

# Integrating e-health technology into a life style intervention programme on exercise behavior, depression and quality of life (QoL) in adult with metabolic syndrome

## 康健通 (電子版) 對代謝綜合症人士的運動、情緒健康及生活質量之影響

Principal Investigator 首席研究員

Dr Eliza Wong 黃美玲博士

email 電郵: eliza.wong@polyu.edu.hk

The metabolic syndrome (MetS) is defined as a cluster of the most dangerous heart attack risk factors: diabetes and prediabetes, abdominal obesity, high cholesterol and high blood pressure. According to the new International Diabetes Federation (IDF) definition, a person with MetS must have Central Obesity (defined as waist circumference with ethnicity specific values; male  $\geq 90$  cm; female  $\geq 80$  cm, or BMI  $\geq 30$  kg/m<sup>2</sup>) plus any two of the following factors or receiving related treatment

1. Raised blood pressure  $\geq 130/85$  mmHg, or receiving medication for hypertension
2. Fasting blood sugar level:  $\geq 5.6$  mmol/L, or receiving diabetes medication or insulin therapy;
3. Reduce HDL cholesterol, male  $\leq 1.0$  mmol/L; female  $\leq 1.3$  mmol/L
4. Raised triglycerides  $\geq 1.7$  mmol/L, or receiving lipid-lowering drugs

MetS has been increasing prevalent, with a prevalence of 24% to 78% in western population and about 21% in China population. The metabolic syndrome will lead to diabetes and prediabetes, and cardiovascular disease if not well treated. These patients, if obese, take little physical exercise or have poor glycemic control, which further increases their risk of cardiovascular events and even death. In addition, MetS patients also perceive high level of anxiety, depression and decrease QoL.

Currently, the School of Nursing of The Hong Kong Polytechnic University has conducted a research project to assess whether e-health life style intervention program (Mets app) can enhance the perception of metabolic syndrome, the persistence of exercise habits and the physical and mental health among individuals at high risk of cardiovascular disease. We would like to invite you to participate in this program!

E-health life style intervention program (Mets app) will enable you to deepen your understanding of metabolic syndrome, improve your self-management, and develop your personal exercise habits and other health records. This research program sincerely invites you to participate in "a three-month e-health life style intervention program". If participants agree to participate in the scheme, they will be given a mobile app as a guide to perform their exercise and monitor their health situation and exercise record. Follow-up assessments will be provided in the first month and the third month.

Participants who satisfy the inclusion and exclusion criteria will be invited to participate in the RCT.

Below is the screen capture of the app:

- 1) E-health life style intervention program (Mets app) is available for Android or IOS users.
- 2) You can click the icon of "iCare MS" to start the program after the download and installation.
- 3) Please enter the registered email and password to log in to the app (The person who participates in the program will get the "password").
- 4) After successfully logging in, you will be taken to the app homepage. Users can start to monitor their physical condition here.

代謝綜合症是累積多個高風險導致心臟病因素的一個統稱，當中包括：糖尿病和糖尿病前期、中央肥胖、高膽固醇和高血壓。國際糖尿病聯盟公布了針對中國人群的代謝綜合症診斷方法。患有代謝綜合症的人首先要具備中央肥胖，即男性腰圍 $\geq 90$ 厘米、女性腰圍 $\geq 80$ 厘米；或身高體重指數 $\geq 30$  kg/m<sup>2</sup>；並同時符合以下任何兩個指標，或接受相關治療，就屬於代謝綜合症人群。

1. 血壓指標： $\geq 130/85$  mmHg，或正在接受降壓藥物治療
2. 空腹血糖指標： $\geq 5.6$  mmol/L，或正在接受降糖藥物或胰島素治療
3. 血脂指標之高密度脂蛋白：男性 $\leq 1.0$  mmol/L；女性 $\leq 1.3$  mmol/L
4. 血脂指標之三酸甘油酯： $\geq 1.7$  mmol/L 或正在接受降脂藥物治療

代謝綜合症越來越普遍，西方人患病普遍率為24%至78%，而中國人群患病普遍率為21%。如果患者未能接受良好的治療，代謝綜合症會導致糖尿病和糖尿病前期，以及心血管疾病。如果這些患者肥胖並幾乎不進行任何體育鍛煉或他們的血糖控制不佳，會進一步增加患上心血管疾病，甚至增加死亡的風險。此外，代謝綜合症的患者還表現出高水平的焦慮、抑鬱和生活質量下降的情況。現時，香港理工大學護理學院有一項研究計劃，其目的是評估康健通(電子版)是否能夠提升高危人士對代謝綜合症的認知，加強運動習慣的持久性及提升身體和精神的健康。誠邀閣下參加此計劃。

