Effectiveness of a Structured Physical Rehabilitation Program for Chinese Population with Depressive Disorders

Lau MYP [1], Ng MKR[2], Tsang WKA[2], Yu HSZ[3],Ng KM[2], Chan CT[2], Chau MWR[1], Lam MYMay[1], Tang LWF[1], Lo YKP[1], Lau WL P[1], Chan SHF[1], Lau WYM[4]

Physiotherapy Department, Kowloon Hospital[1] ; Department of Psychiatry, Kowloon Hospital[2] ; Department of Psychiatry, Kwai Chung Hospital[3];Physiotherapy Department, Kwai Chung Hospital[4]

HA Convention

15 May 2013

Depression

- closely related to ↓ physical fitness, exercise habit & social activity level (Hoffman et al.,2011)
- ↑ complaint of **pain** frequency & severity (Katona et al., 2005)
- **Exercise** - sig ↓ **the negative symptoms** (Hoffman et al.,2011; Mead et al.,2009; Rethorst, Wipfli & Landers,2009)
- **Socio-cultural influence** on manifestations of clinical signs & symptoms of mental health problems between Chinese & Western societies (Pearson & Liu, 2002; Pearson et al., 2002; Tam and Wong, 2007)
  - ↑ likelihood of somatization (Parker, Chan et al., 2005;Xiang et al., 2008)
  - avoid seeking help for psychiatric problems (Parker, Chan, et al.,2005)
- Paucity of published studies on the benefits of exercises in the management depressive disorders among Chinese population

Multi-centers Collaborative RCT - Physical Rehabilitation Program for Patients with Depressive Disorders

Aim of the study

- To investigate the effectiveness of a holistic, structured Physical Rehabilitation Program on improving the physical fitness and negative psychological symptoms for **Chinese patients** with mild to severe depressive disorders

Research Design

- Single-blind randomized controlled trial (RCT)

RCT Registration

Protocol Registration Receipt
02/23/2012

Effectiveness of a Structured Physical Rehabilitation Program for Chinese Patients With Depressive Disorders

This study is currently recruiting participants.

Verified by Dr. Lau Mo Yee Polly, Kowloon Hospital, Hong Kong, February 2012

Sponsor:	Kowloon Hospital, Hong Kong
Collaborators:	Kwai Chung Hospital, Hong Kong
Information provided by (Responsible Party):	Dr. Lau Mo Yee Polly, Kowloon Hospital, Hong Kong
ClinicalTrials.gov Identifier:	NCT01536756

US National Institute of Health (NIH), developed by the National Library of Medicine

ClinicalTrials.gov
Protocol Registration System

Methodology - Subjects

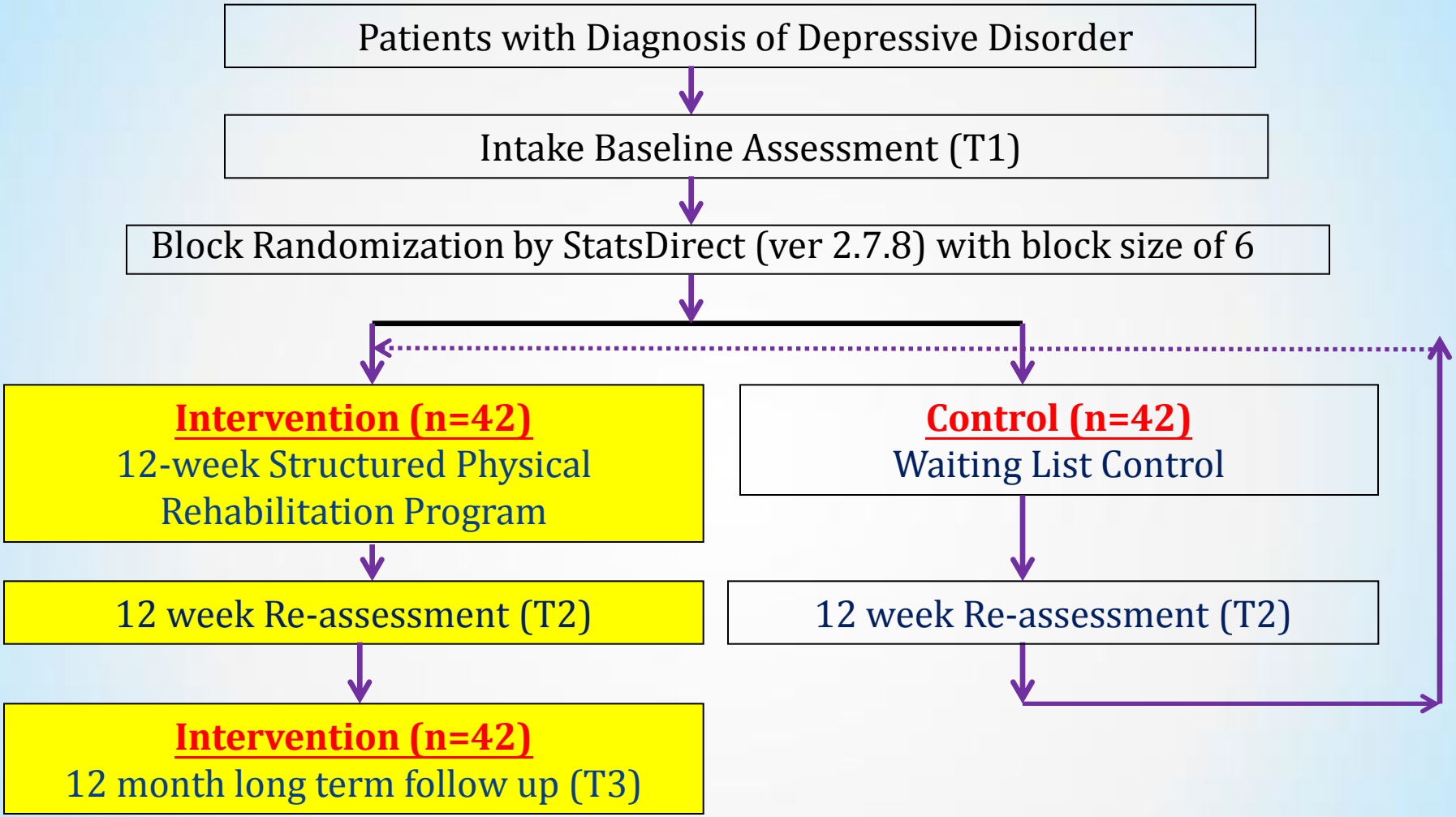
Inclusion Criteria

1. ages 18 to 64 adults
2. diagnosed depressive disorders of mild to severe severity (Diagnostic code: F32.0 to F33.9 of ICD 10)
3. referred from the Department of Psychiatry of Kowloon Hospital or Kwai Chung Hospital
4. able to read, write and understand Chinese
5. mentally capable of making written consent for participation of study

