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Research

Supervised, individualised exercise reduces fatigue and improves strength and quality of life more than unsupervised home exercise in people with chronic Guillain-Barré syndrome: a randomised trial

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KEY WORDS

Guillain-Barré syndrome
Exercise rehabilitation
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ABSTRACT

Question: In people in the chronic phase of Guillain-Barré syndrome (GBS), how much more does a supervised, individualised exercise program improve functional independence with activities of daily living than a home-based exercise program? How do the two exercise programs compare regarding their effects on muscle strength, fatigue, pain and quality of life? **Design**: Randomised controlled trial with concealed allocation, intention-to-treat analysis and blinding of outcome assessors. **Participants**: Sixteen adults with stable residual disability ≥ 6 months after the onset of GBS. **Intervention**: Participants in the experimental group were allocated to 60-minute sessions of physiotherapist-supervised strengthening, endurance and breathing exercises, gait training and pain management, two to three sessions/week for 12 weeks. The control group was prescribed a home program of 30-minute sessions of maintenance exercises and education in self-management, two to three sessions/week for 12 weeks. **Outcome measures**: Functional independence in activities of daily living on the 100-point Barthel Index (primary outcome), muscle strength on the 60-point Medical Research Council scale, fatigue on the 0-to-63 Fatigue Severity Scale, a visual analogue scale of pain severity, and quality of life, measured at baseline and months 6 and 12. **Results**: At month 6, the median between-group difference was 5 (95% CI 0 to 20) for functional independence, 8 (95% CI 4 to 18) for strength, –13 (95% CI –28 to –1) for fatigue, and 12 (95% CI 3 to 13) for the environment domain of quality of life. Estimated effects at month 12 had a similar magnitude, but most of the CIs had greater uncertainty. **Conclusion**: Supervised, individualised exercise reduced fatigue and improved strength and quality of life more than unsupervised home exercise in people with chronic Guillain-Barré syndrome. **Registration**: CTRI/2016/08/007150. **[Shah N, Shrivastava M, Kumar S, Nagi RS (2022) Supervised, individualised exercise reduces fatigue and improves strength and quality of life more than unsupervised home exercise in people with chronic Guillain-Barré syndrome: a randomised trial. *Journal of Physiotherapy* 68:123–129]**

Introduction

Guillain-Barré syndrome (GBS) is an immune-mediated polyneuropathy characterised by progressive weakness in all four limbs, areflexias, autonomic dysfunction and respiratory paralysis. It has an annual incidence of one to two per 100,000 population, with higher male prevalence.[1–3] The mortality and case fatality rates are similar at approximately 3%.[3,4] About 25% of patients require ventilatory assistance during the acute phase. Although the majority of patients recover within 6 months of symptom onset, others have prolonged symptoms. Approximately 10 to 20% of patients have severe residual disability, mostly among young adults aged 30 to 50 years.[5–10]

Therapeutic plasma exchange and intravenous immunoglobulins are beneficial in the acute phase of the illness.[11,12] With advances in the acute care of patients with GBS, survival and the rate of early recovery have improved, but ongoing disability and its impact on social participation remain unmitigated.[1,13] Health-related quality of life is low among those patients who incur residual paralysis due to GBS.[8,9,14] Fatigue is a common consequence of GBS, affecting 60 to 80% patients; it is associated with poor quality of life and activity limitation.[15–18] Residual disability may last for years or even be lifelong; as many as 14% of people with GBS report moderate-to-severe residual disability.[19]

Exercise is a beneficial intervention in many clinical conditions that typically feature weakness and deconditioning.[20] A systematic review of trials of exercise for people with various types of polyneuropathy (including GBS) suggested that exercise moderately improves muscle strength.[21] Although some observational studies primarily or exclusively involving participants with GBS have reported improvement in function, fatigue and muscle strength after supervised cycling or prescribed unsupervised exercises and aerobic activities,[22–24] the absence of a randomised control group makes it

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impossible to discern how much of the improvements were due to exercise.

