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ABSTRACT: This meta-analytic review synthesizes the findings of 24 published studies dealing with the effectiveness of case management with the severely and persistently mentally ill. Summative findings were: (1) Overall, case management interventions are effective—75% of the clients who participate in them do better than the average client who does not; (2) The estimated preventive fraction (e.g., prevention of re-hospitalization) among clients who experience relatively intense case management service (case loads of 15 or less, 89%) is nearly 30% greater than that estimated among similar clients receiving less intensive service; and (3) Various case management practice models did not differ significantly on estimated effectiveness. Important questions concerning the differential effectiveness of case management by specific program, worker, client, and client-worker relationship characteristics remain to be answered.

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For the past 30 years or so, mental health policy makers and service providers have been exploring community alternatives to institutional care of people with severe and persistent mental illness. Federal, state and provincial legislation in both Canada and the United States for example, has supported this trend, with fairly recent mandates being offered on both sides of the border for case management (outreach, identification, assessment and service planning, service linkage and monitoring, advocacy) as a central coordinating point between an area's natural endowment of support services and the community-residing persons and their families who may need such support to maintain themselves in a dignified manner with as much independence as possible.

Of course, such case management programs have been deemed effective by many, however, this is definitely not the present consensus opinion. In fact, four recent research reviews on the topic of case management's effectiveness offer only slightly more than equivocal support for the notion: one each, strongly supportive, moderately, equivocal, and not supportive (Chamberlain & Rapp, 1991; Cnaan, 1994; Rubin, 1992; Solomon, 1992). Though these traditional narrative reviews have performed a valuable service in qualitatively summarizing the extant research in this field, they have not provided the means for estimating the practical—clinical and policy—significance of case management services. Stated another way, the current synthesis of knowledge in this field has yet to provide answers to the following queries of central import to those making cost-benefit decisions: (1) What is the strength of the case management-outcome association (i.e., its effect size [ES])? and (2) What factors (case management model; case manager or client characteristics) affect the case management intervention-outcome association? The present study—a more quantitative or meta-analytic review—endeavors to answer these questions.

METHOD

Computerized data bases of *Psychological*, *Sociological*, and *Social Work Abstracts*, and *Index Medicus* were searched (1980 to 1996) on the following key word scheme: (case management or community support) and (effectiveness or effect or efficacy or benefit or assessment or evaluation or outcome or follow-up). Searches were then augmented with bibliographic reviews of conceptually relevant manuscripts on case management practice with samples of severely and persistently mentally ill people.

Twenty-four studies were so retrieved; they comprise this review's sample for meta-analysis (asterisked in the `References' section).

A scale-free metric or effect size (ES) indicator—the *r*-index—which is calculable and interpretable as Pearson's linear correlation coefficient and estimates the strength of the hypothesized independent-dependent variable association (case management program-outcome measure), was calculated for each of the 24 independent studies (Cooper, 1989). As the majority of the studies in this field fall far short of being able to confidently assess a hypothesized causal program-outcome relationship, that is, they have been pre- or quasi-experiments, an effect size index which focuses upon their correlation was deemed most appropriate. Pearson's *r* is calculable from a variety of outcome statistics (group *M*s and *SD*s, *t*-test, *F*-ratio, χ^2, and *p*-level with group *n*s), and thus allows for ease of across-study comparison and summary. The overall statistical significance of the effect of case management services was estimated by the method of unweighted probabilities (Rosenthal, 1978); sample size was not found to be associated with effect size, so the across-study combined probabilities were not weighted by individual study sample size. Aggregating studies across categorically similar research design and program characteristics (e.g., case management model, case load), their average ESs were then compared.

The practical or clinical-policy significance of case management was then estimated by transforming each *r*-index into another, even more intuitively appealing scale-free metric, that is, Cohen's (1988) U_3 statistic. For example, a U_3 of 75.0% comparing the quality of life of a group of clients who received case management services with their counterparts in a comparison condition would be simply interpretable as follows: 75% of the case management clients scored higher on the quality of life measure than the average person in the comparison group did. Such estimates of practical significance can provide rational and empirical bases for the making of difficult cost-benefit decisions concerning the future effective use of case management.

RESULTS

Sample Description

This meta-analytic review's sample of 24 studies on the effectiveness of case management services with the severely and persistently mentally ill arose primarily from U. S. populations ($n = 19$, 79%; three of the remaining five were Canadian studies) during the past 14 years (data were collected from 1980 to 1993, $Mdn = 1986$). The selected studies typically had total sample sizes of less than 100 client participants (66%; ranged from 20 to 1,215; $Mdn = 70$) and for the most part used pre- (38%) or quasi-experimental (33%) research designs. Full support case management programs or those using the PACT model (62%) with relatively small case loads (ranged from 5 to 40 clients per worker, $Mdn = 15$) have been the primary focus of study (see Table 1).

