




Effects of Qigong exercise and its dose-response relationship in reducing fatigue for patients with Chronic Fatigue Syndrome: A randomized waitlist-controlled trial

Jessie S. M. CHAN
MPH, PhD candidate
Centre on Behavioral Health
Department of Social Work and Social Administration
The University of Hong Kong



Outline

- **Background**
 - CF/CFS
 - Qigong and TCM
- **Methods**
 - Study design
 - Subjects
 - Data collection and data analysis
- **Results**
- **Conclusion**



Background

CF/CFS

- Fatigue is a common problem
- Chronic Fatigue (CF): fatigue or exhaustion for 6 months or longer
- Chronic Fatigue Syndrome (CFS)
 - Unexplained persistent fatigue at least 6 months
 - No definite effective treatment yet
- The prevalence of CF/CFS in general population is much higher than in clinical population

(Lee, et al, 2000; van't Leven, et al, 2009; Yiu, et al, 2005)

Diagnosis criteria (CDC) for CFS

1. Unexplained, persistent fatigue

2. Four or more of the following symptoms for 6 months or more:

Impaired memory
or concentration

Postexertional
malaise

Unrefreshing
sleep

Muscle pain

Sore throat

Multi-joint pain

Tender
lymph nodes

Headaches

(According to: US Centers for Disease Control and Prevention (CDC))

Exclusion criteria

- Any active medical condition that may explain CF (eg. Sleep apnoea or side-effects of medication)
- Any previously-diagnosed medical conditions (eg. Hepatitis B or C)
- Major depressive disorder, any bipolar affective disorder, schizophrenia
- Alcoholism or other substance abuse
- Severe obesity

CFS-like illness

- **CFS-like illness**

- Only based on self-reported fatigue characteristics, symptoms and medical history
- Approximate criteria for CFS
- No confirm clinical examination

(Steel, 1998)

- May contain people with **CF or CFS**
- A large part of the patients with CF/CFS in the community remains unrecognized by the general practitioners

(van't Leven, et al., 2009)

Current treatments for CFS

- Western treatments and medications are often associated with limited clinical benefits
(Huibers et al., 2004)
- Some may even experience undesirable side-effects
(Chen et al, 2010)
- Complementary and alternative therapies are often used by individuals with CF/CFS to manage their symptoms
(Afari et al., 2000; Porter et al, 2010)
- Only cognitive behavior therapy and graded exercise therapy can be effective in treating fatigue and associated symptoms
(Afari & Buchwald, 2003)

Grated exercise therapy (GET)

- Too-vigorous exercise may
 - damage the immune system and increase oxidative stress
 - lead to an increase in fatigue and musculoskeletal pain

(Jammes, et al., 2005; Niji, et al., 2008a; Sorensen et al., 2003)
- Exercise limit can prevent post-exertional malaise for people with CFS (Niji, et al., 2008b)
- Diaphragmatic breathing in meditation can reduce exercise-induced oxidative stress

(Martarelli, et al., 2009)

Qigong

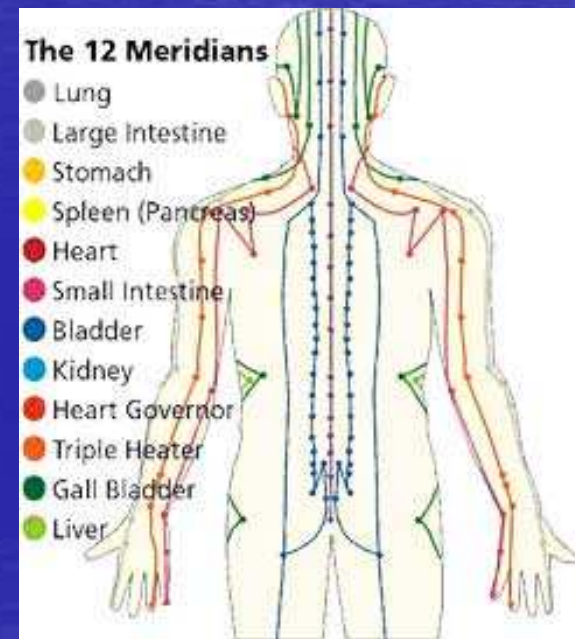
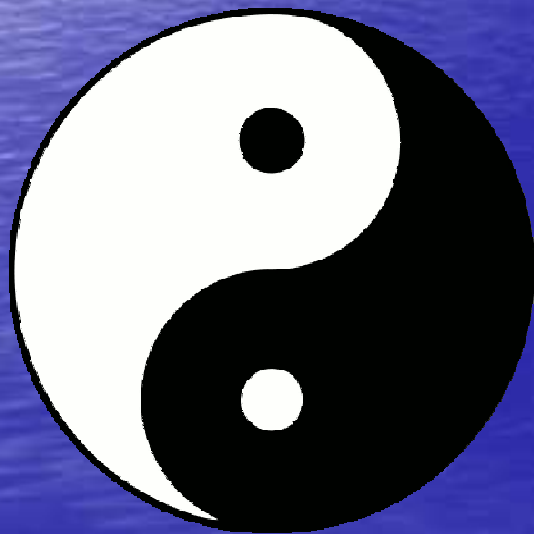
- Qigong is an ancient art of self-healing exercise
 - mind regulation
 - body regulation
 - breath regulation
- Qigong includes
 - Gentle mind-body exercise
 - Meditation



