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Evaluation of a Chronic Disease Self-Management Program in Singapore

Hange Namrata[1], Fan Xinyue[2], Liao Weifen[3] and Yang Kok Soong[1]*

[1]Department of Epidemiology, Ng Teng Fong General Hospital & Jurong Community Hospital, Singapore

[2]Department of Medicine, Ng Teng Fong General Hospital & Jurong Community Hospital, Singapore

[3]Department of Allied Health, Ng Teng Fong General Hospital & Jurong Community Hospital, Singapore

Abstract

Objective: To evaluate the effectiveness of a chronic disease self-management program (CDSMP) in Singapore.

Methodology: A quasi-experimental pre-post study design with 50 participants who had at least one chronic disease managed at a family clinic. Measures related to self-management efficacy were documented at baseline and 6 months post-implementation.

Results: Participants reported less pain (p=0.03) and shortness of breath (p=0.02) and a general improvement in self-reported health (p= 0.02) as well as quality of life (p=0.01) in CDSMP post intervention 6 months phase.

Conclusions: The chronic disease self-management program is effective in improving self-management efficacy among patients with at least one chronic disease resulting in improvement in self-reported health and quality of life.

Keywords: Chronic disease self-management program; perceived health status; regional health systems

Introduction

Regional health care system has taken initiatives to address self-care management activities, for better and holistic care for patients in the community through integrations and partnership with primary care clinics, community organizations to address burden on healthcare, healthcare expenditure and quality of patient's life. Considering ageing along with increasing magnitude chronic diseases; activities are planned in focus on controlling modifiable lifestyle risk factors related to these chronic diseases

Chronic disease self-management program (CDSMP) is a community based patient-centred, educational program, based on Self-efficacy theory [1-3] which aims to empower participants to develop necessary skills for management of medical, social and emotional factors related to chronic conditions. This program offers workshops that involve weekly 2.5 hours sessions over six consecutive weeks. These sessions imparts education on topics such as healthy eating, exercise, cognitive symptom management, medication usage, problem-solving, goal-setting, and action planning [1,2,4]

Randomized trial conducted in 1440 participants for evaluation of effectiveness of CDSMP program for 6 months has shown improvement in health status; self-management behaviors such as exercise, cognitive symptom management [5,6]; while study conducted in 831 participants has shown statistically significant improvement in health distress, physician and emergency departments (ED) visits at 1 year. Overall evidences from published studies have shown reduction in healthcare utilization such as hospitalization and days spent in hospitalization through enhanced healthy behavior and health status in chronic disease patients in post intervention CDSMP phases [5-7]. Along with western countries, CDSMP has shown evidences for significant improvement in health status, self-management behaviors, and self-efficacy in managing chronic diseases in Asian and African countries with modification for eating habits and cultural factors [2,7]. CDSMP evaluated in Chinese population of Hong Kong and Shanghai, China has shown enhancement in self-efficacy, exercise behavior and effective use of cognitive methods for pain and symptoms management [8-10].

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Correspondence:
Namrata Hange, Epidemiology, Ng Teng Fong General Hospital & Jurong Community Hospital, Jurong Health Services, Singapore,
E-mail: namrath3@yahoo.co.in

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Singapore health system is delivering CDSMP Program at family care clinics in integration with staff from tertiary care hospitals. Though CDSMP has proven effective results for chronic diseases management in western world and few Asian countries. However, it remains unclear if these results can be replicated to Singapore context. This study was planned with aim to evaluate the effectiveness of the CDSMP on in terms of health outcomes (health status, self-management behaviors) and utilization of health services reflecting physical and mental health among Singaporean adults. In this article, a report of 6 month results of a longitudinal study is reported.

Methodology

This is longitudinal study with follow up at 6 months post-intervention phases adapted from the Stanford model of care conducted over duration June 2015- January 2016. This study was conducted at community based sites. Recruitment of participants took place in family care clinic through physicians and in house staff nurses. The participants were approached personally by clinic staff and updated on the study outline briefly. After getting verbal consent, CDSMP administrators contacted participants through telephone for further detailed information, consent for participation and arrangement for appointments. During the first consultation and prior to attend first CDSMP session, CDSMP administrators explained the patient about the aims, risk and details of the study. These participants were informed about their rights to withdraw participation at any point in time. Study invitation letter with the registration confirmation packet was given to the participant during first CDSMP session. Data was collected while during the first CDSMP session and 6 months after completion of the last training sessions. During first CDSMP session, these participants completed written informed consent and self-administrated questionnaire.

This questionnaire has been adopted from original CDSMP Stanford model questionnaire with two additional components on quality of life and a functional status. Chinese version of this questionnaire was developed and the conceptual equivalency of translation was tested by using back translation method. Inclusion criteria for participants was of age 18 years or older, at least one of the chronic disease condition and be able to attend physically the 6 sessions of CDSMP. Following participants were excluded from the participation such as participant with cognitive impairment, psychological disorder or advanced neurological disease, unable to attend more than 4 session of CDSMP, patient enrolled in any other patient education or self-help program in past 2 years. This study was approved by the NHG Domain Specific Review Board (*DSRB*). Participation was voluntary and written consent was obtained prior to baseline assessment. Confidentiality of the data was assured to the participant during consent taking. The data will be discarded after 6 years of completion of this study.

