

DIFFERENTIAL PSYCHOLOGICAL EFFECTS OF EARLY AND LATE MOBILISATION AFTER MYOCARDIAL INFARCTION

B. M. Groden and R. I. F. Brown¹

*From the Southern General Hospital and the University of Glasgow,
Glasgow, Great Britain*

ABSTRACT. Two groups of male patients who had survived an acute myocardial infarction and who were treated by alternative regimes of early or late mobilisation were given psychological tests on leaving hospital and at follow-up approximately 1 year later. Test scores on neuroticism, extroversion and lying from the Eysenck Personality Inventory were analysed showing that: (a) both groups studied increased their neuroticism scores and decreased their extroversion scores over the follow-up period; (b) the earlier mobilised group had lower neuroticism scores on leaving hospital; (c) at the end of the follow-up period there was no significant difference between early and late mobilised groups in extroversion and neuroticism scores. It is suggested that the initial advantages of earlier mobilisation in producing optimism in the patient may be lost when the patient is returned to his home environment.

The management of the patient with acute myocardial infarction has changed considerably in recent years. Prolonged bed rest and hospitalisation were long regarded as the mainstay of treatment. Hay (1) commented on the adverse psychological effects of prolonged bed rest and Levine (2, 3) and Levine & Lown (4) observed that patients who were treated by the armchair method fared at least as well as patients treated with a prolonged period of bed rest. It was thought that one of the most encouraging aspects of this type of management was the continued sense of well being and high morale that existed in the patients treated in the armchair. Levine observed that profound psychological changes followed putting a patient to bed for a long period and thought that anxiety was detrimental to the patient's cardiac status by causing an increase in cardiac output.

These studies encouraged others to try the effects of earlier mobilisation of coronary patients (5, 6, 7, 8) and it is concluded that there are no adverse effects of earlier mobilisation. The findings of Beckwith et al. (9) were in general agreement and they also noted that there was less anxiety and a greater feeling of well being in infarct patients treated out of bed. It has also been our impression that the psychological effects of shorter periods of bed rest are beneficial, but in respect of overt psychological disturbances (anxiety and depression) no differences were found (8, 10). It was thought that more precise information could be obtained by carrying out formal psychological testing on infarct patients who were participating in a clinical study of earlier mobilisation.

PATIENTS AND METHODS

Two comparable groups of male patients who had recently sustained a myocardial infarction have been studied. The methods of selection of the patients, criteria for admission to the trial and the precise method of management have been described previously (8). Suffice it to say here that the early mobilised group numbering 18 was allowed to assume a comfortable position in bed after admission and kept in bed for 14 days after which gradual ambulation was permitted with a return home after 21 days in hospital. The late mobilised group (number=27) was kept flat in bed for 3 days, during which the patient was washed and fed by a nurse and then allowed further pillows until 25 days had elapsed when the patient was allowed up and discharged home after 35 days. A total of 45 patients were studied of whom 36 were married.

Volunteer bias was eliminated by the methods of allocation of patients to each group and it was not possible for a patient to opt out of his allocated group. Similarly all patients were required to attend for follow-up visits after discharge. Initially all patients were assessed psycho-

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Table I. *Sampling effects: comparison of early and late mobilisation groups*

	χ^2	<i>p</i>	<i>p</i>
Marital status	1.82	0.50	0.70
Social class	2.98	0.20	0.30

N = 45.

Table II. *Early and late groups combined: scores on leaving hospital compared with scores at follow-up*

Wilcoxon Matched-Pairs Sign-Rank Tests

Scale	\bar{x} hospital	\bar{x} follow-up	<i>z</i>	<i>p</i> (two-tailed)	<i>N</i>
N	8.37	9.87	3.43	0.0006	41
E	12.36	10.91	2.77	0.0056	40
L	4.97	4.51	1.90	0.0574	31

logically within the 3 day period immediately prior to their discharge from hospital. A second or follow-up psychological assessment was carried out on each patient between 6 and 9 months after discharge from hospital when he was required to attend hospital for medical check-up.

The psychological test used in this study was the Eysenck Personality Inventory (E.P.I., form A). The E.P.I. is a screening test well known in the UK and well standardised with published figures for reliability and validity (11). It consists of 57 question items, each answered YES or NO and subdivided for scoring purposes into three scales. The neuroticism scale (N) of 24 items is described by Eysenck as measuring general emotional lability, emotional over-responsiveness, and susceptibility to breakdown under stress—a high score indicating greater emotional lability. The extraversion scale (E) measures sociability, tendency to impulsive behaviour, stimulus seeking, etc. (11). The Lie scale (L) is designed to measure desirability response set or the tendency to answer questions according to the favourable light which the answer would throw on the subject. Extensive item analyses and factor analyses have shown this scale to be valid, reliable, and useful in detecting individuals "faking good" (11, 12).