(Manek & Lin, 2012)

Traditional Chinese Medicine (TCM)

- Qigong focuses on the balance between yin and yang, as well as smoothing the circulation of qi (vital energy) in meridian system (Qi vital energy channel) of the human body



Traditional Chinese Medicine (TCM)

From the perspective of TCM:

- CF/CFS is caused by blood stasis due to Qi (vital energy) deficiency
- Stimulation of the blood and Qi circulation (行氣活血) is the core treatment strategy for CF/CFS

Few studies on Qigong and CF/CFS

- Qigong exercise has been applied in two pilot studies for the treatment of CF/CFS
 - Desirable effects were found
 - The effects of Qigong should be further tested in large-scale RCTs
- (Craske, et al, 2009; Dybwad, 2007)
- To the best of our knowledge, no study on dose-response relationship of Qigong and CF/CFS

Our previous study

- Our Previous Randomized Controlled Trails (RCT) (n=114) has demonstrated that
- Qigong exercise had short-term effect in
 - Reducing fatigue
 - Improving quality of life
 - Improving the spiritual wellbeing

(Chan JSM, et al. (Abstract) Annals of Behavioral Medicine, s224, 2011)

Objectives

- To assess the effects of Qigong exercise on fatigue, quality of life and spiritual wellbeing of people with CF/CFS to confirm our previous results
- To investigate the dose-response relationship and give some guidelines on frequency and duration of Qigong exercise in treatment of CF/CFS.

Significance of study

- The prognosis for untreated CFS is poor
- Better outcome is predicted by less-severe fatigue at baseline (Cairns & Hotopf, 2005)
- Early detection and treatment in the community
 - prevent the deterioration
 - also reduce the future healthcare and socioeconomic burdens



Methods

A community based study

- Press conference to promote the study and recruit subjects



Study design

- Randomized waitlist-controlled trial
- On-line screening questionnaire
- **Subjects:**
 - Adults aged 18-55 years old
 - Had CFS symptoms based on self-reported symptoms and medical history by online screening questionnaire based on CDC CFS criteria
 - Without medical examination by physicians

Sample size calculation

Assuming treatment effect =3 and SD=5
according to previous local CFS study
(Yiu, et al, 2007)

- To achieve 80% power at significant level of 0.05
 - 53 subjects required in each group
- Assuming 30% dropout rate
 - At least **76** required in each group