Exclusion Criteria

1. unstable medical and/or psychological states such as suicidal risk and aggressive impulses
2. severe cognitive, language, or hearing deficits
3. any orthopaedic problems or other diseases which limit physical fitness assessment

Study Design



Sample Size Calculation

- *Power Analysis & Sample Size Program* (PASS 2011, NCSS Statistical Software) with a priori power analysis
- α= 0.05 & power = 0.8 to detect a group difference of medium effect size in reduction of mental health symptoms score and increment in physical health parameters (Rampello et al., 2007; Mead et al., 2009; Rethorst, Wipfli and Landers, 2009)
- 20% of attrition rate suggested by previous articles (Blumenthal et al., 1999; Herman et al., 2002; Blumenthal et al., 2007)

Instrumentation - Physical outcome measures

1. **Body composition** -body mass index – BMI ($kg/m^{2)}$), % body fat by bioelectrical impedance analysis with Body Composition Analyzer (InBody R20®, Biospace Co., Ltd., Seoul, Korea.) (Eckerson et al.,1997; Sun et al.,2005)

2. **Flexibility** -sit & reach flexibility (cm) (ACSM,2010; Jackson & Baker,1986)

3. **Muscular endurance** -1-minute sit-up count (Brower, 2009; Durmus, Durmaz and Canturk, 2010)

Instrumentation - Physical outcome measures

4. Muscle strength

- hand grip strength by **JAMAR dynamometer** (kg), Digital Hand Dynamometer (Patterson Medical Supply, Inc., Bolingbrook, USA)(Castro-Pinero et al., 2009;Rantanen et al.,1999,2003;Tsang,2005)

- isometric quadriceps strength by **Hand Held Dynamometer** (HHD) (kg), Nicholas Manual Muscle Tester (Lafayette Instrument Co., Indiana, USA;Tsepis, Vagenas) (Giakas & Georgoulis, 2004; Hairi et al., 2010; Hebert et al., 2010;Singer et al., 2011)

5. Cardiovascular endurance -maximal oxygen consumption(VO_2 max-ml/kg/min;MET) by using **Submaximal Bike Test with FitMate** PRO (Cosmed, Rome, Italy) (ACSM,2010; Nieman et al., 2006,2007)

6. Physical functioning -Brief Pain Inventory – short form Chinese version (Wang, Mendoza, Gao and Cleeland,1996;Ger et al.,1999)

Self-rated pain assessment questionnaire for the assessment of pain-related functioning impairment in 7 daily activities, including general activity, walking, work, mood, enjoyment of life, relations with others and sleep (Range – 0-10; ↑ score, ↑ pain inferences)

Instrumentation - Mental Outcome Measures

1. **Depression, Anxiety, Stress Scale (DASS-21)** - Chinese version (情緒自評量表)

   (Brown, Chorpita, Korotitsch and Barlow, 1997;Ng et al., 2007; Taouk, Lovibond and Laube,2001)

   a set of 3 self-report scales designed to measure the negative emotional states of depression, anxiety and stress & recommended cut-off scores for conventional severity labels

- Each of the 3 DASS-21 sub-scales contains 7 items (range of each subscore=0-21; ↑ score, ↑ severity)
- Rated on 4-point severity or frequency scales to rate the extent

Domain / Severity	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	>28	>20	>34

Table 1- The recommended cut-off scores of the Chinese translated DASS-21for conventional severity labels

Intervention-
Physical Rehabilitation Program

- Intensity
  - 60-min training session; 3 times per week for 12-week
- Core element
  - aerobic exercise (ACSM,2010;NICE,2010)
  - resistance training (ACSM,2010;NICE,2010)
  - body awareness training (Olsson, Armelius & Aremelius, 2001)
  - crisis & stress management (Tsang, Chan & Cheung, 2008; Hofmann, Sawyer, Witt & Oh, 2010 ;Zautra, Fasman, Davis & Craig, 2010)
  - exercise habit coaching
- Auxiliary intervention for pain
  - Interferential therapy & hot pad (Ernst et al, 2011; Kim et al., 2009; Mead et al., 2009; Rethorst et al, 2009; Ruth & Vlack, 2010; YWatson, 2008; Yang et al, 2010;Zhou et al., 2010)

10-min Warm Up Exercise

10-min Cool Down Exercise

Stretching & mindful breathing for stress management (Zautra, Fasman, Davis & Craig, 2010).

40-min Circuit Training

Aerobic exercises for physical work up

3 sets of 10 repetitions

moderate level
- 50-70% of HR max

Strengthening exercises of major muscles groups

Statistical Analysis - Reliability

- Intraclass correlation coefficient ($ICC_{3,1}$) for the intra-rater test-retest reliability test-retest reliability of the physical outcome measures

Outcome measures	ICC value
BMI	1.00
% body fat	1.00
Sit and reach flexibility	0.97
1 minute sit-up count	0.99
Hand grip strength	0.99
Quadriceps strength	0.97
METS	0.92
VO_2 max	0.93

Good Reliability

Statistical Analysis

- Statistical Package for Social Sciences (SPSS) software, ver 19.0
- Descriptive statistics of means and range was used for the analysis of the demographic data
- Wilcoxon signed ranks test for within-group difference
- Mann-Whitney U test for between groups comparison
- Level of significance set at $p < 0.05$
- Intention-to-treat analysis

