Apps as Valuable Healthcare Helpers

Statistics

80% WORK

50% SLEEP

70% WALK
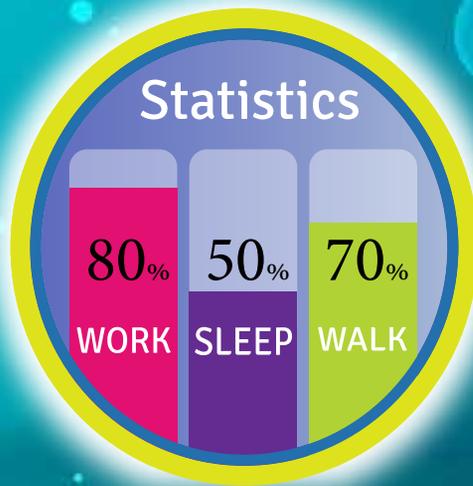
Experiences in the Application of Mobile Health Management Apps by Tzu Chi Nurses

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Food Panda and Uber Eats scooters racing through streets and narrow alleys to make their deliveries has been a common sight in recent years. Nowadays, smartphone apps fulfill a variety of purposes ranging from ordering meals and mobile shopping to mobile bank transfers, making lives smarter and more convenient. Health management related app(s) and associated mobile devices are constantly emerging. In addition,

Basic Statistics

Gender	Number of People	%
Female	1,079	94.2
Male	67	5.8
Total	1,146	100.0
Age	Number of People	%
under 20	3	0.2
21~25	309	27.0
26~30	246	21.5
31~35	143	12.5
36~40	126	11.0
above 40	319	27.8
Total	1,146	100.0
Department	Number of People	%
Internal Medicine	221	19.3
Surgery	148	12.9
Pediatrics	30	2.6
Obstetrics & Gynecology	47	4.1
Intensive Care & ER	233	20.3
Functional Unit	20	1.8
Kidney Dialysis	44	3.8
Operating Room	68	5.9
Outpatient Clinic	195	17.0
Palliative Care	23	2.0
Administration	25	2.2
Psychiatry	34	3.0
Others	58	5.1
Total	1,146	100.0

many people have replaced their wrist watches with smart bracelets. We therefore strive to explore how nursing personnel with medical expertise utilize App(s) or mobile devices for health management.

In this issue, the editorial team of the Department of Nursing, Tzu Chi University of Science and Technology investigates Health Management App usage experiences of clinical nurses with the nursing personnel of seven Tzu Chi hospitals as the sample for this study. The goal lies in the development of mobile Health Management Apps for different chronic diseases to facilitate the work of nursing personnel by harnessing technology and assist patients in health maintenance and promotion.

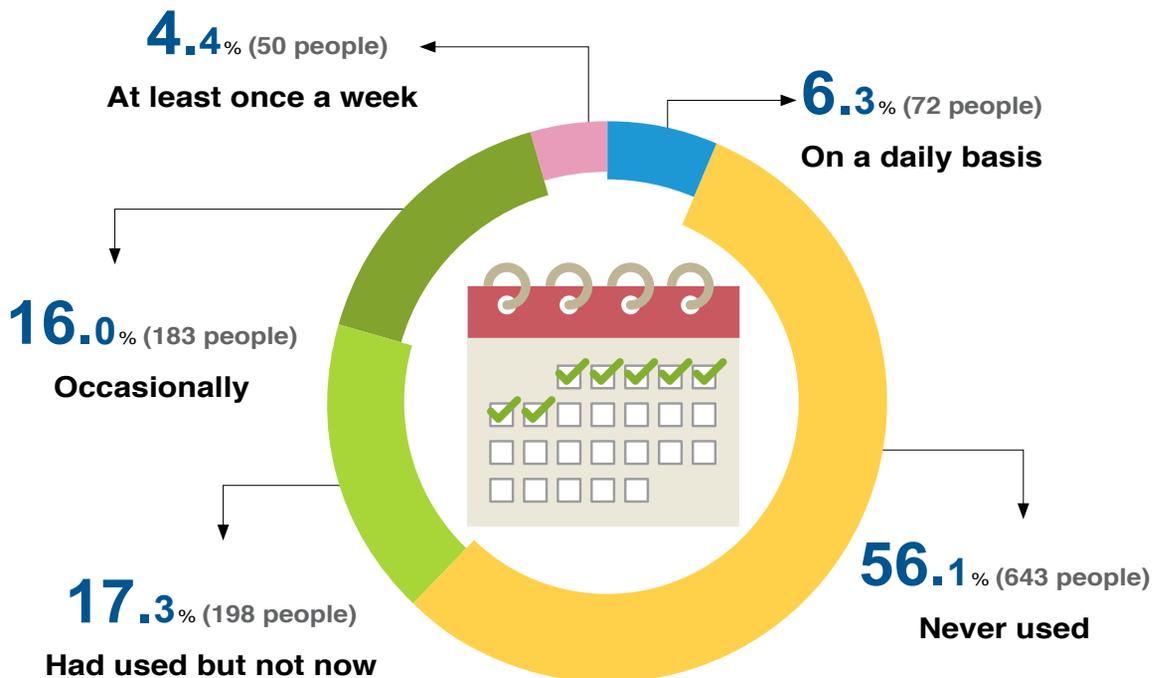| Years worked in the hospital	Number of People	%
under 1	123	10.7
1.1~2	134	11.7
2.1~3	89	7.8
3.1~5	174	15.2
above 5	626	54.6
Total	1,146	100.0
Job Title	Number of People	%
Registered nurse	884	77.1
Deputy head nurse	48	4.2
Head nurse	52	4.5
Supervisor and above	18	1.6
Case manager / functional unit	54	4.7
Nurse Practitioner / senior RN	90	7.9
Total	1,146	100.0
Hospital	Number of People	%
Hualien	233	20.3
Yuli	31	2.7
Kuanshan	26	2.3
Dalin(including Chiayi)	267	23.3
Taipei	266	23.2
Taichung	298	26.0
Douliu	25	2.2
Total	1,146	100.0

