Disease-management partnership functioning, synergy and effectiveness in delivering chronic-illness care

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Abstract

Objective. This study explored associations among disease-management partnership functioning, synergy and effectiveness in the delivery of chronic-illness care.

Design. This study had a cross-sectional design.

Setting and participants. The study sample consists of 218 professionals (out of 393) participating in 22 disease-management partnerships in various regions of the Netherlands.

Main outcome measures. We assessed the relationships among partnership functioning, synergy and effectiveness in the delivery of chronic-illness care. Partnership functioning was assessed through leadership, resources, administration and efficiency. Synergy was considered the proximal outcome of partnership functioning, which, in turn, influenced the effectiveness of disease-management partnerships [measured with the Assessment of Chronic Illness Care (ACIC) survey instrument].

Results. Overall ACIC scores ranged from 3 to 10, indicating basic/intermediate to optimal/comprehensive delivery of chronic-illness care. The results of the regression analysis demonstrate that partnership effectiveness was positively associated with leadership ($\beta = 0.25; P < 0.01$), and resources ($\beta = 0.31; P < 0.001$). No significant relationship was found between administration, efficiency and partnership effectiveness. Partnership synergy acted as a mediator for partnership functioning and was statistically significantly associated with partnership effectiveness ($\beta = 0.25; P < 0.001$).

Conclusion. Disease-management partnerships seemed better able to deliver higher levels of chronic-illness care when synergy is created between partners. Synergy was more likely to emerge with boundary-spanning leaders who understood and appreciated partners’ different perspectives, could bridge their diverse cultures and were comfortable sharing ideas, resources and power. In addition, the acknowledgement of and ability to use members’ resources are valuable in engaging partners’ involvement and achieving synergy in disease-management partnerships.

Keywords: disease management, partnership, chronic-illness care, quality, synergy, primary care

Introduction

Chronic diseases are the main cause of death and disability worldwide and the prevalence of chronic conditions will increase as the population ages [1]. Efforts to improve the quality and efficiency of health care have thus been given high priority by governments and health-care organizations. Chronic diseases often coexist and associated morbidity, mortality, health-care resource utilization and costs impose an enormous burden on patients, medical professionals and societies [2]. The multiple and often complex needs of populations affected by the chronic-illness epidemic require approaches that include collaboration among health-care professionals from various organizations, and extend beyond traditional acute episodic health care and the services of any single organization [3–5]. Thus, there is a need to explore alternative models of health-care delivery. Partnerships, including all types of collaboration that bring organizations or professionals together to improve health, are increasingly used to address these complex issues [6–9]. The current substantial interest and investment in inter-professional partnerships are based on the assumption that collaboration will enhance the capacity of people and organizations to achieve health and health-system goals [10, 11].

Disease management, defined as ‘an approach to patient care that emphasises coordinated, comprehensive care along
the continuum of disease and across health-care delivery systems’ [12], is an emerging form of partnership. Disease management has two key features: it uses empowerment strategies (patient oriented) and decision support tools (professional directed), preferably supported by changes in the organizational system [13]. Disease management is considered an effective approach to improving the delivery of primary care [3, 14]. Because chronic-illness care is performed largely within a primary-care setting, primary-care professionals are at the forefront of chronic-disease diagnosis and management [2]. Synergy is the degree to which the partnership combines the complementary strengths, perspectives, values and resources of all partners in the search for better solutions [15, p. 5] and is generally regarded as the product of a partnership [16]. The synergy that a partnership can achieve is more than simply an exchange of resources among its partners. Theoretically, when partners effectively merge their perspectives, knowledge and skills to create synergy, they create something new and valuable—a whole that is greater than the sum of its parts. A disease-management partnership creates synergy by combining the perspectives, knowledge and skills of diverse partners in a way that enables the partnership to (i) think in new and better ways about how it can achieve its goals; (ii) plan more comprehensive, integrated programmes and (iii) strengthen its relationship to the broader community [11].

A gap exists between professionals’ management of patients with chronic diseases and the desired extent of such management [17]. This disparity raises questions about the functioning of disease-management partnerships and the ability of participating professionals to create synergy that improves chronic-illness care. While inter-professional health partnerships are internationally acknowledged as integral to comprehensive chronic-illness care, evidence for the effectiveness of such partnerships is lacking [18]. We hypothesize that the ability of disease-management partnerships to create partnership synergy is an essential factor for successful disease management. Therefore, this study investigates the relationship among disease-management partnership functioning, synergy and effectiveness in chronic-illness care delivery.