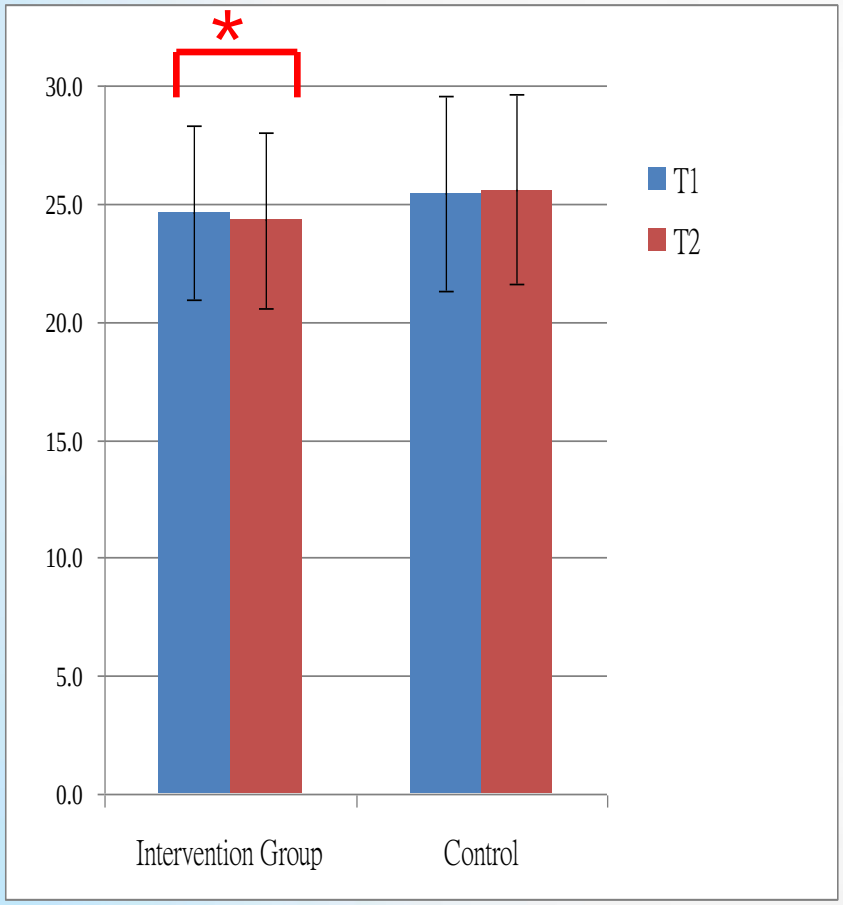
Result – Demographic data

	Intervention Group (n = 28)	Waiting Control (n = 25)
Age (yr), Mean (SD)	46.8(12.1)	46.9 (9.4)
Gender (%)		
Male	6 (21.4)	5 (20.0)
Female	22 (78.6)	20 (80.0)
Height m	1.58(0.1)	1.59(0.1)
Weight Kg	61.4 (10.6)	64.5(10.3)
Body Mass Index	24.6 (3.7)	25.4(4.1)

Comparable baseline characteristics with $p>0.05$

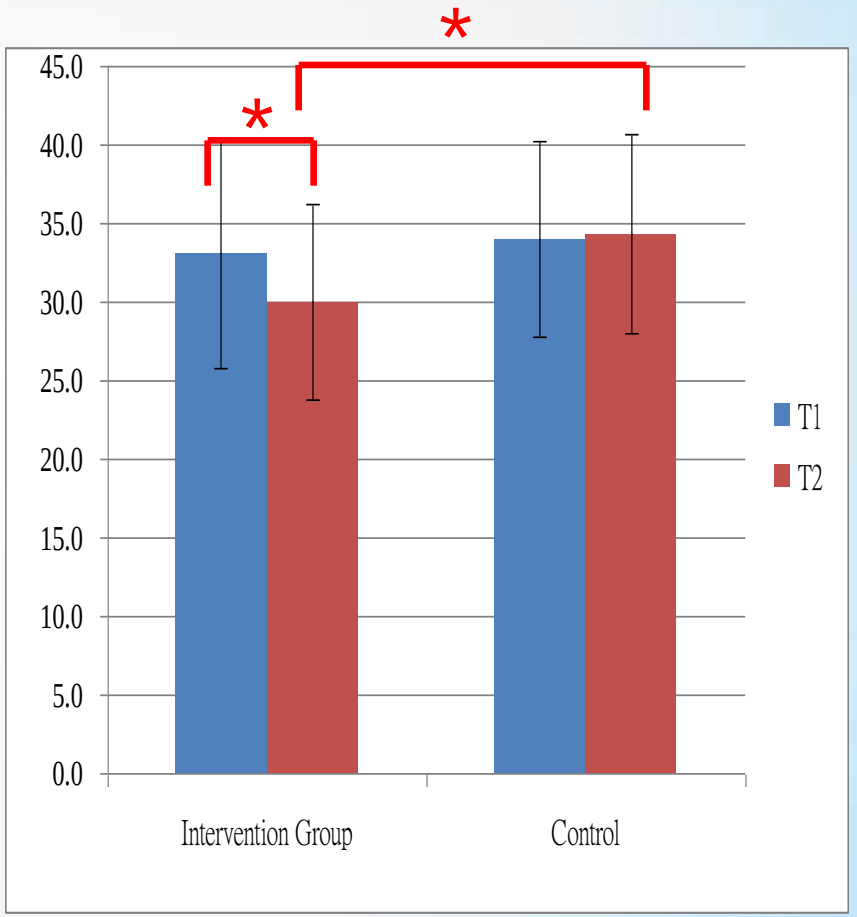
Result – Physical Outcomes (1)