Unfortunately, there is quite limited high-quality evidence about the effects of exercise in people with GBS specifically.[25] No standardised protocol for exercise among GBS patients with disability and activity limitations can be found, and the few reported guidelines and exercise models are not standardised.[26,27] One randomised controlled trial compared high-intensity versus low-intensity supervised multidisciplinary care including physiotherapist-prescribed strengthening, endurance and gait.[28,29] The effect of exercise could not be isolated because participants also received input from an occupational therapist, a psychologist and a speech pathologist. Nevertheless, the reduction in disability resulting from the higher intensity of multidisciplinary care has led clinical practice guidelines to recommend an exercise program as part of rehabilitation.[27]

In view of the limited research that can provide robust estimates of the effects of exercise in people with GBS and taking into consideration the general acceptance and indirect evidence that at least a home exercise program is warranted, we conducted a randomised controlled trial in which an individually designed, supervised exercise program was compared with a home-based exercise program. The trial compared the effects of these two interventions on functional independence with activities of daily living (primary outcome), muscle strength, fatigue, pain and quality of life.

Therefore, the research questions for this randomised controlled trial were:

1. In people in the chronic phase of Guillain-Barré syndrome, how much more does a supervised, individualised exercise program improve functional independence with activities of daily living than a home-based exercise program?
2. How do the two exercise programs compare regarding their effects on muscle strength, fatigue, pain and quality of life?

Method

Design

This parallel, two-group, randomised controlled trial used concealed allocation, blinding of outcome assessors and intention-to-treat analysis. People with chronic symptoms after GBS were enrolled and allocated to either a 12-week, supervised, individualised exercise program (experimental group) or a home-based exercise program (control group). The allocation process used computer-generated block randomisation with stratification by the time since diagnosis (early $<$ 3 years, late $>$ 3 years) and was conducted by an independent researcher. The allocation order was concealed by placing each random allocation in a sealed opaque envelope, which was opened after the participant was enrolled in the study. Thus, researchers and therapists did not know or decide which enrolling participant would receive which therapy. After an envelope was opened, the participant and the therapists who administered the interventions became aware of that participant's allocated intervention, but the outcome assessors remained blinded.[30] Outcomes were measured at baseline and after 6 and 12 months. In addition to ethics approval and prospective registration, the protocol was published.[31]

Participants, therapists and centre

The study was conducted in a 360-bed tertiary hospital in central India.[31] The physiotherapists who administered the randomised interventions had a mean of 19 years (SD 5) of clinical experience.

The study population consisted of patients diagnosed, by physicians or neurologists, as previous cases of 'definite' GBS according to the World Health Organization's (WHO) International Classification of Disease (ICD) 10 (all variants) criteria.[32] To be eligible to participate, patients with GBS were required to be aged $\geq$ 18 years, be in a stable clinical condition and have a physical disability based on International Classification of Impairment, Disability and Handicap (WHO 1980), updated as per the International Classification of Functioning, Disability and Health (WHO 2001), as an international standard to describe health and disability.[33] The exclusion criteria were physiotherapy treatment in the previous 6 months, pregnancy and amputation. Although the hospital registry contained some patients who had had GBS for $>$ 6 years, recruitment was focused on those who were within 6 years of onset.

Interventions

Participants continued to receive usual care throughout the trial, as prescribed by their treating physician or neurologist, which could include some physiotherapy treatment.

Experimental group

In addition to usual care from the treating physician or neurologist, participants in the experimental group were prescribed a 12-week, supervised, individualised exercise program. It consisted of 60-minute physiotherapy sessions, two to three times per week, on an outpatient basis at the research hospital. The exercises in the program included strengthening exercises, endurance training and gait training. The exercise regimen was tailored to each participant's capabilities and was progressed during the 12-week treatment period. Pain management with electrophysical agents was also included in the intervention. At the end of the 12-week intervention period, participants in the experimental group were advised to continue a home exercise program until the end of month 12. During this follow-up period, participants in the experimental group received a phone call every 8 weeks to encourage adherence to exercise and address any concerns.