**Methods**

We evaluated 22 disease-management partnerships to explore associations between disease-management partnership functioning, synergy and effectiveness in chronic-illness care delivery (Fig. 1). In this framework, synergy is the proximal outcome of partnership functioning that, in turn, influences the effectiveness of disease-management partnerships. This study aims to enhance disease-management partnership knowledge in attaining partnership synergy and effectiveness in chronic-disease care.

**Measures**

The Partnership Self-Assessment Tool (PSAT) was used to measure partnership synergy and dimensions of partnership functioning [11, 18–23]. This instrument contains partnership synergy (nine items: e.g. by working together, how well are these partners able to identify new and creative ways to solve problems) and four dimensions of partnership functioning: leadership (11 items, e.g. fostering respect, trust, inclusiveness and openness in the partnership), efficiency (three items: e.g. how well your partnership uses the partners’ financial resources), administration and management (nine items: e.g. evaluating the progress and impact of the partnership) and resources (six items: e.g. data and information: statistical data, information about community perceptions, values, resources and politics). Responses to all items are structured by a five-point Likert scale [18]. A recent study by Butt et al. [24] confirmed the validity of the PSAT for the measurement of partnership processes.

Partnership synergy and dimensions of partnership functioning scores were derived by calculating the mean of responses within each concept. The partnership synergy score reflects the extent to which the participants in the disease-management partnership are accomplishing more together than they can on their own. The Assessment of Chronic Illness Care (ACIC), which was based on the chronic care model (CCM), was used to assess the effectiveness of disease-management partnership [4, 25]. Improved effectiveness was hypothesized to result in higher levels of chronic-illness care. The current ACIC consists of 34 items covering the six sections of the CCM: health-care organization (six items), community linkages (three items), self-management support (four items), delivery-system design (six items), decision support (four items) and clinical information systems (five items). A seventh section (six items) of the ACIC integrates the six components; for example, patients’ self-management goals are linked to information systems [4]. Bonomi et al. [4] have shown all seven ACIC

![Figure 1](image-url) **Figure 1** Theoretical model of disease-management partnership functioning, synergy and effectiveness in improving chronic-illness care.
subscale scores to be responsive to quality-improvement efforts in chronic-illness care.

Subscale scores for the seven sections of the ACIC were derived by calculating the mean of responses within each section, and overall scores were derived by calculating the mean of all subscale scores. We used overall scores to assess the effectiveness of disease-management partnership in delivering chronic-illness care. The highest possible score (11) for any individual item, subscale or overall score was taken to indicate optimal chronic-illness care delivery, and the lowest score (0) was considered to correspond with limited chronic-illness care delivery.

**Setting**

The study is in the context of a national programme on ‘disease management of chronic diseases’ carried out by ZonMw (the Netherlands Organisation for Health Research and Development) and commissioned by the Dutch Ministry of Health [26]. These programmes were implemented in several regions of the Netherlands and consisted of collaborations between general practitioners and hospitals, primary-care collaborators (including physiotherapists and dieticians), and primary-care and community settings. The 22 disease-management partnerships targeted several patient populations, including those affected by cardiovascular diseases \(n = 9\), chronic obstructive pulmonary disease \(n = 5\), diabetes \(n = 3\), heart failure \(n = 1\), stroke \(n = 1\), depression \(n = 1\), psychotic diseases \(n = 1\) and eating disorders \(n = 1\).

**Sample**

A total of 218 respondents filled in the questionnaire (55% response rate; range: 35–100%). Although the response rate of 55% might seem low, and there is the potential danger of non-response bias, it is similar [27], or even quite high [28], compared with other studies in which the respondents also received a questionnaire by mail.

**Fieldwork**

A questionnaire was sent to all 393 professionals participating within the 22 disease-management partnerships (consisting of 153 organizations). Either a package of questionnaires was sent to the contact person of each participating organization (which were distributed to potential respondents through their mail boxes or delivered personally at team meetings) or questionnaires were sent directly to the potential respondents. Two weeks later the same procedure was used to send a reminder to non-respondents.

**Analyses**

Since the professionals are nested in disease-management partnerships, we tested for influence of the disease-management partnership level on partnership synergy using a multi-level model. Results indicated that the partnership level did not influence our results \((-2 \text{ log-likelihood } 1213.369 \text{ vs. } 1212.549; P = 0.37)\). Therefore, we use individual-level data only.