BMI



1.2% ↓

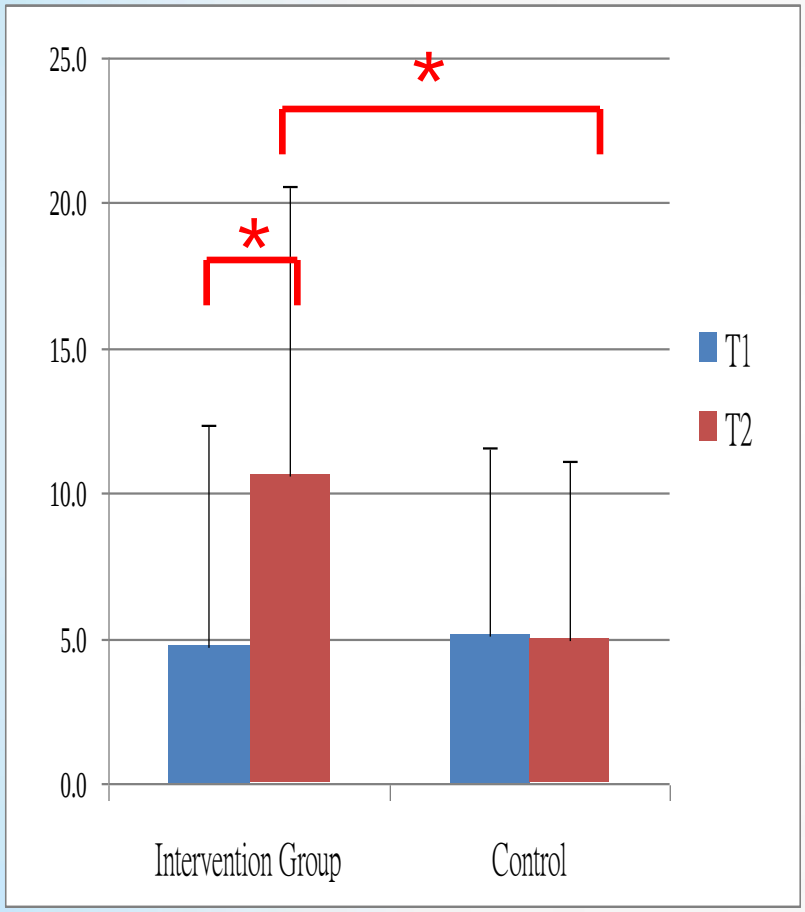
% Body Fat



9.3% ↓

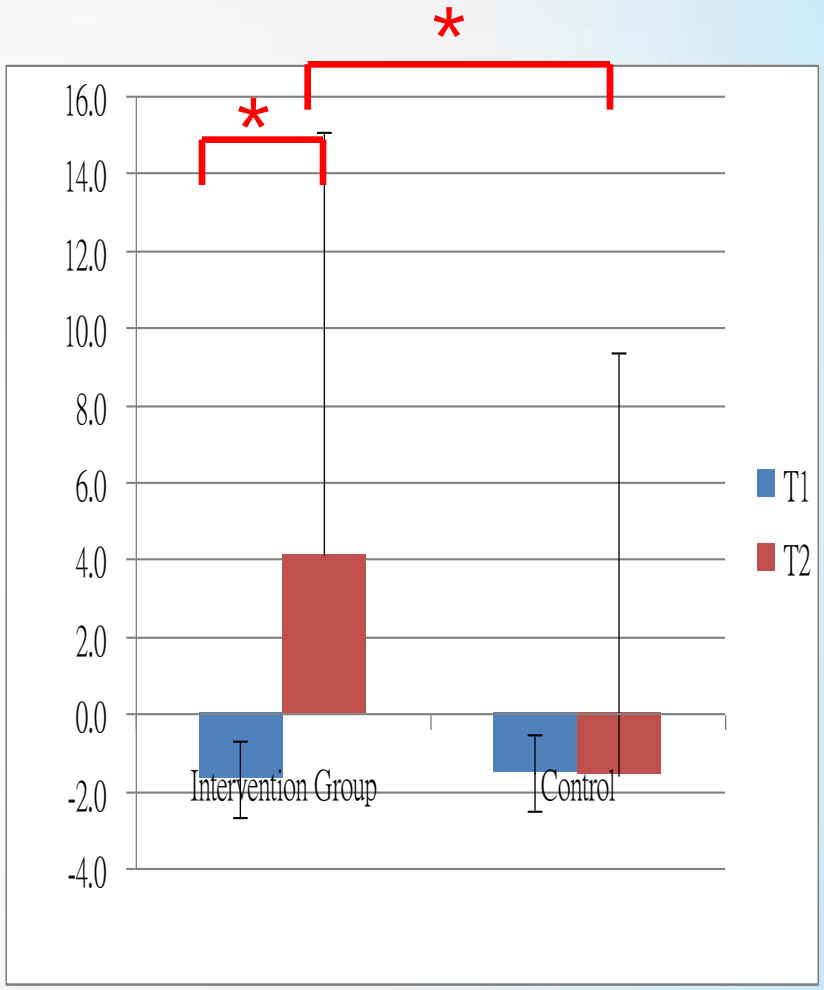
Result – Physical Outcomes (2)