TABLE 1

Descriptive Profile of the 24 Reviewed Studies: Percentage Distributions

Design Characteristics	*Studies* *n*	*%*	*Program Characteristics*	*Studies* *n*	*%*
Year Data Collected			Country		
1980 to 1984	7	29	United States	19	79
1985 to 1989	12	50	Canada	3	13
1990 to 1993	5	21	England	1	4
Mdn = 1986			Australia	1	4
Research Design[a]			Case Management Model[d]		
Pre-experimental	9	38	Full Support or PACT[e]	15	62
Quasi-experimental[b]	8	33	Rehabilitation	4	17
Experimental[b]	7	29	Strengths	3	13
			Generalist	2	8
Sample Size[c]			Median Case Load[f]		
20 to 49	8	33	5 to 10	5	25
50 to 99	8	33	11 to 15	7	35
100 to 1,215	8	33	16 to 20	4	20
Mdn = 70			21 to 40	4	20
			Mdn = 15		

[a]Study cohort follow-up ranged from six to sixty months (*Mdn* = 12); loss to follow-up ranged from 11% to 43% (*Mdn* = 18%).
[b]Comparison or control groups: eleven alternative community intervention programs (four less comprehensive or intensive than the case management program under study, but seven were equally or more so), one waiting-list, one medication only, and two psychiatric hospitals.
[c]Total sample = case management + comparison or control groups.
[d]The vast majority of the original studies (19 of 24) essentially only conceptually defined their case management programs, that is, they did not procedurally define them. The modal study in this field (79%) operationally defined its specific case management intervention with a paragraph or less of methodological text. Moreover, within such descriptive text, potentially important interventive concepts (e.g., assertiveness, continuity, team approach, and so on) were typically presented without concomitant procedural delimitation.
[e]PACT = program of assertive community treatment (Stein & Test, 1980).
[f]Four studies did not report sufficient data to calculate this variable.

Case Management Effectiveness

The major categories of outcome measures reported in the 24 reviewed studies of case management effectiveness are displayed in Table 2; they were all found to have changed significantly in the predicted direction (combined probabilities minimally $p < .05$). Statistical signifi-

TABLE 2

Case Management Effects by Hypothesized Dependent Variable Conceptual Definition

	Number of Studies		Effect Size Metrics r-Index		Cohen's
Dependent Variable	*Reported*	*Supported*[a]	*Mean*	*SD*	U_3 (%)
Functional status	15	10	.309	.216	74.2
Re-hospitalization	13	10	.277	.235	71.8
Quality of life	10	8	.325	.182	75.4
Cost of care	6	5	.300	.195	73.6
Services received	4	4	.318	.165	74.9
Emergency room visits	4	3	.348	.161	77.1
Intervention plan compliance	3	3	.407	.125	81.4
Social Network	1	1	.180	.000	64.3
Jail time	1	1	.530	.000	89.4

Note. The combined probability within each dependent variable conceptual domain was found to be significant at a minimum $p < .05$.
[a]Findings supported the hypothesis that case management services are effective, $p < .05$.

cance notwithstanding, the magnitude of the observed average effects, which were summarized across studies, may categorically be described as quite large. For example, among the three most prevalent types of measures, that is, those assessing client functional status ($n = 15$ studies), the prevention of re-hospitalization ($n = 13$), and quality of life ($n = 10$), approximately three-quarters of those clients in a case management program did better than the average person in a comparison condition (U_3s of 72% to 75%). Similarly, approximately three-quarters ($U_3 = 74\%$) of the case managed care plans cost less than the average comparison care plan. Also, though empirically supported by fewer studies, case management seems to be highly preventive of certain deleterious outcomes which may be experienced by community-residing mentally ill people. For example, most (approximately 80% to 90%) of the clients working with a case manager experienced fewer emergency room visits and spent less time in jail over the course of the study than did their non-case managed counterparts.

Practice model characteristics. Considerable variability was also ob-

served around the above described average effects (see Table 2, numbers of studies not supporting case management's hypothesized effectiveness, and *SD*s). This meta-analysis also explored the possible reasons for such variability in case management's observed effectiveness. Only one coded variable—case load—was found to moderate overall ES (see Table 3). This intuitively appealing finding may best be interpreted in a straightforward colloquial way; as with other services, `a community gets what it pays for' when purchasing case management services. Lower, more costly, case loads are clearly more effective in supporting client functioning, bolstering their quality of life, and preventing re-hospitalization. For example, nearly 90% of the clients who experienced relatively more intensive case management (15 clients per worker or less, $Mdn = 12$) spent fewer days in the hospital than the average person who did not receive case management services, whereas, significantly fewer (61%) of the clients who experienced less intensive service (more than 15 clients per worker, $Mdn = 25$) experienced such an advantage; $F\ (1,9) = 12.66$, $p < .01$. In fact, case load was found to be highly associated with case management ES ($r = .73$), itself accounting for approximately half of its variability ($r^2 = .53$).