Control group

In addition to usual care from the treating physician or neurologist, participants in the control group were prescribed a home-based exercise program. At the beginning of the intervention period, they attended a session at the hospital where they were taught a 30-minute regimen of maintenance exercises – including active-assisted exercises (using one limb to assist another limb), active exercises and strengthening exercises – to be followed at home without supervision. They were advised to complete the exercise program for 30 minutes, two to three times per week. They also received a telephone call every 8 weeks to obtain information about activity levels and any medical visits. At the end of the 12-week intervention period, participants in the control group were advised to continue the home exercise program until the end of month 12. During this follow-up period, participants in the control group received a phone call every 8 weeks to encourage adherence to exercise and address any concerns.

Outcome measures

Primary outcome

The primary outcome was functional independence in activities of daily living measured using the Barthel Index, which is a 10-item scale wherein each item is rated in terms of whether the patient can perform the task independently (scored 2), can perform the task with some assistance (scored 1) or is unable to perform the task (scored 0). Item scores are summed and the total is multiplied by 5 to form an overall score ranging from 0 to 100, in steps of five, with higher scores indicating greater independence.[34]

Secondary outcomes

Muscle strength: Muscle strength was assessed using the Medical Research Council Manual muscle testing grades. Six muscle groups were graded: shoulder abductors, elbow flexors, wrist extensors, hip flexors, knee extensors and foot dorsiflexors. Each muscle group was graded from 0 (no visible contraction) to 5 (normal). The 12 scores were summed to give a total score ranging from 0 to 60.[35]

Fatigue: Fatigue was measured using the Fatigue Severity Scale. The participants first rated their agreement with nine statements about their fatigue from 1 (strongly disagree) to 7 (strongly agree), and then rated their fatigue severity globally on a visual analogue scale from 0 (worst) to 10 (normal).[17]

Pain: Pain was measured on a 100-mm visual analogue scale of pain, with the opposite ends marked as 'no pain' and 'unbearable pain'.[36]

Quality of life: The Hindi version of the World Health Organization Quality of Life (WHOQoL-BREF) was used to measure health-related quality of life. This valid and reliable tool has 26 items across domains assessing: physical health, psychological health, social relationships and environment health;[37] each item is rated on a 5-point scale. The raw domain score is the sum of its item scores. Each domain score is then converted to a scale of 0 to 100, with higher scores indicating better quality of life.

Data collection

Data were collected using a structured template, which was sealed immediately after it was completed. The assessor used a new template each time and all sealed envelopes were opened after completion of the trial at the time of data entry. The data were then entered into a mobile electronic data storage system[a] developed for the trial.[38]

Baseline and follow-up assessments were undertaken by a blinded assessor who was trained in collection of the demographic data and application of the outcome measures. The assessor did not have any contact with either the treating physiotherapists or the independent researcher who developed the randomisation sequence. The assessment sessions took 45 to 60 minutes. Participants in the experimental and control groups were assessed at the time of recruitment and 6 and 12 months later. The assessor did not have any access to previous assessments, treatment schedules or treating rehabilitation therapy team documentation. All measurement records were secured and filed and only opened at the time of entry into the database by an independent researcher.