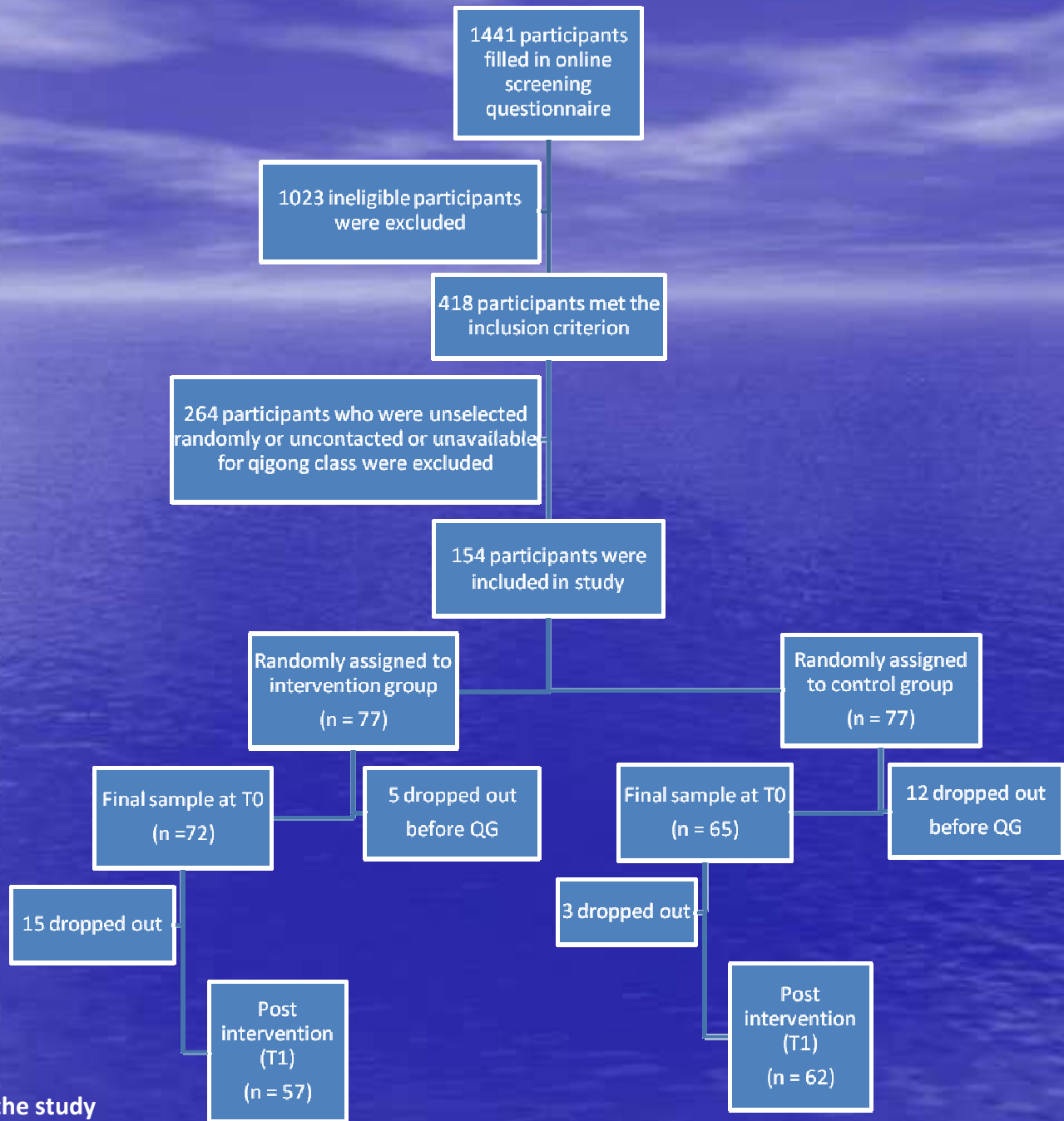
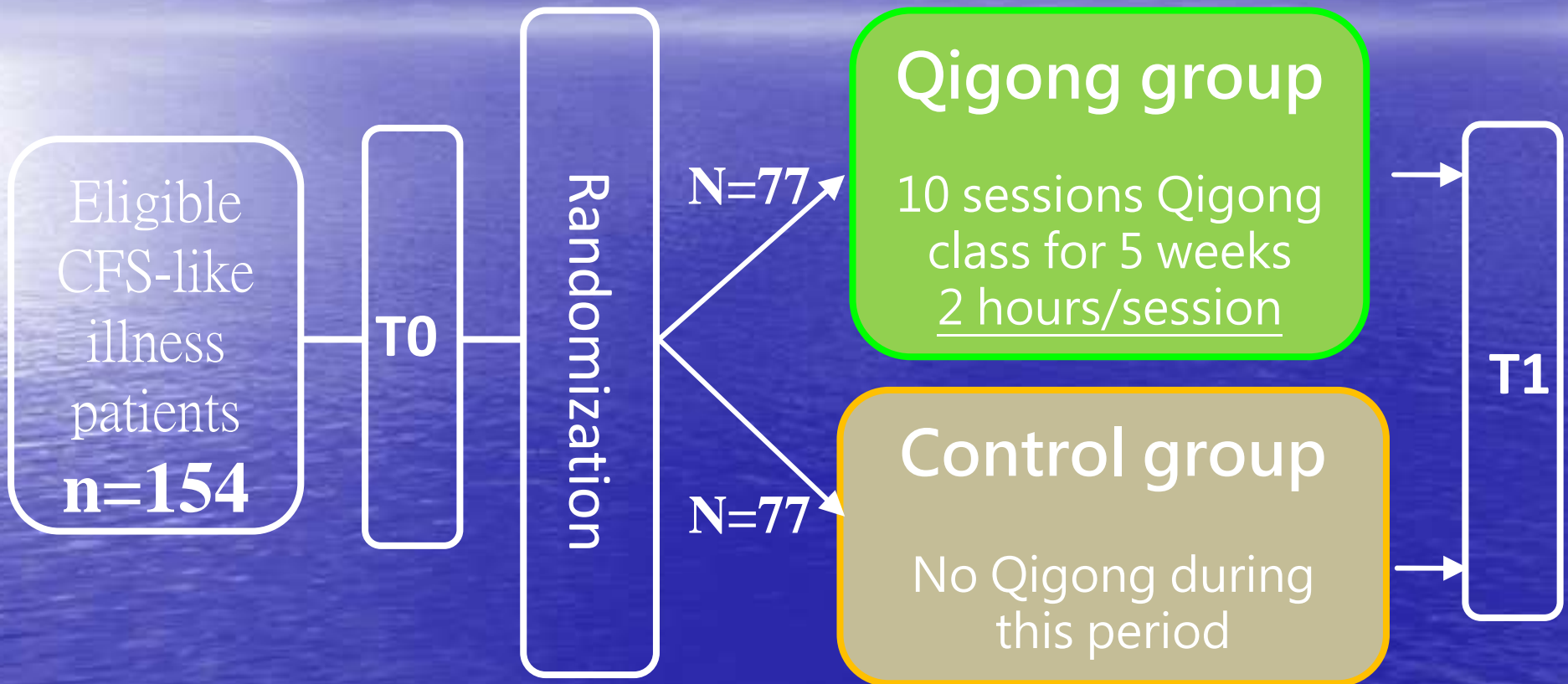