Sit-up Count



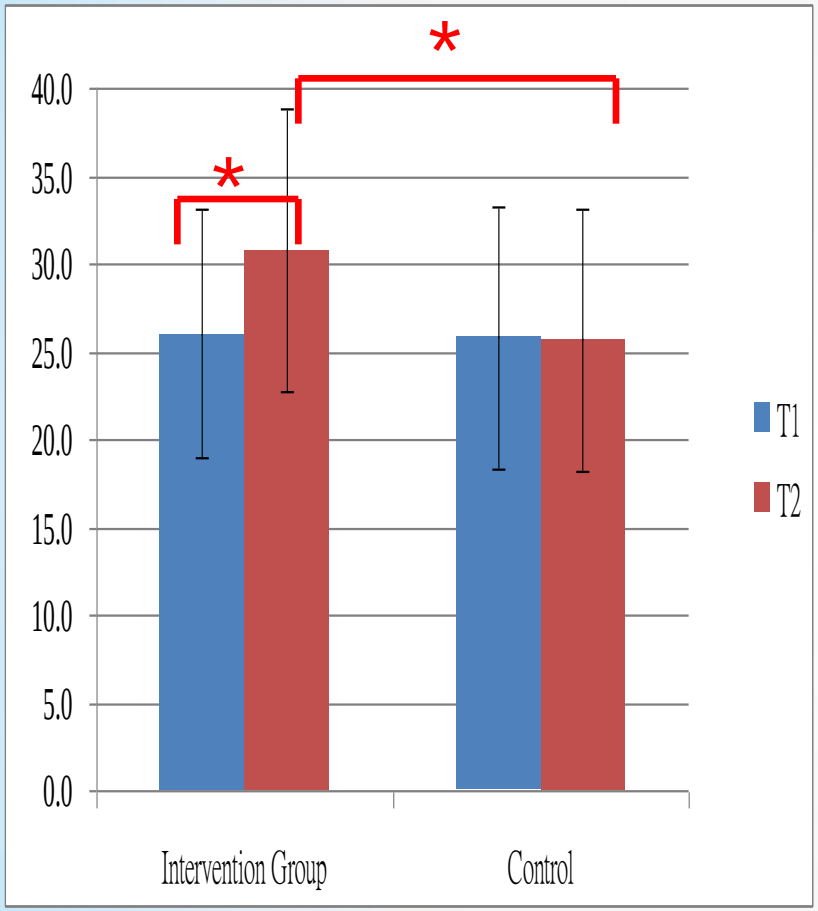
125% ↑

Sit & Reach



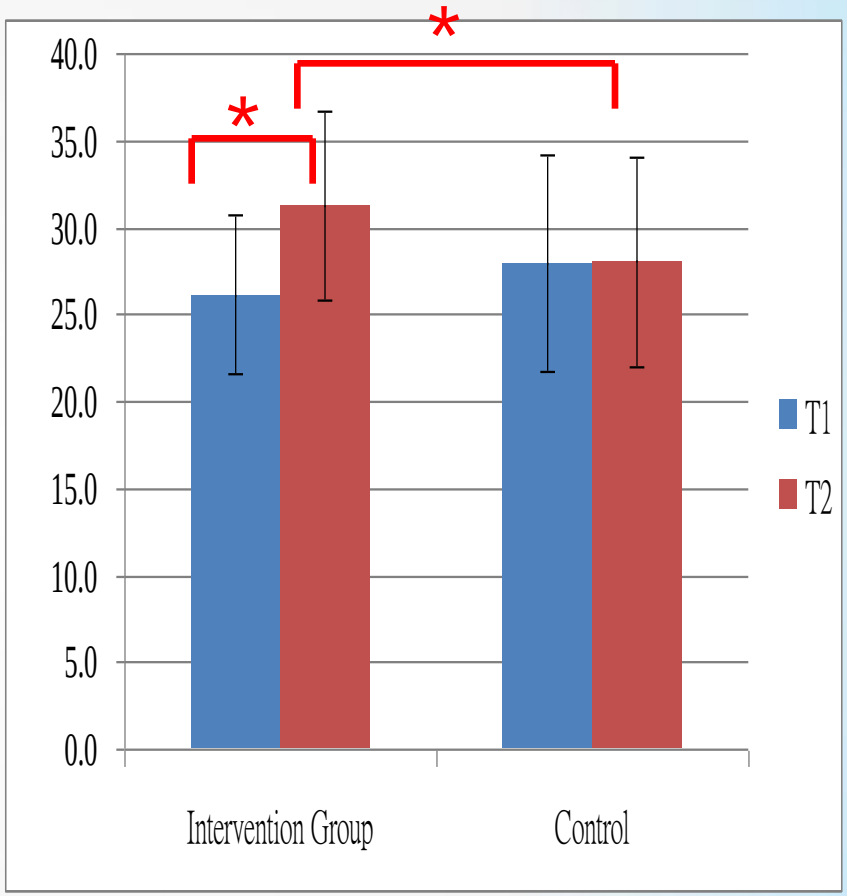
346% ↑

Result – Physical Outcomes (3)