We used descriptive statistics to analyse the professionals’ demographic characteristics. Cronbach’s \(\alpha\) served as a measure of homogeneity reflecting the (weighted) average correlation of items within a scale measured at the individual level. Correlation analyses were performed to investigate relations between partnership functioning, synergy and effectiveness in the delivery of chronic-illness care. Stepwise multiple regression analyses were used to determine the consistency of the data with theoretical model propositions.

**Results**

**Sample characteristics**

A total of 218 respondents filled in the questionnaire (55% response rate; range: 35–100%). Table 1 displays descriptive characteristics of the sample of professionals. Of those who completed the baseline questionnaire (218/393, 55%), the majority was female and the mean age was 47.2 ± 9.47 years. About 75% had been working in their current organization for >3 years, and more than half worked >29 h per week. Disease-management teams consisted primarily of general practitioners, practice nurses, policy and management and paramedical professionals.

The descriptive statistics for the disease-management partnership functioning, synergy and effectiveness are shown in Table 2. Overall ACIC scores of respondents ranged from 3 to 10, indicating basic/intermediate to optimal/comprehensive delivery of chronic-illness care. Cronbach’s \(\alpha\) for the ACIC was 0.91, indicating excellent reliability. Overall Cronbach’s \(\alpha\) values for the PSAT ranged from 0.93 to 0.94.

<table>
<thead>
<tr>
<th>Gender</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>139</td>
<td>66.2</td>
</tr>
<tr>
<td>Male</td>
<td>71</td>
<td>33.8</td>
</tr>
<tr>
<td>Organizational work history (&gt;3 years)</td>
<td>160</td>
<td>75.1</td>
</tr>
<tr>
<td>Working hours (&gt;29 h)</td>
<td>144</td>
<td>67.6</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>76</td>
<td>34.9</td>
</tr>
<tr>
<td>Practice nurse</td>
<td>56</td>
<td>25.7</td>
</tr>
<tr>
<td>Policy and management</td>
<td>28</td>
<td>12.8</td>
</tr>
<tr>
<td>Para/perimedical profes</td>
<td>26</td>
<td>11.9</td>
</tr>
<tr>
<td>Medical/social specialist</td>
<td>6</td>
<td>2.8</td>
</tr>
<tr>
<td>Other</td>
<td>26</td>
<td>11.9</td>
</tr>
</tbody>
</table>

No., number of respondents.
Table 2 Descriptive properties of the measures for partner-level data, including Cronbach’s $\alpha$, variances, means and standard deviations

<table>
<thead>
<tr>
<th>Measure</th>
<th>Partner level means (SD)</th>
<th>Actual range of scores</th>
<th>Cronbach’s $\alpha$</th>
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</thead>
<tbody>
<tr>
<td>Partnership functioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership (11 items)</td>
<td>13.7 (6.3)</td>
<td>0.0–29.0</td>
<td>0.93</td>
</tr>
<tr>
<td>Efficiency (3 items)</td>
<td>4.2 (1.9)</td>
<td>0.0–9.0</td>
<td>0.76</td>
</tr>
<tr>
<td>Administration (9 items)</td>
<td>12.3 (4.8)</td>
<td>0.0–24.0</td>
<td>0.89</td>
</tr>
<tr>
<td>Resources (6 items)</td>
<td>4.9 (5.4)</td>
<td>0.0–29.0</td>
<td>0.86</td>
</tr>
<tr>
<td>Partnership synergy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synergy (9 items)</td>
<td>9.4 (4.8)</td>
<td>0.0–23.0</td>
<td>0.93</td>
</tr>
<tr>
<td>Partnership effectiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACIC (34 items)</td>
<td>6.5 (1.4)</td>
<td>3.0–10.0</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Table 3 Correlations between partnership functioning, synergy and effectiveness

<table>
<thead>
<tr>
<th></th>
<th>Leadership</th>
<th>Efficiency</th>
<th>Administration</th>
<th>Resources</th>
<th>Synergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnership functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>0.522***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>0.700***</td>
<td>0.551***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>0.578***</td>
<td>0.512***</td>
<td>0.619***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partnership synergy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synergy</td>
<td>0.622***</td>
<td>0.512***</td>
<td>0.535***</td>
<td>0.596***</td>
<td></td>
</tr>
<tr>
<td>Partnership effectiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACIC</td>
<td>0.435***</td>
<td>0.339***</td>
<td>0.360***</td>
<td>0.466***</td>
<td>0.483***</td>
</tr>
</tbody>
</table>

***$P < 0.001$ (two-tailed).

(partnership synergy, leadership) to 0.76 (partnership efficiency), indicating good reliability.