The intervention included six sessions conducted over duration of six consecutive weeks for 2.5 to 3 hours each. Each session had attendance of 10 to 15 participants of mixed ages and diagnoses, including family members occasionally. All CDSMP sessions were scheduled in primary care clinic with help of two local paramedical facilitators. Two paramedical facilitators were trained from Stanford University and these master trainers trained another 12 staff. All session were conducted under supervision of master trainers. Session was conducted in Chinese and partly English. The topics covered in CDSMP sessions included such as exercise; nutrition; symptom management, relaxation skills, medication use and compliance, communication, self-management skills and problem solving skills.

Table 1: Baseline characteristics (N =50).

Characteristic	Percentages (%)
Co-morbidity (> 1 disease condition)	62%
Gender : Women	65%
Self-reported chronic disease conditions	Percentages (%)
Hypertension	66%
Diabetes	48%
Hyperlipidaemia	36%
Arthritis	9%
Asthma	7%

Study was focused on measuring self-reported health status measures (health distress, self-rated health, illness, fatigue, pain ,shortness of breath, stress and sleeping pattern), health behaviors (aerobic exercises, stretching exercises and communications with physician), and health care utilization measures (physician visits, emergency visits and length of stay in hospitalizations) during last past 6 months. For participants with baseline and 6 month measures, *t*-test was used to determine if measures changed significantly over that period. Matched-pair *t*-test was used to test for changes in health status, utilization, and self-efficacy between baseline and 6 months post intervention. Wilcoxon signed rank test was used for data with abnormal distribution and ordinal variable. P value of 0.05 was used for statistical tests.

Results

This CDSMP Session recruited and assessed 50 participants at baseline phases and post-intervention 6-months follow-up, respectively. Although not all participants provided data on all outcomes at each time point. Sixty five percentage of the participants were female (n = 32), with an average age of 61 years. More than 50% of population was in range of 61-70 years while 80% of population was in range of 51-70 years. Self-reported diagnosis included hypertension (66%) followed by diabetes (48%), hyperlipidaemia (37%), arthritis (9%) and asthma (7%). 62% participants had multiple chronic conditions. Average attendance for CDSMP session was 5.5 (Table 1).

There was statistically significant improvement in self-reported health from baseline 66% participants to 80% in post-intervention 6 months phase (p= 0.02). There was statistically significant reduction in pain scores from baseline 3.24 to post-intervention phases 2.84 (p=0.03).There was statistically significant reduction for number of participants reporting shortness of breath (p=0.02). There was statistically significant improvement in feeling; especially for focus from baseline (0.02) and feeling down (0.05). Overall, there was clinically significant enhanced positive feeling in post intervention phases.

Although statistical**ly** significant changes were not found in the indicators of the utilization of health services (ED visits, hospitalizations and night spent in hospital), trends of a reduction in usage were noted. Medication noncompliance significantly declined from 33% from baseline to 22% in post intervention 6 month CDSMP Phase. This decline was statistically significant (p=0.05). More than half of the participants who had reported problem in remembering timing of medication at baseline improved at 6 months post intervention phase (p=0.03). Overall there was statistically

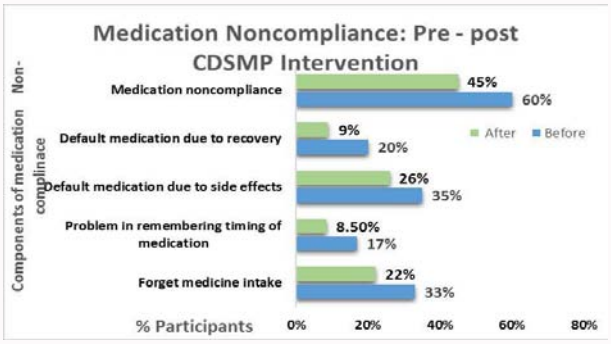

Figure 1: Medication noncompliance: Pre- Post CDSMP intervention.

significant post-intervention improvement in medication compliance (p=0.04). Participants who defaulted medicine despite of recovery significantly declined from baseline 35% to 26% in post intervention phase (p=0.04). Participants who defaulted medication due to side effects statistically significantly declined from baseline 20% to 9% in post intervention phase(p=0.05). Overall there was statistically significantly decline from 60% baseline to 45% in post intervention phase in medication non-compliance (P=0.04) (Figure 1).

There was statistically significant improvement in mobility in 6 months post-intervention phase (P=0.05). Compared with their baseline status, participants showed statistically significant reduction in pain (P=0.01) and anxiety (P=0.04) .Overall, there is statistically significant improvement in Quality of life score in 6 months post-intervention phase (p=0.001) (Table 2).