Hand Grip Strength

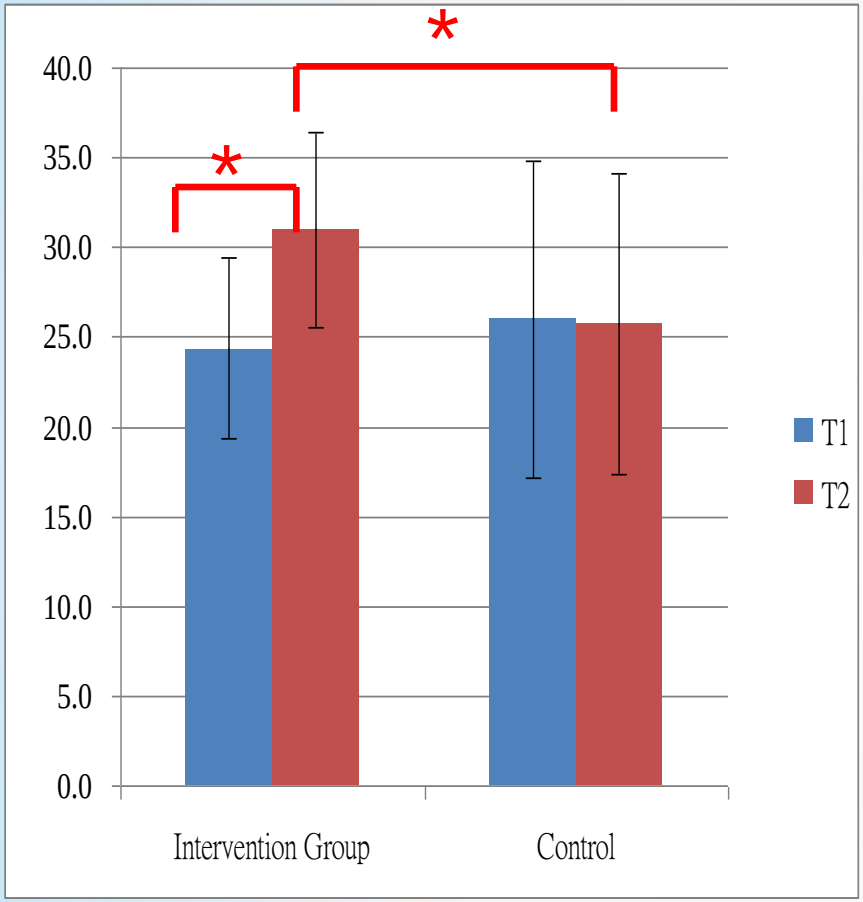
18.3% ↑

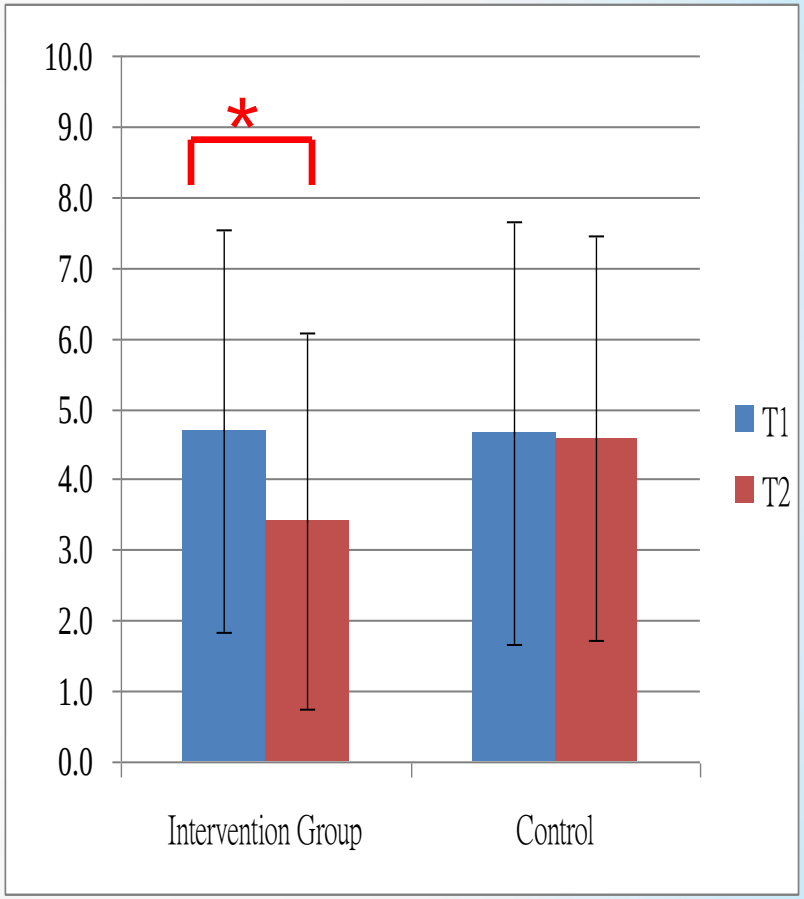


Quadriceps Strength

19.5% ↑

Result – Physical Outcomes (4)





Exercise Endurance

Submaximal Bike Test (VO2 max)

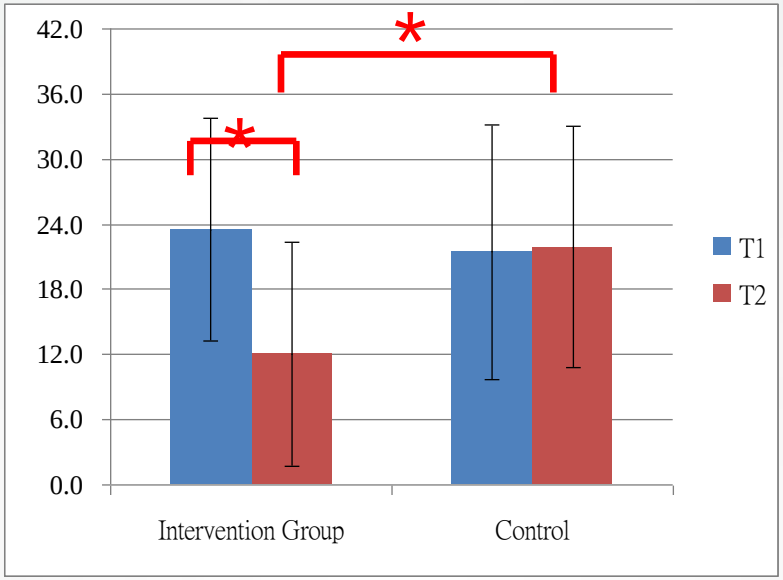
27.4% ↑

Pain Interference

27.3% ↓

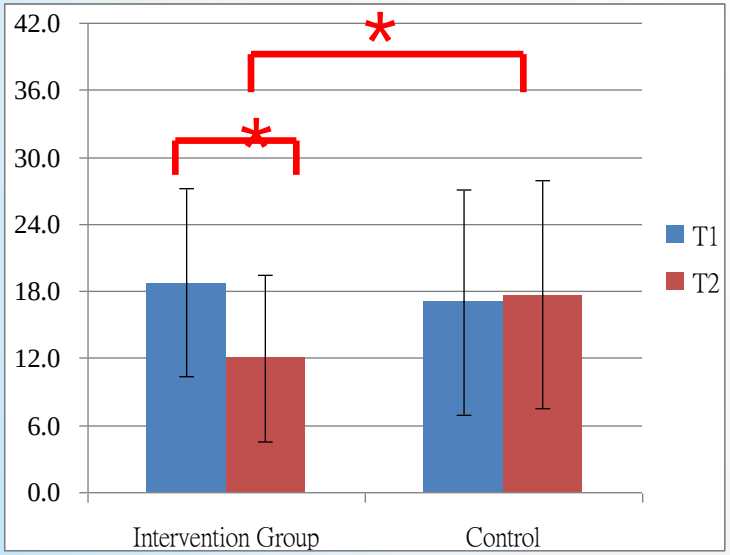
Result – Mental Outcomes (1)

DASS

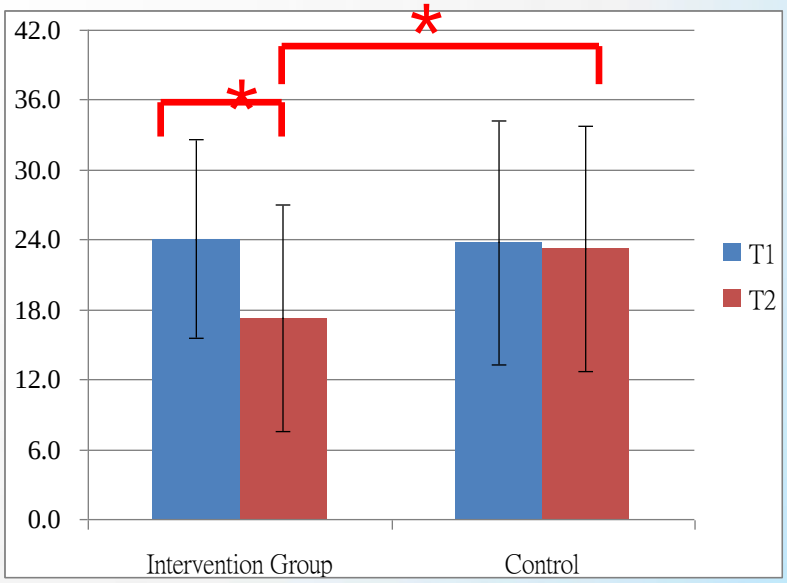


Depression Domain

48.6%↓



Anxiety Domain 36.1%↓



Stress Domain 28.2%↓

Summary of Results

- The physical profile of all patients below Hong Kong norm
- Significant improvement in all physical & mental outcome measures for intervention group after 12-week physical rehabilitation program
- When compared with control group,
  - Significant improvement in physical outcome except BMI & pain interference not reaching statistical significant level
  - Significant improvement in mental outcome including all 3 domains (depression, anxiety & stress)
  - Significant difference in the % of changes of all physical & mental outcome measures