Table 3 displays the unadjusted relationships as assessed with Pearson’s correlation analysis. These results show that partnership functioning, synergy and effectiveness are all strongly related to each other (all at $P \leq 0.001$).

Table 4 shows the relationship between partnership functioning and partnerships effectiveness in chronic-illness care delivery (Step 1; Table 4). These results demonstrate that partnership effectiveness in delivering chronic-illness care was positively influenced by leadership ($\beta = 0.25; P \leq 0.01$) and resources ($\beta = 0.31; P \leq 0.001$). No significant relationship was found between efficiency, administration and effectiveness of disease-management partnership in chronic illness-care delivery. Table 4 Step 2 shows that after controlling for all variables of partnership functioning, partnership synergy still significantly affected partnership effectiveness in chronic-illness care delivery ($\beta = 0.25; P \leq 0.001$). In addition, the previously significant relationship between independent variable(s) of partnership functioning (leadership and resources) and the outcome variable (partnership effectiveness) weakened when the effects of the mediator (partnership synergy) entered the model; this finding supports partial mediation of partnership synergy on partnership effectiveness in chronic-illness care delivery [29].

Discussion

We hypothesized that the ability of disease-management partnerships to create partnership synergy is an essential factor for successful disease management. Therefore, this study aimed to investigate the relationship between disease-management partnership functioning, synergy and effectiveness in chronic-illness care delivery. The results showed a strong relationship between disease-management partnership functioning, synergy and effectiveness in chronic-illness care delivery. In addition, our study showed that partnership synergy acts as a mediator between disease-management partnership functioning and effectiveness in the delivery of chronic-illness care. The advantages achieved by partnerships with high levels of synergy are likely to enhance partnership effectiveness in prevention and health promotion that have been identified by other investigators [10, 30]. The innovative, holistic and grounded thinking of synergistic disease-management partnerships is reflected in the improved delivery of chronic-illness care. Partnerships that are capable of implementing comprehensive, multi-componential interventions are more likely to achieve substantial changes in disease-management outcomes, thereby meaningfully contributing to the delivery of health services and the improvement of population health.
Our study found a strong association between disease-management partnership resources and effectiveness in chronic-illness care delivery. In addition, we found that the direct effect of resources on effectiveness in chronic-illness care delivery was partly mediated by partnership synergy, which suggests a strong relationship between partnership synergy and resources. Straub et al. [36] also found that fostering equitable involvement by acknowledging and using members’ resources, in particular their knowledge and expertise, was valuable in achieving partnership synergy. Beyond basic resources, such as money, space, equipment and goods, disease-management partnerships need a broad array of skills and expertise to engage partners, support the collaboration process and perform and coordinate the multiple components of their interventions. Such skills may include communications, information technology, management, evaluation, cultural competency, public policy and training. Information, which forms the basis for joint problem-solving, is also an essential resource for achieving synergy [11]. The types of information that partnerships need go beyond statistical data to include the perspectives, values and ideas of different stakeholders and community groups, as well as information about the community’s assets, political environment and history. The ability of collaboration to bring together different types of information, such as scientific data from various disciplines and the perceptions of
diverse community groups, is a great source of strength of partnership synergy.

The limitations of this study should be considered when interpreting the findings. Most importantly, the data collected were cross sectional; as a result, causal relationships among dimensions of disease-management partnership functioning, synergy and effectiveness could not be inferred. Until such a pathway is established, it will not be possible to confirm that synergy is a key mechanism through which disease-management partnerships gain advantage over single agents in addressing health and health-system issues. Furthermore, we investigated 22 disease-management partnerships only, and were unable to find multi-level effects. Future research in large-scale settings is necessary to investigate the possible influence of the nested structure on our study findings. The sample of partnerships participating in the study was a convenience sample and not a random sample. In addition, we were unable to include clinical outcomes of chronically ill patients. Future research should include these to investigate the relationship between disease-management partnership functioning, synergy and effectiveness in improving patient outcomes.

In conclusion, these exploratory results provide some support for the theoretically proposed associations between partnership functioning, synergy and the delivery of chronic-illness care. Disease-management partnerships seem better able to deliver higher levels of chronic-illness care when synergy is created between participating professionals. In turn, partnership synergy and effectiveness in the delivery of chronic illness care are more likely to emerge when disease-management partnerships have boundary-spanning leaders who understand and appreciate partners’ different perspectives, are able to bridge their diverse cultures and are comfortable sharing ideas, resources and power. In addition, the acknowledgement of and ability to use members’ resources are valuable in ensuring partners’ involvement and achieving synergy and effectiveness in disease-management partnerships.

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References