The test was administered by a trained psychologist under conditions of confidentiality and privacy on leaving hospital and at follow-up. Information on the age, occupation, and marital status of each patient was collected at the first interview.

RESULTS

The early and late mobilisation groups were compared for any chance inequalities of number of patients with a particular marital status or social

class (determined by occupation from the Registrar General's Index) and none were found (Table I). There was no significant difference in the average ages of the early and late mobilisation groups (\bar{x} age early group = 55.96 and \bar{x} age late group = 54.47; $z = 0.49$; $p = 0.6242$; Mann-Whitney U-Test) (13).

The scores obtained at the first testing in hospital by both groups taken together were compared with the scores of these groups at the second (follow-up) testing. Since each patient was being used as his own control the powerful Wilcoxon Matched-Pairs Sign-Rank Test was used (Siegel, S., 1956, p. 75 ff.) (Table II).

Scores obtained on leaving hospital from the early mobilisation group were compared with those on leaving hospital obtained from the late mobilisation group (Table III).

Scores on leaving hospital were then compared with scores at follow-up for the early and late mobilisation groups separately on each scale again using the Wilcoxon Matched-Pairs Sign-Rank Test (Table IV).

Scores obtained at follow-up testing were compared between early and late mobilisation groups (Table V).

Table III. *Scores on leaving hospital: early and late groups compared*

Mann-Whitney U-Tests

Scale	\bar{x} early	\bar{x} late	<i>z</i>	<i>p</i> (two-tailed)
N	6.72	9.48	1.99	0.0466
E	13.33	11.55	1.47	0.1416
L	5.33	4.78	1.07	0.2846

N = 45.

Table IV. *Early and late groups separately: scores on leaving hospital compared with scores at follow-up*

Wilcoxon Matched-Pairs Sign-Rank Tests

Scale	Group	\bar{x} hospital	\bar{x} follow-up	<i>z</i>	<i>p</i> (two-tailed)	<i>N</i>
N	Early	6.72	8.61	1.87	0.0614	16
N	Late	9.48	10.80	1.80	0.0718	25
E	Early	13.33	11.72	2.15	0.0316	15
E	Late	11.55	10.40	1.66	0.0970	25
L	Early	5.33	4.39	2.13	0.0332	13
L	Late	4.74	4.59	1.72	0.0854	18

Finally a table of the increase or decrease in score between hospital and follow-up testings for each patient was compiled for early and late mobilisation groups for each scale. The significance of the relative magnitude of increase or decrease in the early and late mobilisation group was then compared for each scale using the Mann-Whitney U-Test (Table VI).

In addition for scales N and E the Spearman Rank Difference Correlations between hospital and follow-up testings were computed for the early and late mobilisation groups separately to allow comparison with the test-retest reliability coefficients quoted for Eysenck's standardisation sample. These are given in Table VII along with Eysenck's product-moment correlations for test-retest reliability.

When all patients with an L score of five or over on either the hospital or the follow-up testings were eliminated only 4 patients remained in the early mobilisation group and nine in the late mobilisation group. When scores of all patients on leaving hospital were compared with scores of all patients at follow-up only the change in score from hospital to follow-up testing on the E scale remained significant (Table VIII).

Table V. Scores at follow-up: early and late groups compared

Mann-Whitney U-Tests

Scale	\bar{x} early	\bar{x} late	z	p (two-tailed)
N	8.61	10.70	1.44	0.1498
E	11.72	10.40	1.19	0.2340
L	4.39	4.55	1.51	0.1310

$N=45$.

Table VI. Comparison of early and late mobilisation groups on the relative magnitude of increases or decreases in scores from hospital to follow-up testings

Mann-Whitney U-Tests

Scale	\bar{x} change: early	\bar{x} change: late	z	p (two-tailed)
N	1.89 increase	1.22 increase	0.85	0.3954
E	1.61 decrease	1.14 decrease	0.77	0.4412
L	0.94 decrease	0.18 decrease	1.49	0.1362

$N=45$.

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Table VII. Correlation between hospital and follow-up testings

Spearman Rank Difference Correlations

Scale	Group	r	p	N
N	Early	0.51	<0.05	36
N	Late	0.73	<0.001	54
Eysenck standardisation $r=0.84$ (1 year) and 0.88 (9 months)				
E	Early	0.72	<0.001	36
E	Late	0.73	<0.001	54
Eysenck standardisation $r=0.82$ (1 year) and 0.97 (9 months)				

Table VIII. Patients with Lie scores of four and below only. Early and late groups combined: scores on leaving hospital compared with scores at follow-up

Wilcoxon Matched-Pairs Sign-Rank Tests

Scale	\bar{x} hospital	\bar{x} follow-up	z	p	N
N	11.28	11.85	0.74	0.4592	12
E	12.53	10.69	1.96	0.0500	12

For the same sample, scores on N and E on leaving hospital were compared with those at follow-up, testing separately for the early and late mobilisation groups, but no significant differences were found between scores at hospital and follow-up testing.