Data analysis

Data analysis was performed using open-source software[b] with an intention-to-treat approach. Baseline data were summarised using standard descriptive statistics. The data distribution of the outcome measures was determined to deviate from a normal distribution using the Kolmogorov Smirnoff test; therefore, non-parametric statistics were used in the remaining analyses. Outcomes were compared between groups to provide estimates of the effect of the experimental intervention relative to the control intervention. Each of these estimates was reported as a median difference with a 95% CI, calculated using the method of Campbell and Gardner.[39]

In the published protocol,[31] a sample size that was calculated with open-source software was nominated.[40] However, we knew that that estimate was not robust because what constitutes a smallest worthwhile effect in GBS was unclear[29] and estimates of the anticipated standard deviation of the Barthel Index in GBS could only be based on a relatively small cohort study with different eligibility criteria.[8] Therefore, we elected to recruit as many patients as possible within the resources available to conduct the study, knowing that the CIs would indicate the degree of precision in the study's final estimates of the effects of treatment.

Results

Compliance with the trial protocol

The interventions were applied as described in the registered protocol. All of the registered primary and secondary outcomes were reported and no unregistered outcomes were reported.

Flow of participants through the study

After 118 patients had been screened, 16 participants fulfilled the eligibility criteria; they were randomised equally to each group. All participants completed the study in full and provided data on all outcome measures at all scheduled assessment times. Figure 1 shows the flow of participants through the study.

Characteristics of the trial participants

The two groups were similar with respect to their demographic characteristics (Table 1) and their baseline scores on the outcome measures (first two columns of data in Tables 2 and 3). Individual participant data are presented in Table 4 on the eAddenda. The groups were similar with respect to these characteristics and baseline scores.

Effects of intervention

Primary outcome

Functional independence improved in both groups but more so in the experimental group (Table 2). At month 6, the median between-group difference in the amount of improvement in the 100-point Barthel Index was 5 points (95% CI 0 to 20). The lower limit of the CI indicated that the experimental intervention may not improve the Barthel Index more than the control intervention, but is unlikely to be less beneficial. The upper limit indicated that the experimental intervention might have a substantial benefit over the control intervention. The result at month 12 was very similar (median difference 5 points, 95% CI 0 to 25).

Secondary outcomes

Muscle strength: Muscle strength improved in both groups but more so in the experimental group (Table 2). At month 6, the median between-group difference in the amount of improvement in the 60-point Medical Research Council scale was 8 points (95% CI 4 to 18). The CI indicated some uncertainty in the exact amount of benefit, but showed that the experimental intervention improves strength more than the control intervention. The result at month 12 was very similar (median difference 10 points, 95% CI 4 to 8).

Fatigue: Fatigue reduced in both groups but more so in the experimental group (Table 2). At month 6, the median between-group difference in the amount of improvement on the 63-point Fatigue Severity Scale was 13 points (95% CI 1 to 28). The CI indicated some uncertainty in the exact amount of benefit, spanning from an arguably trivial benefit (ie, a reduction of 1 point on the Fatigue Severity Scale) to a substantial benefit (ie, a 28-point reduction). Nevertheless, it showed that the experimental intervention reduces fatigue more than the control intervention. Although the main estimate at month 12 was even more beneficial (median difference 22 points), the CI showed even greater uncertainty, including the possibility of no greater benefit than the control intervention.

Pain: On average, pain severity tended to decrease in the experimental group but there was no clear improvement in the control group (Table 2). At month 6, the best estimate was that pain severity reduced by 1.5 points more in the experimental group than the control group (95% CI 0 to 3). The limits of the CI indicated that the experimental intervention might have a worthwhile benefit over the control intervention (ie, a reduction of 3 points on the 0-to-10 visual analogue scale) or it may not reduce pain more than the control intervention, but it is unlikely to cause any more pain. The effect at month 12 was more uncertain.

