Purpose: Low levels of physical activity are common in women with systemic lupus erythematosus (SLE), and a sedentary lifestyle is associated with risk factors of cardiovascular diseases, poor health outcomes and increased mortality. It has been suggested that encouraging physical activities could benefit SLE population. However, there is limited information about effective strategies of promoting physical activity for people with SLE. Because walking was the most practical and desirable activity for SLE patients, this study aimed to design and evaluate the feasibility of a pedometer-based exercise decision support system on smartphone APP for SLE women.

Methods: The structure of this proposed system includes a step counter, personal information, an environmental detector (e.g., temperature, humidity, ultraviolet, and atmospheric particulate matter), a goal calculation algorithm, a step-count feedback section and the cloud computing system. Function of the system consists of pre-exercise assessment (based on personal and environmental information), exercise decision making, personalized exercise recommendation, and real-time monitoring and feedback. We proposed an initiate goal of 5,000-7000 steps/day that include 30 minutes of moderate to vigor physical activity. Individual step-count goals were developed based on the user’s mean daily steps of the previous week. Women with stable progress were encouraged to approaching 7,000-10,000 steps/day. A feasibility study was conducted among ten women with SLE, age between 20 and 65 years old, at an outpatient clinic in Taiwan. Each participant was instructed to carry the smartphone and use this proposed system for 4 weeks.

Results: Nine women who had mild to moderate SLE disease severity completed the study. Their mean age was 48.3±13.5 years. Mean daily step counts ranged between 1578 and 4050 with the mean of 2669 steps/day. Although mean daily steps of these women were not significantly increased during the 4-weeks study (mean differences: 488±1276 steps/day, t= -1.15 , p= 0.28 ), they reported satisfaction for the proposed system to promote daily activity at homes.

Conclusion: This system is innovate because of the pre-exercise assessment mechanisms and personal goal setting are specific to detecting suitable environment and the recommended amount of daily activity for SLE users. Based on the amount of activity and goals reached of the participants, we adjusted the program of this system accordingly. Further evaluation of its efficacy is in progress.


**Abstract Summary:**
In this study, a pedometer-based exercise support system on smartphone was proposed for SLE women. Mean daily steps ranged between 1578 and 4050 with the mean of 2669 steps/day. They reported satisfaction for the system to promote daily activity at homes. Further evaluation of its efficacy is in progress.

**Content Outline:**
I. Introduction:

1. Low levels of physical activity are common in women with systemic lupus erythematosus (SLE), and a sedentary lifestyle is associated with poor health outcomes and increased mortality.
2. There is limited information about effective strategies of promoting physical activity for people with SLE.
3. The purpose of this study was to design and evaluate the feasibility of a pedometer-based exercise decision support system for SLE women.

II. Main Point

1. The development of a pedometer-based exercise decision support system on smartphone APP for SLE women.

   a) The function of this system included pre-exercise assessment (based on personal and environmental information), exercise decision making, personalized exercise recommendation, real-time monitoring and interactive feedback.

   b) Individual step-count goals were developed based on the user’s mean daily steps of the previous week.
c) Women with stable progress were encouraged to approaching 7,000-10,000 steps/day.

2. A 4-weeks feasibility study was conducted among ten women with SLE at an outpatient clinic in Taiwan.

a) Nine women who had mild to moderate SLE disease severity completed the study.

b) Mean daily step counts ranged between 1578 and 4050 with the mean of 2669 steps/day.

c) Mean daily steps of these women increased during the 4-weeks study (mean differences: 488±1276 steps/day).

d) They reported satisfaction for the proposed system to promote daily activity at homes.

III. Conclusion:

1. This system is innovate because of the pre-exercise assessment mechanisms and personal goal setting are specific to detecting suitable environment and the recommended amount of daily activity for SLE users.

2. Further evaluation of its efficacy is in progress.

First Primary Presenting Author

Primary Presenting Author
Jen-Chen Tsai, PhD, RN
National Yang-Ming University
School of Nursing
Professor
Taipei
Taiwan

Professional Experience: 2012-present--professor and associate dean, School of Nursing, National Yang-Ming University, Taipei, Taiwan 2004-12--professor, School of Nursing, Taipei Medical University, Taipei, Taiwan 1997-2003--associate professor, School of Nursing, Taipei Medical University, Taipei, Taiwan 1982-97--nurse, head nurse, Taipei Veterans General Hospital, Taipei, Taiwan

Author Summary: Jen-Chen Tsai is a Professor of National Yang-Ming University, School of Nursing, in Taiwan. Her professional specialty includes: nursing care of adults with medical and surgical health problems, cardiac rehabilitation nursing, and physical activity interventions for patients with chronic illness.

Second Secondary Presenting Author

Corresponding Secondary Presenting Author
Mei-Ling Wu, PhD
Chang Gung University of Science and Technology
Department of Nursing
Lecturer
Guishan Dist
Taoyuan City
Taiwan

Professional Experience: 1993-1996 Staff nurse National Taiwan University Hospital, Taipei, Taiwan 1998-Present Lecturer, Department of Nursing, Chang Gung University of Science and Technology, Taiwan 2014-2016 Consultant, Systemic Lupus Erythematosus patient group, Taiwan Education: PhD, 2017 National Yang-Ming University, Taipei, Taiwan, Nursing
Author Summary: Mei-Ling Wu is a lecturer of Department of Nursing in Chang Gung University of Science and Technology. Her research interest focus on improving SLE patients engages in active life.