Discussions

Significant improvement in physical outcome

- Benefits of exercises in improving **physical fitness** well documented in medical literatures (ACSM,2009;2010;Keith,2004; Thase,2007; Plante et al,2007) e.g. ↑ strength & cardiovascular endurance, ↓body fat, preserving fat-free mass

Discussions

Significant improvement in mental outcomes

- findings accord with that of overseas studies – ↓ mild to moderate depression alone or in combination with other treatments (Donaghy, M, & Durward, B. 2000; Larun et al 2006)
- ↑ **plasma beta-endorphin** inducing a temporary mood elevation & relaxation effects (Craft LL et al, 2004 ;Sylvia et al., 2009)
- as an outlet for individuals to discharge negative emotions in a healthy, safe & acceptable manner;
- altering negative thinking style (Ekeland et al,2004; *Mike Carrera, 2002*)
- Benefits also detected in Chinese patients

Discussions

Avoid seeking help for psychiatric problems in Chinese

- Augmented by positive encouragement from healthcare team
- Positive influences / motivation from peers
- provides peer ventilation, mutual support that foster commitment, and the common goal of achievement, ↑ compliance (↓ dropout) *(Yalom & Leszes, 2005)*
- ↓ labeling effect

Clinical Implications

- Cultural validation of the effects of structured physical rehabilitation program in Hong Kong Chinese patients with depressive disorder
- Information on physical profile, pain prevalence & mental profile will provide valuable data for better service planning
- New service package focusing on engaging and empowering patients with depressive disorders to be co-producer of the treatment outcomes
  - from hospital based transition of care to future **community-based sustainable home care**
  - decreased labeling effect of patients with mental health problems

Limitation

- This study was designed specifically for Chinese populations and the findings may not be applicable to non-Chinese patients with depressive mood disorders

- Patients with **suicidal risk** are not included in this study

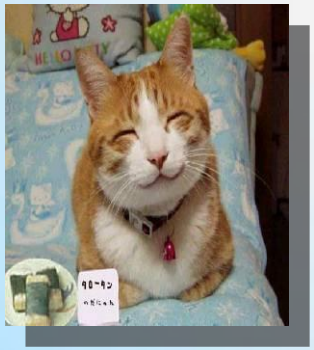
Conclusions

- RCT in progress
- the preliminary results suggested that a comprehensive physical rehabilitation program could be an **effective** intervention to improve physical fitness & negative psychological symptoms for **Chinese** patients with depressive disorder
- All subjects were highly satisfied with the program

Acknowledgements

Special thanks to all of the participants of this study

This project is supported by the KCC Research Grant - R1002 (Ref. No. 1305)




Thank You !
PsychiatricTherapy

References

- Blumenthal, J.A., Babyak, M.A., Moore, K.A., Craighead, W.E., Herman, S., Khatri, P. & Waugh, R. et al. (1999). Effects of exercise training on older patients with major depression. *Archives of Internal Medicine, 159*(19), 2349-56.
- Blumenthal, J.A., Babyak, M.A., Doraiswamy, P.M., Watkins, L., Hoffman, B.M., Barbour, K.A. & Herman, S. et al. (2007). Exercise and Pharmacotherapy in the treatment of major depressive disorder. *Psychosomatic Medicine, 69*,687-96.
- Brown, T.A., Chorpita, B.F., Korotitsch, W. & Barlow, D.H. (1997). Psychometric Properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy, 35*(1), 79-89
- Cheng, S.T. & Hamid, P.N. (1995). An error in the use of translated scales: The Rosenberg Self-Esteem Scale for Chinese. *Perceptual and Motor Skills*, *81*(2), 431-434.
- Eckerson, J.M., Evetovich, T.K., Stout, J.R., Housh, T.J., Johnson, G.O., Housh, D.J. & Ebersole, K.T. et al. (1997). Validity of bioelectrical impedence equations for estimating fat-free weight in high school female gymnasts. *Medicine & Science in Sports & Exercise, 29*(7), 962-8.
- Ernst, E., Lee, M.S., Choi, T.Y. (2011). Acupuncture: Does it alleviate pain and are there serious risk? *A review of reviews, 152*, 755-764.
- Ger, L.P., Ho, S.T., Sun, W.Z., Wang, M.S. & Cleeland, C.S. (1999). Validation of the Brief Pain Inventory in a Taiwanese Population. *Journal of Pain and Symptom Management, 18*(5), 316-322.
- Herman, S., Blumenthal, J.A., Babyak, M., Khatri, P., Craighead, W.E., Krishnan, K.R. & Doraiswamy, P.M. (2002). Exercise therapy for depression in middle-aged and older adults: Predicators of early dropout and treatment failure. Health Psychology, 21(6), 553-563.

References

- Hofmann, S.G., Sawyer, A.T., Witt, A.A. & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *78*(2) 169-183.
- Husain, M.M., Rush, A.J., Trivedi, M.H., McClintock, S.M., Wisniewski, S.R., Davis L. & Luther, J.F. et al. (2007). Pain in depression: STAR*D study findings. *Journal of Psychosomatic Research, 63*(2), 113-22.
- Katona, C., Peveler, R., Dowrick, C., Wessely, S., Feinmann, C., Gask, L. & Huw, L. et al. (2005). Pain symptoms in depression: definition and clinical significance. *Clinical Medicine*, *5*(4), 390-5.
- Kim, H.Y., Wang, J., Lee, I., Kim, H.K., Chung, K. & Chung J.M. (2009). Electroacupuncture suppresses capsaicin-induced secondary hyperalgesia through an endogenous spinal opioid mechanism. *Pain*, *145*(3), 332-40.
- Ng, F., Trauer, T., Dodd, S., Callaly, T., Campbell, S. & Berk, M. (2007). The validity of the 21-item version of the Depression Anxiety Stress Scales as a routine clinical outcome measure. *Acta Neuropsychiatrica, 19*, 301-310.
- Mead, G.E., Morley, W., Campbell, P., Greig, C.A., McMurdo, M. & Lawlor, D.A. (2009). Exercise for depression. *Cochrane Database of Systematic Reviews*, (3). doi:10.1002/14651858. CD004366. pub4
- Nieman, D.C., Austin, M.D., Benezra, L., Pearce, S., McInnis, T. & Gross, S.J. (2006). Validation of Cosmed's FitMate™ in measuring oxygen consumption and estimating resting metabolic rate. *Research in Sports Medicine*, *14*(2), 89–96.