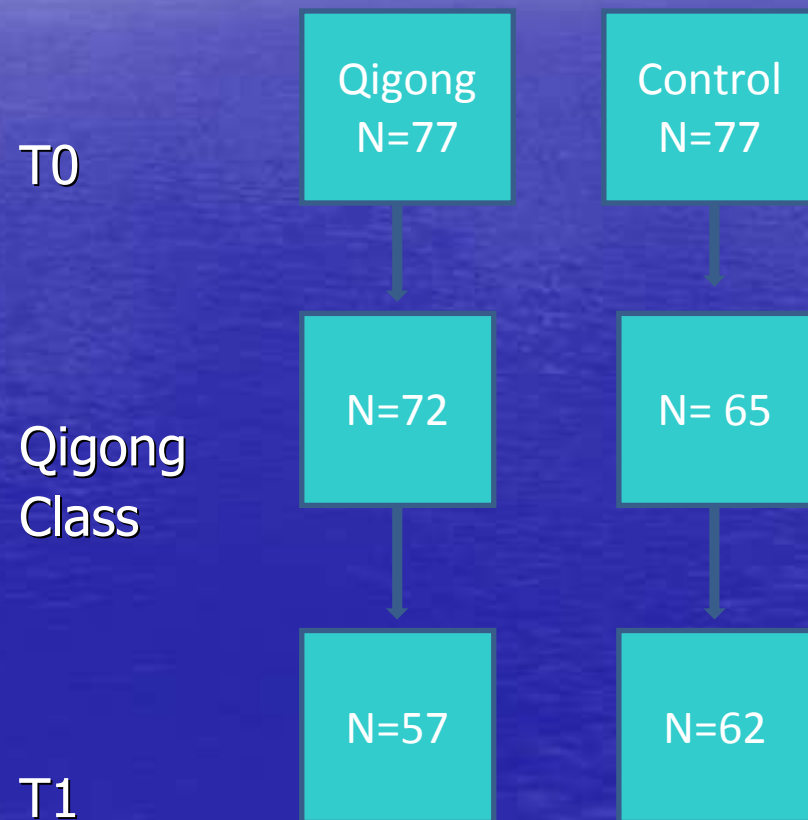
Figure1: Flow chart of participants into the study

Study design



Final sample in data analysis

- **At T0:**
 - 77 in Intervention group
 - 77 in control group
- **Qigong class:**
 - 5 dropped in Qigong group
 - 12 dropped in control group
- **At T1:**
 - 15 dropped out
 - 3 dropped out



Intervention

- 10 sessions of Qigong exercise (wu xing ping heng gong, 五行平衡功) class
- 2 hours per session, and twice a week for 5 weeks
- Self practice (15 – 30 minutes per day) at home
- Two parts
 - Movement exercise (10 forms)
 - Meditation



Outcome measurements

- Primary outcome: Chalder's Fatigue (CF) scale (14 items)
(Chalder, et al, 1993; Wong, 2010)
 - Total fatigue score: sum of all items
 - Physical fatigue: sum of items 1 - 8
 - Mental fatigue: sum of items of 9 - 14
- Quality of life: SF-12 Health Survey Questionnaire (12 items)
(Ware, 1996; Lam, 2005)
 - Physical Component Summary (PCS)
 - Mental Component Summary (MCS)
- Body-Mind-Spirit integrative well-being (BMSIWB)-Spirituality (13 items)
 - Tranquility
 - Disorientation
 - Resilience

(Ng, S.M, et al., 2005)

Data collection and analysis

- Data including
 - Demographic data
 - Lifestyle
 - Chalder's fatigue
 - SF-12
 - BMSIWB-Spiritualityby the online questionnaire
- Two time points
 - Baseline (T0)
 - Post-training (T1)
- After Qigong class
 - Frequency and duration of self-Qigong practice

- **Comparison**

- Intervention and control groups
- In Qigong group
 - ≥ 3 days / week
vs < 3 days / week
 - ≥ 30 minutes/time
vs < 30 minutes/time

By

- Chi-squared test for categorical data
- T-test for continuous data
- Data analysis was conducted by SPSS18



Results

Table 1 Patients' demographic information and lifestyles at baseline (n = 137)

Demographic	Intervention (n = 72)		Control (n = 65)		P*
	Mean (SD)	N (%)	Mean (SD)	N (%)	
Age (years)	42.4 (6.7)		42.5 (6.4)		.979
Gender					
Female		52 (72.2%)		53 (81.5%)	.198
Employment					
Full-time		55 (76.4%)		52 (80.0%)	
Part-time		3 (4.2%)		1 (1.5%)	
Housewife		9 (12.5%)		10 (15.4%)	.629
Unemployed		4 (5.6%)		1 (1.5%)	
Other		1 (1.4%)		1 (1.5%)	
Education					
Secondary school		31 (43.1%)		33 (50.8%)	
Tertiary or above		41 (56.9%)		32 (49.2%)	.366
Marital status					
Single		21 (29.2%)		23 (35.4%)	
Married/cohabiting		46 (63.9%)		38 (58.5%)	.738
Divorced/separated /widowed		5 (6.9%)		4 (6.2%)	
Have religion					
Yes		21 (29.2%)		24 (36.9%)	.334
Lifestyles					
Do exercise regularly		19 (26.4%)		17 (26.2%)	.975
Smoking		6 (8.3%)		2 (3.1%)	.190
Alcohol drinking	5.0 (1.8)	31 (43.1%)	4.7 (2.2)	22 (33.8%)	.269
Sleep time (hours)					.434

