscale of the GHQ-28. Finally, it is possible that better medication was used, especially in the ICU, to keep patients sedated and to treat anxiety.

A limitation of our study was not using a control group. Therefore, we do not know whether our results are confined to GBS only or to other ICU patients or in general.

**Depressive Symptoms.** At 3 months, an increased percentage of patients were depressed (CES-D). However, severe depression was not found (severe depression subscale of the GHQ). This seems in accordance with previous literature, which reported that depressive symptoms are primarily noticeable when the nadir is passed but recovery has not yet begun.\textsuperscript{2} At 6 months, our patients who suffered from depressive symptoms had significantly improved and remained normal thereafter. In a study of 10 patients, Lennon et al. mentioned psychological factors, such as depression, anxiety, and motivation, but only one of his patients had a significantly increased score on a depressive subscale and that was partly because of other reasons.\textsuperscript{7} This result is in accordance with our former conclusion that depressive symptoms can be present in the first months but does not seem to play a major role during further stages of recovery in most GBS patients. This conclusion is important, because reduction of depression may help to slow down the process of disabellement.\textsuperscript{13} Although depressive symptom levels were normal for our group at 6 months, the treating physician should still be alerted to depressive symptoms in individual patients.

**Health Status.** At 12 months, the health status (SIPTOT) in our group was still worse than normal. This result emphasizes the impact of GBS.

During the first 6 months after GBS, psychosocial health status (SIPPSY) improved significantly. Improvement in the mental health status was also found in a longitudinal study of 20 patients with an immune-mediated neuropathy, using the mental health subscale of the Medical Outcome Study (Short Form-36).\textsuperscript{15} Apparently, most psychosocial changes occur during the first 6 months. From 6 months to 12 months, the psychosocial health status in our patients showed no significant further changes but still remained worse than normal. This is in contrast to the results of Merkies et al., who found that the mental health status had normalized at 12 months.\textsuperscript{15} The absence of significant differences in their study may have been caused by the small sample size (thus with a limited power to detect significant differences) in their study.

Our results are more in accordance with a recent Swedish study by Forsberg et al.\textsuperscript{3} Using the SIP, they showed a worse psychosocial health status at 1 year. They also found that most improvement in health status occurred during the first 6 months. Between 1 and 2 years they noticed little further improvement. Their results were similar to those found among a group of patients at 3–6 years after GBS.\textsuperscript{16}

The physical health status improved significantly up to 12 months. However, it is important to note that, even at 12 months, the SIPPSY was still clearly impaired. This also confirms the results of Forsberg et al., who found a decreased physical health status at 12 months.\textsuperscript{3}

**Physical Recovery and Psychological Distress, Health Status, and Depressive Symptoms.** Patients with good physical recovery at 1 year showed less psychological distress than might be anticipated. Therefore, physical recovery seems to be an important factor in the level of psychological distress. As physical recovery at 12 months was significantly worse in patients who did not complete our study or refused to participate, psychological distress may have been greater than what was found in our study. Patients who recover less during the first year have more psychological distress and a worse psychosocial health status and should receive attention not only for their physical status but also for their psychosocial recovery. In contrast, no relation was found between physical recovery and depressive symptoms at 1 year. Neither age, gender, treatment, artificial respiration, nor admission to a rehabilitation center consistently or significantly influenced psychological distress or psychosocial health status in GBS patients.

**Perceived Physical Condition and Psychological Distress, Health Status, and Depressive Symptoms.** Our study showed that both physical recovery and the perceived physical condition were important with respect to the level of psychological distress, health status, and psychosocial health status. The perceived disruption of the physical residua at 12 months was related to a decrement in health status and psychosocial health status and increased psychological distress, but also to depressive symptoms. These findings confirm that the patient’s perspective is of central importance. With respect to psychological distress, social function was most consistently disturbed at 12 months. More physical residua and perceived disruption can be the cause of more limitations in being able to go to social events or to work, or enjoying leisure activities. However, other factors, such as not being able to cope with the residua, can lead to less participation.
in social activities and cause more psychological distress. Therefore, during rehabilitation, special attention should be given to social functioning.