References

- Olsson, M.E., Armelius, B. & Armelius, K. (2001). A comparative outcome study of body awareness therapy, Feldenkrais, and conventional physiotherapy for patients with nonspecific musculoskeletal disorders: changes in psychological symptoms, pain, and self-image. *Physiotherapy Theory and Practice,17*(2),77-95
- Parker, G., Chan, B., Tully, L. & Eisenbruch, M. (2005). Depression in Chinese: the impact of acculturation. Psychological Medicine, 35, 1475-1483.
- Pearson, V., & Liu, M. (2002). Ling's death: An ethnography of a Chinese woman's suicide. Suicide and Life-Threatening Behavior, 32, 347–358.
- Pearson, V., Phillips, M. R., He, F., & Ji, H. (2002). Attempted suicide among young rural women in the People's Republic of China: Possibilities for prevention. Suicide and Life-Threatening Behavior, 32, 359–369.
- Rampello, A., Franceschini, M., Piepoli, M., Antenucci, R., Lenti, G., Oliveri, D. & Chetta, R. (2007). Effect of Aerobic Training on Walking Capacity and Maximal Exercise Tolerance in Patients with Multiple Sclerosis: A Randomized Crossover Controlled Study. *Physical Therapy, 87*(5), 545-555.
- Rethorst, C.D., Wipfli, B.M. & Landers, D.M. (2009). The antidepressive effects of exercise: a meta-analysis of randomized trials. *Sports Medicine*, *39*(6), 491-511.
- Rosenberg, M. (1965). *Society and the adolescent self-image*, Princeton, NJ: Princeton University Press.
- Ruth, D. & Vlack, K. (2010). The trajectory of chronic pain: Can a community-based exercise/education program soften the ride? *The Journal of the Canadian Pain Society*, *15*(6), 361-368.

References

- Schmitt, D.P. & Allik, J. (2005). Simultaneous Administration of the Rosenberg Self-Esteem Scale in 52 Nations: Exploring the Universal and Culture-Specific Features of Global Self-Esteem. *Journal of Personality and Social Psychology*, *89*(4), 623-642
- Tam, P.W.C. & Wong, D.F.K. (2007). Qualitative Analysis of Dysfunctional Attitudes in Chinese Persons suffering from Depression. Hong Kong Journal of Psychiatry, 17, 109-114.
- Taouk, M., Lovibond, P.F. & Laube, R. (2001) *Psychometric properties of a Chinese version of the short Depression Anxiety Stress Scales (DASS21)*. Report for New South Wales Transcultural Mental Health Centre. Cumberland Hospital , Sydney.
- Tsang, H.W., Chan, E.P. & Cheung, WM. (2008). Effects of mindful and non-mindful exercised on people with depression: a systematic review. *British Journal of Clinical Psychology*, *47*(3), 303-322.
- Vaccarino, A.L., Sills, T.L., Evans, K.R. & Kalali, A.H. (2009). Multiple pain complaints in patients with major depressive disorder. *Psychosomatic Medicine, 71*, 159-62.
- Wang, X.S., Mendoza, T.R., Gao, S.Z. & Cleeland, C.S. (1996). The Chinese version of the Brief Pain Inventory (BPI-C): its development and use in a study of cancer pain. *Pain, 67*, 407–416.
- Watson, T. (2008). *Electrotherapy: Evidence-Based Practice. 12th ed*. London, United Kingdom: Churchill Livingstone.
- Win, S., Parakh, K., Eze-Nliam, C.M., Gottdiener, J.S., Kop, W.J. & Ziegelstein, R.C. et al. (2011). Depressive symptoms, physical inactivity and risk of cardiovascular mortality in older adults: the Cardiovascular Health Study. *Heart, 97*(6), 500-505.

References

- World Health Organization (2011). *World Health Organization: The disorder management in depression.* Retrieved April 30, 2011 http://www.who.int/mental_health/management/depression/definition/en/
- Wu, W. & Jin, H. (1986). Use of scales to evaluate neurotic depression. *Chinese Journal of Neurology and Psychiatry*, *19*, 339-341 (in Chinese)
- Xiang, Y.T., Weng, Y.Z., Leung, C.M., Tang, W.K. & Ungvari, G.S. (2008) Socio-demographic and clinical correlates of lifetime suicide attempts and their impact on quality of life in Chinese schizophrenia patients. Journal of Psychiatric Research, 42(6), 495-502.
- Yang, E.J., Park, WB., Shin, H.I. & Lim, J.Y. (2010). The effect of back school integrated with core strengthening in patients with chronic low-back pain. *American Journal of Physical Medicine & Rehabilitation, 89*(9), 744-54.
- Zautra, A., Fasman, R., Davis, M. & Craig, A. (2010). The effects of slow breathing on affective responses to pain stimuli : An experimental study. *Pain*, *149*(1), 12-18.
- Zheng, Y.P., Zhao, J.P., Philips M., Liu, J.B. Cai, M.F., Sun, S.Q. & Huang, M.F. (1988). Validity and reliability of the Chinese Hamilton Depression Rating Scale. *The British Journal of Psychiatry, 152*: 660-664.
- Zhou, G.B., Ma, W.T., Yu, W., Guo, A.L., Ji, J.Q. (2010). Effect of electroacupuncture on pain threshold and spinal NR2B subunit expression in a rat model of neuropathic pain. *Nan Fang Yi Ke Da Xue Xue Bao, 30*(12), 2702-4.
- Zhu, C., He, K., Zhang, H., Hu, B. & Yang, H. (1985). Evaluation of the severity of depression. *Chinese Journal of Neurology and Psychiatry*, *18*, 295-297.