* Chi-squared test for categorical variable and T-test for continuous variable

Table 2 Comparison of Chalder's fatigue (CF) scale, Quality of life (SF-12) and BMSIWB-spirituality between two groups at T0 and T1 (n = 137)

	Intervention (n = 72)	Control (n = 65)	P*
	Mean (SD)	Mean (SD)	
CF total score			
Baseline (T0)	39.7 (6.6)	39.8 (6.3)	.916
Post intervention (T1)	[15] 24.4 (12.0)	[3] 34.1 (8.8)	.000
T1 – T0	[15] -14.7 (10.3)	[3] -5.8 (7.3)	.000
CF physical score			
Baseline (T0)	24.7 (4.0)	24.6 (3.7)	.887
Post intervention (T1)	[15] 14.8 (7.4)	[3] 21.0 (5.2)	.000
T1 – T0	[15] -9.7 (6.5)	[3] -3.6 (4.2)	.000
CF mental score			
Baseline (T0)	15.0 (3.8)	15.2 (3.9)	.750
Post intervention (T1)	[15] 9.6 (5.5)	[3] 13.1 (4.6)	.000
T1 – T0	[15] -5.0 (4.7)	[3] -2.2 (3.7)	.000
SF-12-PCS score			
Baseline (T0)	36.4 (6.6)	35.8 (7.2)	.632
Post intervention (T1)	[15] 41.3 (7.0)	[3] 38.3 (7.6)	.026
T1 – T0	[15] 4.8 (7.0)	[3] 2.6 (5.9)	.072
SF-12-MCS score			
Baseline (T0)	32.4 (10.2)	33.5 (8.7)	.514
Post intervention (T1)	[15] 42.6 (8.5)	[3] 34.0 (9.1)	.000
T1 – T0	[15] 9.8 (11.9)	[3] 0.5 (8.1)	.000
BMS-Spirituality score			
Baseline (T0)	65.2 (25.8)	71.1 (23.7)	.167
Post intervention (T1)	[15] 80.2 (22.7)	[3] 71.9 (24.3)	.057
T1 – T0	[15] 14.4 (21.9)	[3] 0.4 (19.0)	.000

CF: Chalder's fatigue, PCS: physical component summary, MCS: mental component summary, BMS-spirituality: Body-Mind-Spirit-Spirituality * T-test, [Number of missing data]