Discussion

The adaptation of CDSMP material and questionnaire to local context and local language has facilitated intense interaction among the participants; leading to better involvement and understanding of the subject among CDSMP participants [11]. CDSMP appears to be effective in persons with single or multiple chronic diseases conditions in Singaporean population as consistent with studies done in the German and Chinese population [9,11]. This study has addressed short term changes in CDSMP 6 months post intervention phases.

As reported in this study, participants reported enhancement of positive feelings through improving focus and decreasing negative feelings such as feeling down. Similarly to the UK's and Japan's CDSMP session's output, current CDSMP session has effectively improved self-reported of general health, self-efficacy and health-related quality of life from baseline [6,12]. This session seems to boost up confidence for medication management and improved communication with physicians. This indirectly appears to be reflected in effective symptoms management, leading to reduction in ED visits and hospitalizations. These factors such as health care resources utilization, symptoms management and positive mental health all together appears to improve quality of life in CDSMP participants in Singapore. Despite various tertiary care hospitals are conducting CDSMP program in Singapore, this is the first study addressing evaluation of a self-management educational intervention for persons with one or multiple conditions in Singapore population. Despite chronic diseases management program expected to give results over the years; but the results of these study prove effectiveness over 6 months period. These results shared with participants in a platform; that will help them to keep them motivate and enhance self-management technique (Figure 2).

It is important to acknowledge several limitations in this study. A major limitation of the study is the inherent problems of using quasi-experimental design, which limits the external and internal validity of study findings. The absence of a control group to determine relative risk reduction makes it hard to determine that "improvements" are only due to the intervention. Randomized controlled trials will be beneficial relating these changes in health behavior due to CDSMP Sessions. Secondly, these health behaviors as well health service utilization data are self-reported, leading to reference bias. Future research on CDSMP should explore longer term outcomes, their effect on clinical measure of disease in Singaporean population. In future, application of this CDSMP session in various close districts is under pipeline to check statistically significant improvement in large sample

Table 2: Baseline and Six-Month post intervention CDSMP phases: Health Behaviors, Health Status and Health Service Utilization.

	Baseline Mean values (SD)	Post-intervention Mean values (SD)	P value	Effect Size (from Baseline)
1) Health behavior: Physical activity:				
Aerobic Exercise (In minutes)	121(136.44)	122(136.83)	0.62	0.09
Strengthening exercise (In Days)	3.1 (2.15)	2.6(2.16)	0.60	0.16
Health behavior: Medication compliance	1.0 (1.1)	0.64(0.87)	0.05	0.37
2) Health status				
Self-rated health (1-5,↓ = better)	3.32(0.83)	2.94(0.63)	**0.02**	0.42
Symptoms : Pain (0-10 ,↓ = better)	3.52(2.95)	2.39(2.12)	**0.03**	0.39
Quality of life : Pain (0-5,↓ = better)	1.76(.55)	1.44(.50)	**0.008**	0.51
Quality of life Scores Total	6.5 (1.19)	5.9(1.03)	**0.01**	0.46
Feeling: Feeling down (0-3,↓ = better)	0.43(.63)	0.23(.57)	**0.05**	0.37
Feeling: Low focus (0-3,↓ = better)	0.26(.58)	0.03(.18)	**0.02**	0.45
Feelings (Total score)	2.91(3.43)	2.22(2.3)	0.24	0.23
3) Health service utilization (Past 6 months)				
Physician Visits	2.59 (3.02)	3.07(5.9)	0.9	-0.08
Night spent in hospitalization	0.14(0.59)	0.11(.57)	0.78	0.04

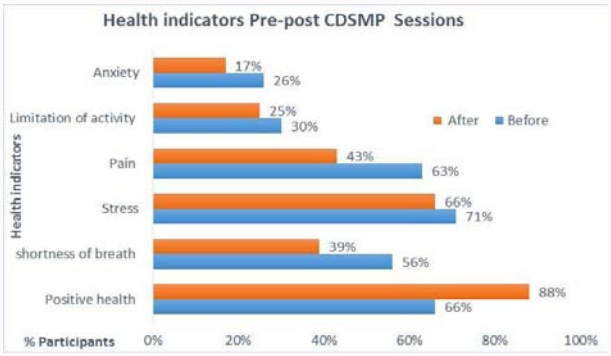

Figure 2: Comparison of pre -post CDSMP intervention.

size of populations. Disease specific CDSMP sessions addressing diabetes, asthma and hypertension are under consideration to handling related confounding.

Conclusion

This study has evaluated short-term effectiveness of the CDSMP implemented in Singapore, in terms health status and behaviors at baseline and 6 months post intervention phases. Chronic disease self-management program modified in local context proves effectiveness in improving self-efficacy among patients with at least one chronic disease resulting in improvement in self-reported health and quality of life. This feasible, locally modified health intervention has helped to improve health status through decreasing hospitalization and ultimately reducing burden on health care. Considering short-term effectiveness CDSMP has well addressed mental health components, leading to positive mental health, improved health status and better quality of life ultimately reducing healthcare utilization. This component will keep motivation for self-management of health related risk factors for preventing or delaying disease progression in Singaporean population. These findings suggest that the Chronic Disease Self-management Program can be effective for Singaporean people with one or multiple chronic conditions.

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