DISCUSSION

There is a significant increase in neuroticism (N) from the time the patients are tested on leaving hospital to the follow-up testing 9 months to a year later (Table II). This might seem a slightly surprising finding if it was expected that the emotional impact of the serious and often sudden illness would still be great on leaving hospital and that as patients returned to work and readjusted over the follow-up period their emotional lability and appeal for support, both of which are involved in high N scoring, would diminish. These scores might suggest either 1) that coronary patients generally leave hospital not yet having felt the full psychological impact of their illness and only begin to do so when they attempt to return to their old way of life and perhaps find that they no longer can, or 2) that (especially in the case of the early mobilised) they leave hospital into a world of immediate family, general

practitioners and workmates, all of whom may put them in the role of the seriously ill with a consequent reduction in the patients' morale.

In spite of the absence of known bias in selecting for early and late mobilisation treatment and in spite of the comparability of the early and late groups as far as gross social characteristics such as marital status and social class (Table I) there is, at the point of leaving hospital, a significant difference in scores on neuroticism between the early mobilised group and the late mobilised (Table III). The early mobilised group are significantly lower on scores on neuroticism, suggesting that the regime of early mobilisation may have lessened the psychological shock of the disease on these patients, or, at any rate, maintained their morale and protected them relative to the late mobilisation group up until this stage. By the time of follow-up testing, however, this initial advantage of early mobilisation has disappeared and there is no significant difference between the early and late groups' scores on N (Table V). This implies that there has been, during the follow-up period, a slightly greater increase in emotional lability, appeal for help, and neuroticism in general among the early mobilisation group than among the late and this is corroborated by results in Table IV, suggesting that the second of the two alternative hypotheses above may be nearer the truth. The rate of increase in N scores over the follow-up period recorded in the early group here is now however significantly greater than in the late group (Table VI).

Scores on the extraversion (E) scale also show a statistically significant change for all patients over the follow-up period (Table II), in this case showing a trend towards greater introversion and following the pattern of N scores in indicating a patient relatively extraverted and unaffected on leaving hospital but becoming increasingly withdrawn and cautious during the follow-up period, either as the real problems and significance of his illness are borne in upon him or as he accepts his society's role of the seriously ill.

There is no significant difference in extraversion between early and late mobilised patients (Tables III, IV and V) for although early mobilised patients are slightly less introverted than later mobilised patients on leaving hospital the difference is not statistically significant (Table III). Once again by follow-up testing the early mobi-

lised patients have moved closer to the late (Table V) and this is corroborated from Table IV. Although the trend during the follow-up period towards introversion is slightly greater among the early mobilised patients it is not statistically significant (Table VI).

The scores of the early and late groups are nowhere significantly different on the Lie scale (L) (Tables II, III, IV, V and VI). Eysenck (11) recommends that all N scores and some E scores on the E.P.I. should be treated with caution if they are accompanied by an L score of 5 or more from the individual patient concerned. When, however, in this sample all patients with a Lie score of 5 or over are eliminated the numbers in the early and late groups drop to a very low level (four and nine respectively) and the only one of the results discussed above remaining statistically significant is the drop in extraversion scores (increasing introversion) for all patients considered together over the follow-up period (significant at 0.05) (Table VIII). This means that it has not been possible except in that one instance to eliminate the possible vitiating effect of lying or tendency to answer questions according to the good light the answer will throw on the patient in this study. All the above suggestions in the discussion must therefore remain suggestions for investigation in a further study with larger numbers of patients when it may be possible to eliminate the high liars and still retain enough patients in the samples to draw statistically significant conclusions.

From Table VII on the other hand it can be seen that the test-retest reliability of the N and E Scales is reduced sufficiently to allow that some significant change between first testing and follow-up could be taking place, while remaining sufficiently high to imply that the basic characteristics of the test are working normally as in the original standardization sample.

CONCLUSIONS

Because of difficulties in eliminating the vitiating effect of high lie scores, all the following are tentative suggestions for follow-up in a larger study involving more patients.

1. All coronary patients as a group appear to experience a relatively delayed psychological effect from their illness. The full impact on neuroti-

cism and extraversion scales is not discernable on leaving hospital to the extent that it is some 9 months to a year later. The trend over this follow-up period is toward greater neuroticism and introversion.

2. Up to the point of leaving hospital there is some evidence that a regime of early mobilisation may delay the psychological and social impact of the serious illness. Early mobilised patients appeared less neurotic on leaving hospital although this initial advantage was lost over the follow-up period.

3. There seems to be no significant difference in the long term psychological and social effects of early mobilisation as opposed to late mobilisation for coronary patients.

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Address for reprints:

B. M. Groden, M.D., M.R.C.P. (Glasg.), M.R.C.P. (Edinb.)
Dept. of Cardiology,
Southern General Hospital
Glasgow, Great Britain