Comparison between Qigong and control groups at T0 and T1

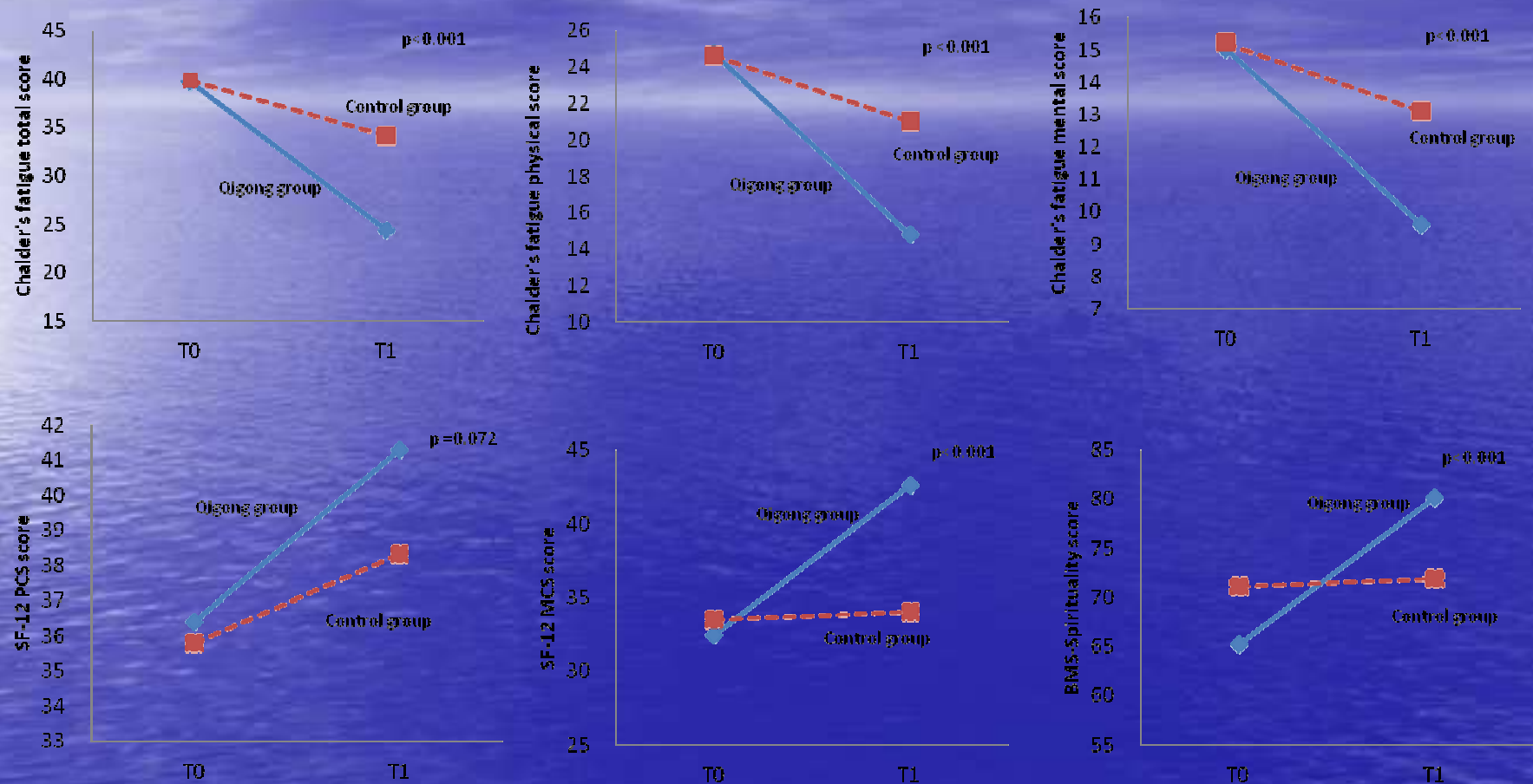


Figure 2 Comparison of outcomes between two groups at T0 and T1, with p-values for interaction effect of group*time

Table 3 Weekly self-practice Qigong at home during Qigong training in intervention group

Intervention group (n = 72)

Days of Qigong practice /week

No practice	4 (5.6%)
1 – 2 days	14 (19.4%)
3 – 4 days	20 (27.8%)
5 – 6 days	12 (16.7%)
Every day	6 (8.3%)
Missing	16 (22.2%)

Duration per time (minutes)

No practice	3 (4.3%)
< 15	6 (8.3%)
15 – 30	19 (26.4%)
30 – 45	23 (31.9%)
45 – 60	4 (5.6%)
> 60	1 (1.4%)
Missing	16 (22.2%)

Table 4 Comparison between groups by Qigong practice frequency per week and duration of Qigong practice per time

	Frequency of Qigong practice			Duration of Qigong practice		
	≥ 3 days/week	< 3 days/week	<i>P</i> *	≥ 30 minutes/time	< 30 minutes/time	<i>P</i> *
	(n = 38)	(n = 18)		(n = 28)	(n = 28)	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
CF total score						
Baseline (T0)	39.2 (6.0)	38.4 (7.4)	.702	38.8 (5.3)	39.0 (7.5)	.902
Post intervention (T1)	21.8 (11.2)	29.1 (12.3)	.032	20.9 (8.9)	27.4 (13.8)	.004
T1 – T0	-17.3 (8.9)	-9.3 (11.4)	.006	-17.9 (8.4)	-11.6 (11.3)	.021
CF physical score						
Baseline (T0)	24.4 (4.1)	24.3 (4.3)	.922	24.0 (3.8)	24.7 (4.4)	.561
Post intervention (T1)	13.1 (7.0)	17.9 (7.3)	.021	12.3 (5.5)	16.9 (8.4)	.020
T1 – T0	-11.3 (5.9)	-6.4 (6.7)	.007	-11.7 (5.5)	-7.8 (7.0)	.023
CF mental score						
Baseline (T0)	14.8 (3.7)	14.2 (4.0)	.585	14.8 (3.0)	14.4 (4.5)	.675
Post intervention (T1)	8.8 (5.2)	11.2 (5.7)	.117	8.6 (4.8)	10.5 (6.0)	.181
T1 – T0	-6.0 (4.1)	-2.9 (5.4)	.023	-6.2 (4.3)	-3.8 (5.0)	.059
SF-12-PCS score						
Baseline (T0)	36.3 (7.2)	36.8 (6.7)	.800	36.2 (7.5)	36.8 (6.6)	.744
Post intervention (T1)	42.1 (7.3)	39.2 (6.2)	.149	42.2 (6.6)	40.1 (7.4)	.269
T1 – T0	5.8 (6.9)	2.4 (7.1)	.089	6.0 (6.6)	3.3 (7.4)	.151
SF-12-MCS score						
Baseline (T0)	33.9 (10.5)	31.2 (10.1)	.362	35.9 (10.5)	30.1 (9.5)	.032
Post intervention (T1)	44.3 (8.1)	39.8 (8.2)	.058	44.6 (8.3)	41.1 (8.2)	.112
T1 – T0	10.4 (11.0)	8.6 (14.1)	.602	8.7 (11.4)	11.0 (12.6)	.475
BMSWBI-Spirituality						
Baseline (T0)	65.7 (27.5)	66.4 (22.2)	.922	66.2 (27.0)	65.7 (24.9)	.939
Post intervention (T1)	82.8 (23.3)	75.7 (21.5)	.275	83.5 (22.3)	77.5 (23.3)	.329
T1 – T0	17.1 (18.9)	9.2 (27.4)	.214	17.3 (19.8)	11.9 (24.2)	.359