康健通 (電子版) 能令閣下加深對代謝綜合症的認識及提升自我管理，建立個人運動習慣及其他健康紀錄。此研究計劃誠意邀請閣下參與一個為期三個月之康健通計劃。如閣下同意參與此計劃，便可獲電子手機程式，程式可指引參與者每天作適量的步行或其他運動，然後在第一個月及第三個月作跟進。

The inclusion criteria are those:

1. Hong Kong Residents who have smart phone.
2. Age 45 or above
3. MetS Clients [1] with central obesity (male  $> 90$  cm, female  $> 80$  cm) + 2 items of the followings
  - Raised triglycerides  $\geq 150$  mg/dL (1.7 mmol/L) or specific treatment for this lipid abnormality
  - Reduced HDL cholesterol  $< 40$  mg/dL (1.03 mmol/L) in males  $< 50$  mg/dL (1.29 mmol/L) in females or treatment for this lipid abnormality
  - Raised blood pressure systolic BP  $\geq 130$  or diastolic BP  $\geq 85$  mmHg or treatment of previously diagnosed hypertension (HT)
  - Raised fasting plasma glucose (FPG)  $\geq 100$  mg/dL (5.6 mmol/L), or treatment of previously diagnosed type 2 diabetes (DM)

以下是參加本計劃的納入標準：

1. 香港居民並擁有一部智能手機
2. 年滿45歲或以上
3. 中央肥胖(男性腰圍 $> 90$ 厘米，女性腰圍 $> 80$ 厘米)，以及符合以下兩項的身體指標：
  - a) 血脂指標之三酸甘油酯： $\geq 1.7$  mmol/L 或正在接受降脂藥物治療
  - b) 血脂指標之高密度脂蛋白：男性 $\leq 1.03$  mmol/L，女性 $\leq 1.29$  mmol/L 或正在接受降脂藥物治療
  - c) 血壓指標： $\geq 130/85$  mmHg，或正在接受降壓藥物治療
  - d) 空腹血糖指標： $\geq 5.6$  mmol/L，或正在接受降糖藥物或胰島素治療

以下是為代謝綜合症患者而設的手機應用程式之使用方法 (康健通適用於Android 或 IOS 系統)

- 1) 下載應用程式後，會有iCare MS的圖像，點擊iCare MS的圖像以進入應用程式
- 2) 完成啟動後，請輸入已登記的電郵及密碼以登入應用程式 (凡參加此計劃的人士會獲得「密碼」)
- 3) 成功登入後會進入此應用程式主頁。使用者可以在此主頁中使用各種不同的功能，以監察身體情況



Below are different functions in this app:

- 1) Waist circumference record: This function allows the user to view and edit the waist circumference record. Please click the "add waist circumference record" to modify. If the waist circumference of the man is greater than or equal to 90 cm and the waist circumference of the woman is greater than or equal to 80 cm, a red mark will appear in the "Remarks" as a reminder.
- 2) Sports Record: This feature allows users to set a monthly-sports goals and to view and edit their sports records. Please click the "add sports record" to modify.
- 3) Blood pressure record: This function allows users to view and edit their blood pressure record. Please click the "add blood pressure record" to modify. If the blood pressure is greater than 130 mmHg or the blood pressure is greater than 85 mmHg, a red mark will appear in the "Remarks" as a reminder.
- 4) Blood glucose record: This function allows users to view and edit their blood glucose record. Please click "add blood glucose record" to modify.
- 5) Health record: This function allows users to view and edit their health records. Please click "add health record" to modify. If the high-density cholesterol is less than 1.03 mmol/L or the triglyceride is greater than 1.7 mmol/L or the fasting blood glucose is greater than 5.6 mmol/L, there will be a red mark in "Remarks" as a reminder.

在 "iCare MS" 中可使用各種不同的功能：

- 1) 腰圍紀錄：這項功能可讓使用者查看並新增腰圍紀錄；點選「新增腰圍紀錄」可作修改。若男腰圍大於或等於90厘米及女腰圍大於或等於80厘米，會有紅色標示出現於「備註」以作提示。
- 2) 運動紀錄：這項功能可讓使用者建立每月運動目標，並讓使用者查看並新增運動紀錄，「點選」新增運動紀錄可作修改。
- 3) 血壓紀錄：這項功能可讓使用者查看並新增血壓紀錄；點選「新增血壓紀錄」可作修改。若上壓大於130 mmHg或下壓大於85 mmHg，會有紅色標示出現於「備註」以作提示。
- 4) 血糖紀錄：這項功能可讓使用者查看並新增血糖紀錄；點選「新增血糖紀錄」可作修改。
- 5) 健康紀錄：這項功能可讓使用者查看並新增健康紀錄；點選「新增健康紀錄」可作修改。若高密度膽固醇少於1.03 mmol/L或三酸甘油酯大於1.7 mmol/L或空腹血糖大於5.6 mmol/L，會有紅色標示出現於「備註」以作提示。