Quality of life: The clearest benefit on quality of life was observed in the environment domain of the WHOQoL-BREF (Table 3). At month 6, it showed a clear but small benefit (median difference 12 points, 95% CI 3 to 13). Although the median difference was even greater at month 12, this estimate came with much greater uncertainty; the CI spanned from no benefit to a substantial benefit (ie, 28 points on the 100-point scale). Similarly promising but uncertain estimates were obtained on the psychological domain at months 6 and 12 and on the

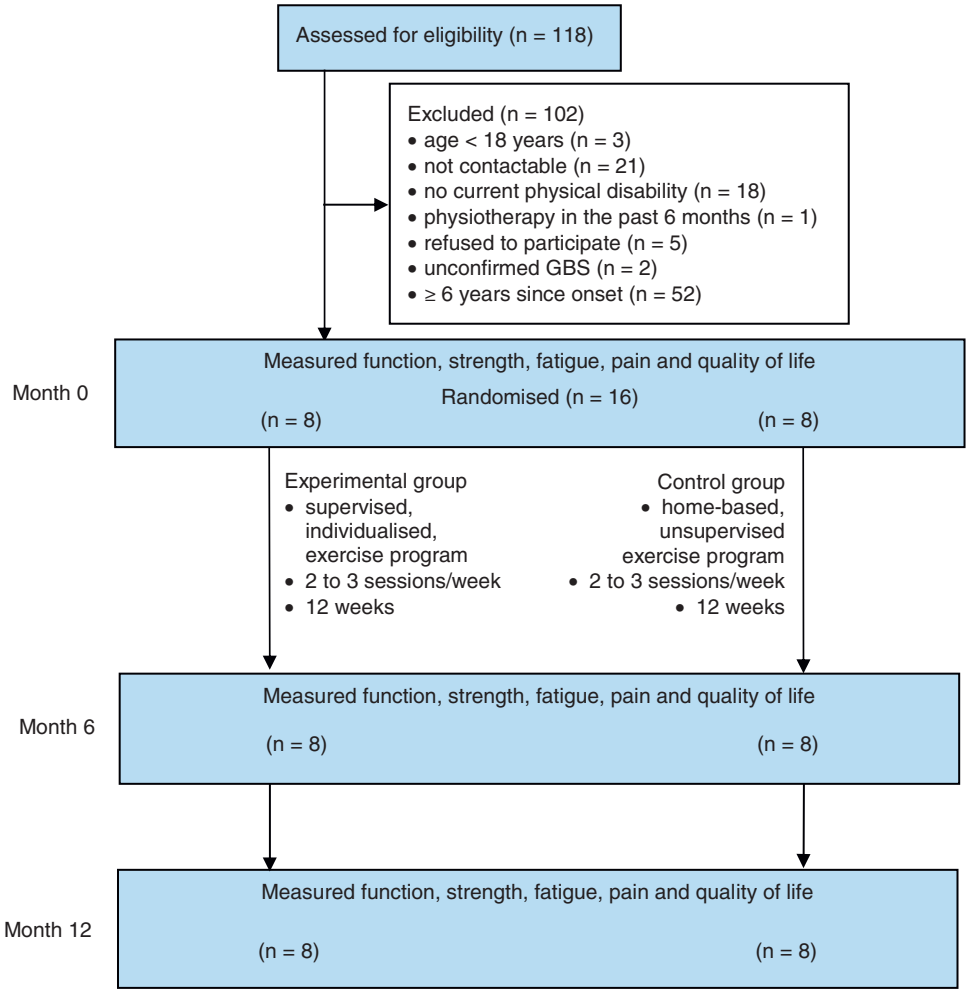

Figure 1. Flow of participants through the trial.

physical health domain at month 12. All other main estimates favoured the experimental group but with wide CIs.

Discussion

The primary outcome of this trial indicates that the effect of a physiotherapist-supervised, individualised exercise program with pain management is as good as or better than an unsupervised home exercise for improving functional independence with activities of daily living. Some secondary outcome measures identified more certain estimates of benefit, including muscle strength, fatigue and one domain of quality of life at 6 months, with the beneficial effect on muscle strength still clearly evident at 12 months.