CF: Chalder's Fatigue,

Comparison of outcomes between two groups by weekly frequency of Qigong practice at T0 and T1

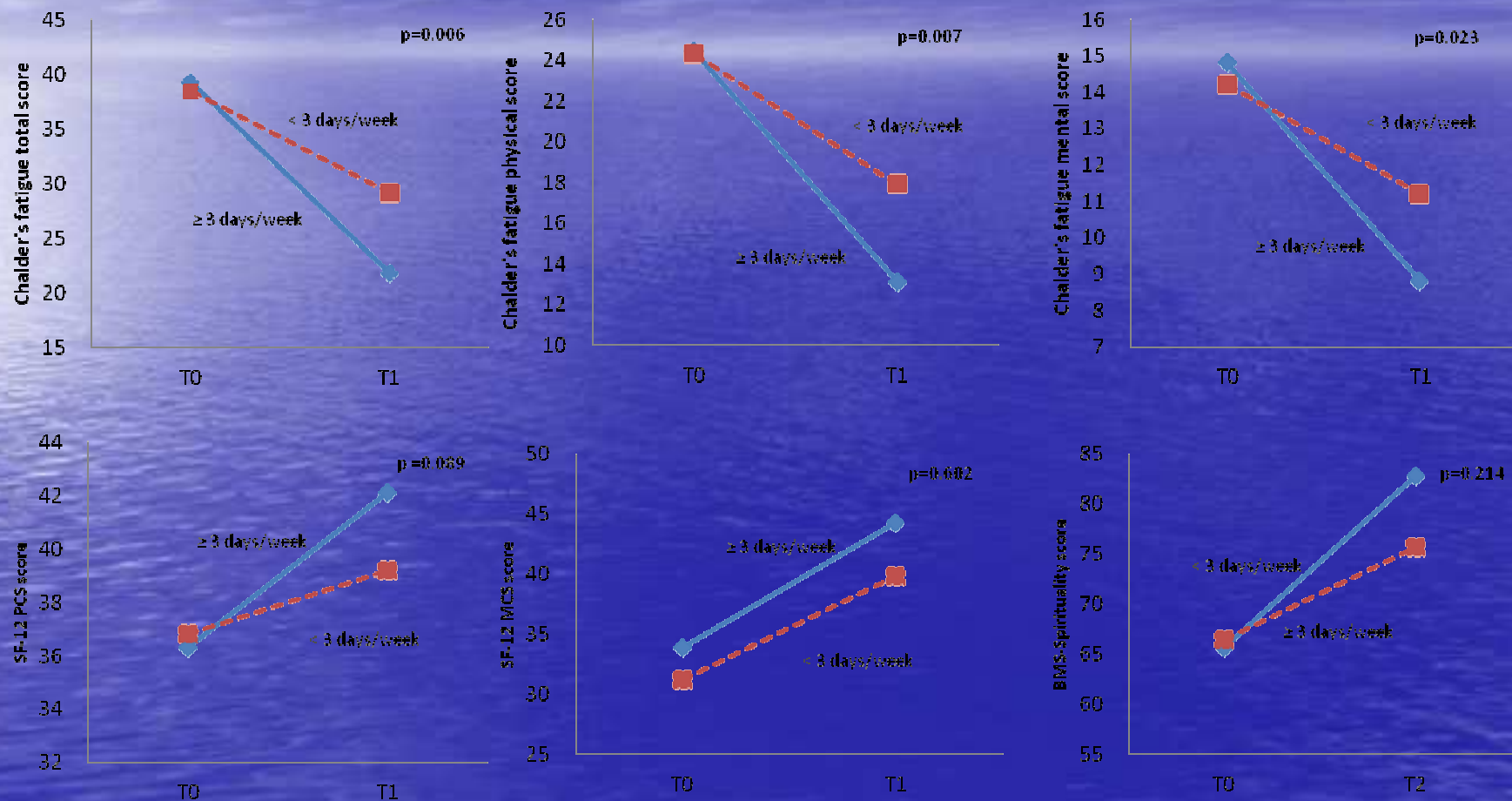


Figure 3 Comparison of outcomes between two groups by weekly frequency of Qigong practice at T0 and T1, with p-values for interaction effect of group*time

Comparison of outcomes between two groups by duration of Qigong practice per time at T0 and T1