TABLE 3

The Effectiveness of Case Management Services by Case Load

Dependent Variable / *Case Load*	*Number of Studies*		*Effect Size Metrics*		
	Reported	*Supported*[a]	*r-Index* *Mean*	*SD*	*Cohen's* U_3 *(%)*
Functional status**					
15 or less ($Mdn = 12$)	8	7	.448	.195	84.3
More than 15 ($Mdn = 25$)	4	2	.162	.096	62.9
Re-hospitalization***					
15 or less	4	4	.530	.135	89.4
More than 15	7	4	.144	.189	61.5
Quality of life*					
15 or less	5	5	.426	.160	82.7
More than 15	3	1	.183	.164	64.5

*$p < .10$, **$p < .05$, ***$p < .01$.

This study's observed non-significant relationships are perhaps as telling as its significant ones. ES did not differ significantly by any of the other design nor program characteristics displayed in Table 1. Perhaps most interestingly, what the original program designers conceptually named their case management program (e.g., PACT, rehabilitation, strengths or generalist) was unrelated to its estimated effectiveness. Finally, the reviewed studies were nearly devoid of descriptive information on client or case manager characteristics (only five studies reported any, albeit sketchy demographic descriptions), so an exploration of their potentially moderating affect on outcome was not possible.

Caveat on Potential Publication Bias

Other reviewers of the literature on case management's effectiveness have noted the potential for publication bias to confound review findings (Cnaan, 1994; Solomon, 1992). Because it was based on published research, the findings of this meta-analysis may be so confounded, though we believe that such intrusion is highly unlikely. Rosenthal's (1979) fail-safe N at $p < .05$ for the overall finding of case management's effectiveness was found to be 736. This is the estimated number of studies with null findings indicative of ineffectiveness which would have to exist in worker's "file drawers" to change this review's conclusion of case management's effectiveness. The computed fail-safe N is more than 30 times the number of studies included in this review ($n = 24$). Moreover, recent reviewers of the unpublished literature on more generally social work's interventive effectiveness have estimated similar effects as those arising from the published literature (de Smidt & Gorey, 1997; Grenier & Gorey, 1998). Thus, this review's overall findings seems highly resistant to the potential impact of unretrieved null results.

DISCUSSION

Case management programs were found to benefit many clients they serve. Summarizing across such prevalent outcome measures as functional status, re-hospitalization and quality of life, consistently three-quarters or more of their participants did better than the average non-participant, an effect, the size of which compares favorably with other social work and psychotherapeutic interventions (Gorey, 1996). Obvi-

ously then, some significant subsample of severely and persistently mentally ill people who receive case management services, perhaps as many as one in four of them, do not do better than those in a non-case management comparison condition, and in fact, some of them probably do worse. Moreover, the type of data which would be needed to predict which clients are most likely to benefit from which type of case management is not yet represented in the extant research literature. It ought not be surprising that this meta-analysis found no significant outcome differences by case management practice model. This is also consistent with other reviews of psychotherapy and social work practice (Gorey & Cryns, 1991; Gorey, Thyer, & Pawluck, in press; Horvath & Symonds, 1991). It seems clear that what one names an intervention probably pales in comparison to the specific operational strategies which are actually put in place in the field, along with the specific characteristics of those doing the work, the clients who participate, and the working relationship between them (Coady, 1993; Cohen, 1989; Mechanic, 1996; Neale & Rosenheck, 1995; Rothman, 1991; Walsh, 1995).

Of the research and program design characteristics which this meta-analysis coded, one—case load—accounted for about half of the observed variability in case management's effectiveness. This leaves the other half of the explanatory model as of yet unaccounted for. A number of important questions are as of yet unanswered or even unposed: (1) What are the specific operational elements of case management which work? (2) What worker (case management experience, credentials, behaviors) and client (familial, diagnostic, behavioral) characteristics bode for success? (3) What aspects of the client-worker relationship (engagement, continuity, empathy, mutuality, trust) are critically important and how can they be developed and supported? and (4) What mix of program and client-worker characteristics works best? We encourage our colleagues to join us in meeting this next generation of case management practice research challenges.

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