Muscle ache and cramps were present in almost half of our patients. Another study reported pain in 33% of the patients. It can certainly have a major patient group but has been described in previous studies of patients after GBS. In rheumatoid arthritis, pain is strongly related to increased levels of psychological distress and has a significant effect on the quality of life. Haythornthwaite and Benrud-Larson reported that neuropathic pain decreases quality of life. In our study, patients with muscle ache and cramps had significantly worse scores on psychosocial health status, health status, and psychological distress, confirming the aforementioned reports. Improvement in muscle ache and cramps could contribute to an increase in well-being and is therefore essential in the treatment of patients after GBS.

Fatigue was not studied extensively in our patient group but has been described in previous studies of GBS. It can certainly have a major effect on psychological distress, as was found in a study among patients with rheumatoid arthritis. Merkies et al. found that fatigue contributed to reduced psychosocial functioning in GBS. In patients after GBS, its effect on health status and psychological distress should be studied more extensively. More attention to how GBS patients cope with pain and fatigue is warranted, as this may lead to the development of better coping strategies.

**Implications for Care.** Patients who recover less during the first year deserve attention not only for their physical recovery but also for their residual psychosocial health status. As most of the improvement of the psychosocial health status occurs in the first 6 months, and after 1 year further improvement has ceased, adequate attention and support, especially during the first months, is very important with respect to the final psychosocial residua.

The importance of evaluating the perceived effect is emphasized by our results. We agree with Zifko that a careful neurological examination should be supplemented by information on patients’ own perception of their physical condition. If muscle ache and cramps or disturbance of the perceived physical condition and the perceived disrupting effect of physical residua are present, the treating physician should be especially alert to depressive symptoms and psychological distress in the individual patient. Treatment of muscle ache and cramps and the perceived disruption could contribute to an increase in the patient’s well-being. The treating physician might also consider extending the follow-up of the patient beyond 1 year because of the physical and psychosocial residua still present at 1 year. Therefore, this knowledge can improve both the quality of care and the quality of life by enabling the attending physician to better evaluate and support the patient’s recovery. Furthermore, it is important for patients themselves to realize that other GBS patients also experience an impaired psychosocial health status.

**Limitations.** Although we studied a broad group of GBS patients, our group still represented a certain selection. All patients participated in a trial, and inclusion criteria were onset of weakness within 2 weeks and loss of ability to walk independently for 10 meters. We realize that we missed a group of patients who Van Koningsveld et al. described as having mild GBS (able to walk unaided at nadir). Furthermore, age <16 years was also an exclusion criterion. We decided to exclude this group, because, among other reasons, social circumstances and perspective on the future are very different and related to exact age. Although our study only included Dutch patients, we have no indication that this influenced the results. The participating Dutch hospitals are located throughout the country, and both local hospitals and academic centers participated.

Both a weakness and a strong point in our methodology lies in the questionnaire at 12 months, which we developed specifically for this study. This questionnaire, and in particular the indices that were constructed, have not been validated. However, it was not our aim to develop a disease-specific questionnaire that would have required a different study design. Our questionnaire enabled us to ask very specific questions that provided us with important information. The questions were simple and straightforward as were the different indices used.

In conclusion, most improvement of psychological distress, depressive symptoms, and psychosocial health status occurs during the first 6 months after onset of GBS, but the psychosocial health status at 1 year is still disturbed. Depressive symptoms do not play a role during the further recovery of most patients. Finally, muscle ache and cramps, the perceived physical condition, and especially the perceived disrupting effect of physical residua all have an important influence on psychological distress, depressive symptoms, and psychosocial health status at 1 year. Improving muscle ache and cramps and the perceived physical condition could contribute to an increase of well-being. Therefore, knowledge that a considerable number of patients may have both physical and psychosocial residua should be taken into...
consideration by the medical and nursing staff. This, in turn, will contribute to a more adequate and personalized evaluation of the physical, psychological, and social condition of the patient and, consequently, to an improvement in the quality of the care given to GBS patients.

The authors thank the members of the Dutch Guillain–Barre’ study group for permission to use some of the trial data.

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