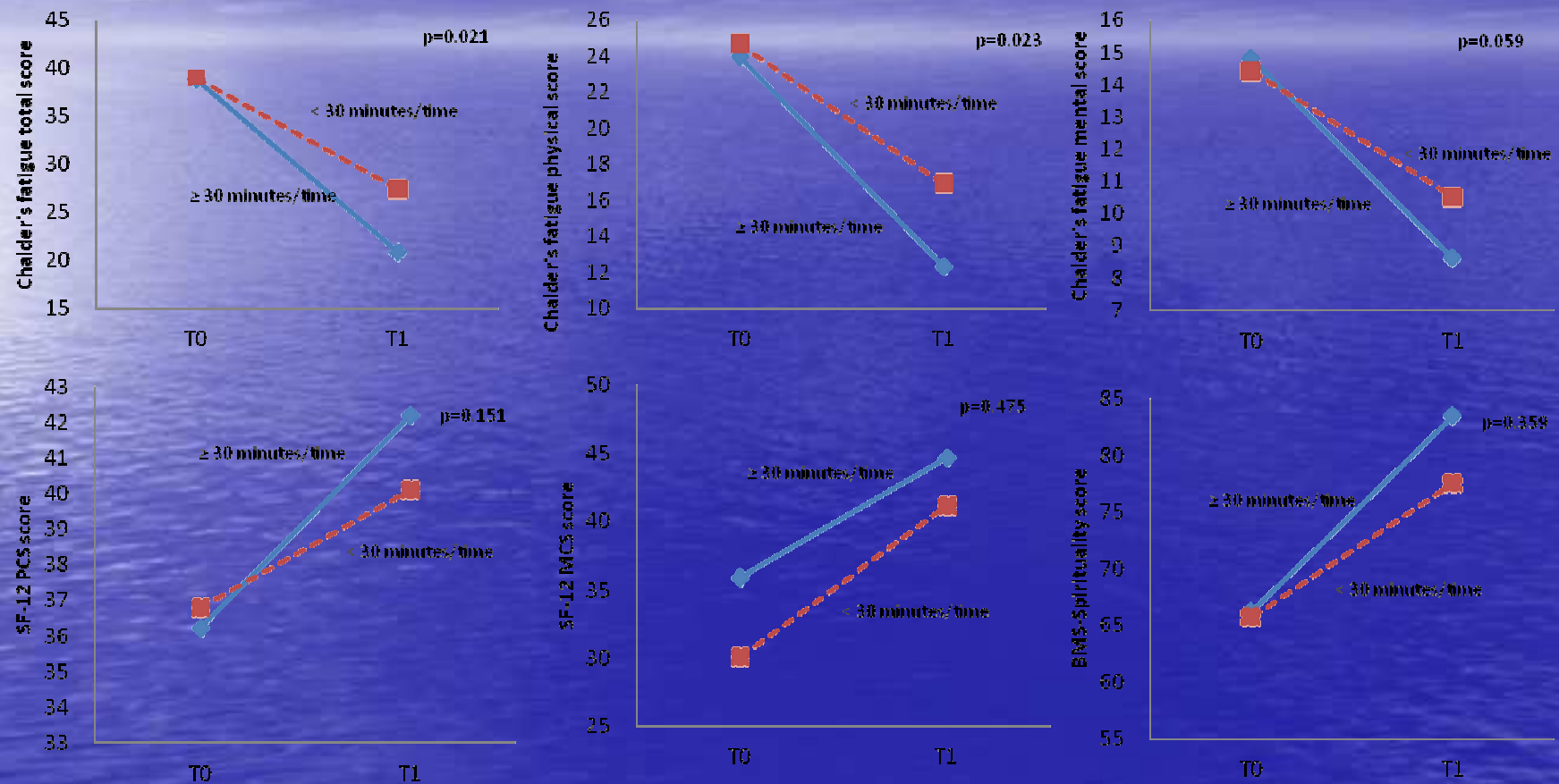


Figure 4 Comparison of outcomes between two groups by duration of Qigong practice per time at T0 and T1, with p-values for interaction effect of group*time

Strengths

- To the best of our knowledge, first study on dose-response relationship of Qigong and CF/CFS
- Large scale RCT
- Promising results
- May give the useful prescription guideline for clinicians and patients

Future direction

- Recruit the subjects fully meet the CDC criteria for CFS with medical examination
- Other exercise or health education in control group
 - To reduce social interaction effect
- Diary of self Qigong practice at home
- Record not only Qigong practice, but also other exercise practice in the daily life

Conclusions

- **Qigong exercise can help patients with CF/CFS reduce the level of fatigue.**
- **Qigong exercise can help improve mental health and spiritual wellbeing.**
- **A practice regimen of at least 3 days per week and at least 30 minutes each time may produce better results.**

Acknowledgments

- My supervisors
 - Prof. Cecilia L.W. Chan, PhD
 - Dr. Rainbow T.H. Ho, PhD
- Dr. Yuen L.P. Chinese clinician, MD. (Qigong Master)
- Dr. Jonathan S.T. Sham, MD, PhD
- Prof. So K.F., PhD
- Dr. Benson Liu, PhD
- My colleagues in Centre on Behavioral Health
- All staffs in International Association for Health and Yangsheng
- All participants in our Qigong study



Thank You!

Jessie S. M. CHAN

Email: chansm5@hku.hk, <http://cbh.hku.hk>

Centre on Behavioral Health

Department of Social Work and Social
Administration

The University of Hong Kong