Before discussing the results further, it is important to consider their believability. The study had several features that support the robustness of the findings: the study was consistent with the prospectively registered protocol; all participants were followed up for a full year; allocation was truly random with concealment of the allocation list during recruitment; assessors were blind to treatment group for the primary outcome and all objective secondary outcomes; and data analysis followed the intention-to-treat principle and generated CIs to indicate the precision of the study's estimates. An obvious limitation of the study was the small sample size: GBS is a rare disease, affecting one to two people per 100,000 population,[1–3] of whom only 10 to 20% progress to have severe residual disability (chronic phase).[5–10] This may explain why the Physiotherapy Evidence Database (PEDro) has only one other trial comparing different forms of exercise-based rehabilitation in chronic GBS. The GBS literature was also unable to provide thresholds for clinically worthwhile effects on the study's outcome measures and, with a condition as rare as GBS, it is difficult to recruit a pilot cohort to establish them. Nevertheless, clinical physiotherapists can explain to patients the anticipated benefits from the supervised, individualised program relative to unsupervised home exercise. Patients can then decide for themselves whether the additional benefits are large enough to make attending the centre for the supervised program worthwhile. Therefore, it is believed that the current trial makes a substantial and believable contribution relative to the existing evidence.

The primary outcome measure generated estimates with CIs indicating that the supervised program is either better than or as

Table 1
Baseline characteristics of the study participants.

Characteristic	Exp (n = 8)	Con (n = 8)
Age *(yr)*, mean (SD)	33 (13)	47 (17)
Gender, n (%)		
female	2 (25)	3 (38)
male	6 (75)	5 (63)
Education *(yr)*, mean (SD)	10.5 (3.4)	10.8 (4.3)
Married, n (%)	5 (63)	8 (100)
Immunomodulatory therapy, n (%)		
therapeutic plasma exchange	2 (25)	4 (50)
intravenous immunoglobulins	6 (75)	4 (50)
Presenting symptoms, n (%)		
fatigue	4 (50)	5 (63)
paraparesis/difficulty walking	6 (75)	4 (50)
pain	2 (25)	4 (50)
hand weakness	0 (0)	2 (25)
facial weakness	1 (13)	0 (0)

Some percentages do not sum to 100 due to the effects of rounding.
Con = control group, Exp = experimental.

Table 2
Median (IQR) outcomes for each group, median (IQR) within-group difference, and median between-group difference (95% CI) for objective outcome measures and symptom scores.

Outcome	Groups						Within-group difference				Between-group difference	
	Baseline		Month 6		Month 12		Month 6 minus baseline		Month 12 minus baseline		Month 6 minus baseline	Month 12 minus baseline
	Exp	Con	Exp	Con	Exp	Con	Exp	Con	Exp	Con	Exp minus Con	Exp minus Con
	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)		
Barthel Index *(0 to 100)*	90 (76 to 95)	93 (89 to 96)	95 (93 to 100)	93 (90 to 96)	100 (95 to 100)	95 (90 to 100)	8 (4 to 16)	0 (0 to 1)	8 (5 to 18)	3 (0 to 5)	5 (0 to 20)	5 (0 to 25)
MRC scale *(0 to 60)*	35 (34 to 40)	39 (36 to 44)	42 (40 to 48)	40 (38 to 44)	44 (42 to 50)	41 (38 to 44)	8 (6 to 12)	0 (−2 to 1)	10 (7 to 14)	0 (−2 to 1)	8 (4 to 18)	10 (4 to 18)
Fatigue Severity Scale *(0 to 63)*	51 (49 to 54)	51 (50 to 53)	32 (26 to 41)	46 (33 to 51)	22 (19 to 42)	50 (49 to 50)	−18 (−28 to −11)	−2 (−18 to −1)	−26 (−34 to −13)	−2 (−2 to −1)	−13 (−28 to −1)	−22 (−33 to 0)
Pain VAS *(0 to 10)*	5.5 (4.8 to 6.3)	5.5 (4.3 to 7.3)	4.0 (2.0 to 5.0)	6.0 (2.0 to 7.0)	2.5 (2.0 to 4.3)	6.0 (4.8 to 6.3)	−2.0 (−3.0 to −0.8)	−0.0 (−0.3 to 0.3)	−2.5 (−4.3 to −0.8)	−0.5 (−1.0 to 0.3)	−1.5 (−3.0 to 0.0)	−2.0 (−5.0 to 1.0)

Con = control group, Exp = experimental group, MRC = Medical Research Council, VAS = visual analogue scale.

Table 3
Median (IQR) outcomes for each group, median (IQR) within-group difference, and median between-group difference (95% CI) for quality of life domains.

WHOQoL–BREF *(0 to 100)*	Groups						Within-group difference				Between-group difference	
	Baseline		Month 6		Month 12		Month 6 minus baseline		Month 12 minus baseline		Month 6 minus baseline	Month 12 minus baseline
	Exp	Con	Exp	Con	Exp	Con	Exp	Con	Exp	Con	Exp minus Con	Exp minus Con
	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)	(n = 8)		
Physical health	45 (42 to 50)	48 (44 to 52)	59 (42 to 64)	48 (44 to 56)	64 (57 to 68)	48 (44 to 54)	7 (−4 to 19)	−3 (−4 to 0)	20 (7 to 25)	−4 (−4 to 0)	7 (−1 to 24)	21 (0 to 29)
Psychological	52 (46 to 55)	54 (46 to 64)	63 (57 to 69)	56 (46 to 59)	67 (61 to 72)	52 (49 to 55)	9 (6 to 15)	0 (−5 to 0)	15 (6 to 21)	0 (−5 to 1)	9 (0 to 21)	17 (0 to 21)
Social relationships	38 (33 to 46)	42 (29 to 50)	63 (48 to 75)	63 (48 to 69)	62 (48 to 77)	63 (48 to 69)	8 (0 to 29)	17 (−2 to 25)	13 (6 to 29)	17 (−2 to 25)	4 (−25 to 33)	8 (−25 to 33)
Environment	42 (39 to 44)	44 (40 to 50)	55 (44 to 56)	41 (34 to 46)	58 (48 to 61)	41 (39 to 44)	11 (8 to 12)	0 (−5 to 0)	17 (6 to 25)	−3 (−4 to 0)	12 (3 to 13)	22 (0 to 28)

Con = control group, Exp = experimental group, WHOQoL-BREF = World Health Organization Quality of Life questionnaire (Hindi Version).

good as the home program for improving functional independence with activities of daily living. GBS can severely affect ability to perform activities of daily living.[8,41] Patients who are particularly frustrated with this may decide that the supervised program is worth trying, even though the estimated average effect on independence was uncertain, especially given that the benefits on other outcomes were more certain. Rather than estimating whether a specific benefit is worthwhile, any decision about the greater value of the supervised program should include consideration of all the benefits that were identified. If the effort and risk involved in performing the exercise are similar in both environments, the additional travel to exercise sessions could be the main inconvenience for opting for the supervised program.

One of the more certain benefits was the improvement in muscle strength, which was well maintained from month 6 to month 12. Interestingly, El Mhandi et al observed in their prospective cohort study that strength did not improve after a home-based exercise program, which led them to recommend examination of a supervised, individualised program.[23] Various studies have established that exercises are widely prescribed for people with GBS to improve strength[42] but there remains only one other trial that is similar to ours.[29] That trial did not use the Medical Research Council scale to measure strength, but their supervised individualised program did cause greater long-term improvements in Functional Independence Measure motor sub-scores than their home program.[14]

Fatigue is considered to be one of the most disabling symptoms of GBS, with prevalence estimates ranging 38 to 82%.[15,17,43] The CI for the between-group comparison of fatigue at month 6 in the current study ranged from a small benefit to an arguably worthwhile benefit. A benefit from exercise interventions on fatigue has been noted in people with polyneuropathies,[21,41] so the benefit on fatigue in the current study is plausible.

Pain is reported in all phases of GBS, with a prevalence of 66% in the acute phase and 33% a year after symptom onset.[42] The current participants were already beyond the acute phase, which may be why no reduction in pain occurred in the control group. At 6 months, the supervised program might have a worthwhile benefit over the control intervention (ie, a reduction of 3 points on the 0-to-10 visual analogue scale) or it may not reduce pain more than the control intervention, but it is unlikely to cause any more pain. Exercises are generally effective in the treatment of chronic musculoskeletal pain.[44]

GBS typically has a long-term negative effect on mood, including anxiety and depression, and deterioration in quality of life.[45,46] Unlike the previous similar randomised trial,[14] a greater improvement from the supervised program was observed in one quality of life domain at month 6: environmental quality of life. This indicates better responses to questions related to opportunity to undertake leisure activities, ability to access transport options, ability to access health services, and feeling safe. Greater strength and less fatigue may enable patients to achieve these important aspects of life. Various other domains had CIs that spanned from no benefit (and no detriment) up to about 25 points on the 100-point domains.

The pool of estimated improvements in strength, fatigue and quality of life – albeit with uncertainty in the magnitude of the benefit – may lead patients to prefer the supervised program. Perhaps another outpatient exercise-based rehabilitation service is available that people with GBS could attend or the hospital might offer the service temporarily when these rare patients enter the chronic phase.

This study could not estimate how quickly the benefits were obtained or whether any immediate treatment effect was greater or less than the month 6 results because outcomes were not measured during or at the end of the intervention period. However, the trend for most estimates to be more uncertain at month 12 than month 6 suggests that the effects may wane over time, which is clinically plausible.

The treatment protocol was standard; however, the treating physiotherapists were not constant. This might have created a difference in implementation of intervention. Physiotherapy is a key tool in the rehabilitation process; however, it requires continuity of care. This issue of continuity of care also appears in the recommendations for further research.

Researchers interested in further examination of rehabilitation for people with GBS should strive to secure funding for collaborative research proposals in order to achieve larger sample sizes. India is a developing country with resource constraints; it struggles to provide treatment to 85% of its population who live in poverty. This made it difficult to secure such funding for the current study. Researchers might also strive to include as many female participants as possible; there were 2.2 times as many males as females in the current study and males are affected 1.5 to 2 times more often than females.[1–3] Another reason could be that less importance is given to providing medical care to females in some developing countries like India.[47] The age group of the current participants was the most commonly affected age group.[48] Further research could also assess the economic burden of treatment.[49] The effects of GBS on spouses/relatives, the patients' long-term prospects, and the availability of physiotherapy for rehabilitation are areas that need the attention of researchers in the developing world. This study's participants had had GBS for $\leq$ 6 years; however, the effect on disability also needs to be studied for chronic GBS, including longer-term follow-up for people with GBS in the community.[45]

What was already known on this topic: Guillain-Barré syndrome (GBS) is a rare polyneuropathy causing limb weakness, areflexias, autonomic dysfunction and respiratory paralysis. Severe residual disability occurs in about 10 to 20% of patients.
What this study adds: In people with chronic Guillain-Barré syndrome, a 12-week supervised, individualised exercise program had a similar or better effect on functional independence as a 12-week unsupervised home exercise program. At 6 months, the supervised program reduced fatigue and improved strength and quality of life more than the home program. At 12 months, the estimated effects had a similar magnitude but most of the confidence intervals showed greater uncertainty.

Footnotes: [a] KoBo toolbox, Open Data Kit (ODK) platform, Harvard Humanitarian Initiative, Cambridge, USA.

[b] R software, R Foundation for Statistical Computing, Vienna, Austria.

eAddenda: Table 4 can be found online at https://doi.org/10.1016/j.jphys.2022.03.007.

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