The term "Health Management App(s)" is defined as built-in health/disease care apps on mobile devices such as smartphones, tablets, or wireless devices utilized for the collection, analysis, and sharing of health-related data with the goal of facilitating personal health status management and enhancing the overall quality of the care provided by healthcare personnel.

After distribution of e-questionnaires to the respondents, a total of 1,146 valid questionnaires were returned.

Q1 | How often you use Health Management Apps?
(N = 1,146)

4.4% (50 people)
At least once a week

6.3% (72 people)
On a daily basis

16.0% (183 people)
Occasionally

56.1% (643 people)
Never used

17.3% (198 people)
Had used but not now

40% of the respondents have experience using Health Management Apps – Around 10% are active users

44.0% of the surveyed nurses state that they have used or are currently using Health Management Apps. Active users, who use such apps at least once a week or on a daily basis, account for 10.7%.

"Recording of menstrual periods", "daily exercise record", and "detection and recording of heart rates" are the three most popular functions among the respondents who have experience using such apps with selection rates of 46.9%, 45.9%, and 41.0%, respectively. "Detection and recording of weight" and "daily sleep record" were selected by 35.7% and 29.8% of the respondents, respectively.

The fact that all of the listed functions (a total of 14 items) were selected by different respondents is a clear indicator for personalized needs. In the open-ended "others" option, some survey participants stated that they use such apps to record their daily step count. The most frequently mentioned function was recording or query of COVID-19 related information such as vaccinations, rapid tests, and positive tests. Some respondents stated that they use Health Management Apps as a tool for the provision of health education to patients.

Ideal for Exercise Reminders and a Smart Grasp of Menstrual Periods and Sleep Regimens

"Reminder of insufficient exercise and exhortation to engage in exercise" and "clear understanding of menstrual periods as a guideline for pregnancy or contraception" were rated as the most helpful functions of such Apps by 51.1% and 37.4% of the respondents, respectively. The third-ranked item was "adjustment of sleep habit or patterns" (27.2%) followed by "reminder of insufficient water intake" (22.0%) and "emotional adjustment and stress release to achieve mental balance" (20.0%). These four functions reflect the health problems most commonly encountered by clinical nurses.

As for the tracking of menstrual periods, the survey sample mostly consists of women in their childbearing years. Most clinical nurses work in shifts, which can result in irregular periods. Recording of relevant information including menstruation days, calculated cycles, reminders of expected ovulation days, arrival of menstruation, and safety period of the menstrual cycle, is therefore of vital importance for the planning of pregnancy or contraception. In addition, nurses wearing white uniforms at work or

Q2 | Which function(s) of Health Management Apps are most important in your daily life?

(N = 305, 6 choices at most)

Detection and recording of heart rates 41.0%

Detection and recording of blood pressure 12.8%

Detection and recording of blood sugar 6.6%

Detection and recording of blood oxygen saturation 13.4%

Detection and recording of weight 35.7%

Daily exercise record 45.9%

Daily diet record & calorie calculation 9.2%

Daily water intake 10.8%

Daily sleep record 29.8%

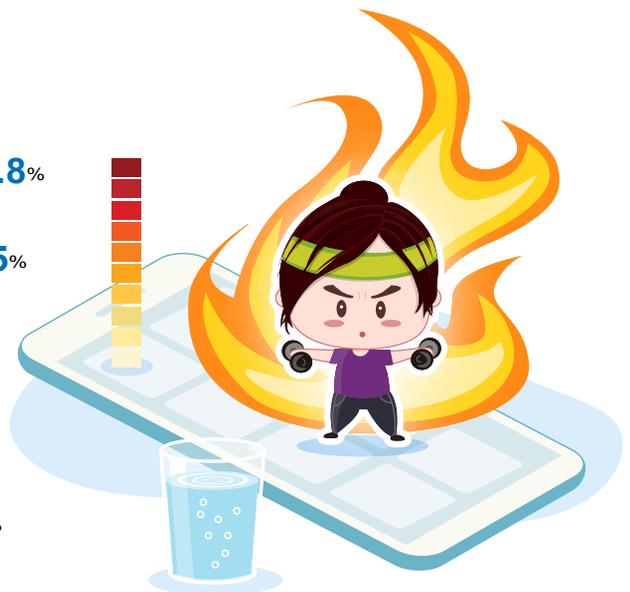**Physical & mental conditions record 9.8%**

Record personal medication status 8.5%

Health condition analysis 10.5%

Reminders (exercise time, etc.) 7.5%

Recording of menstrual periods 46.9%

Others 4.9%

Q3 | Benefits of the Health Management App(s) to you?
(N = 305, multi-choices)

51.1% **Reminder of insufficient exercise and exhortation to engage in exercise**

17.0% **Paying attention to calorie intake, eating less delicate cakes and desserts, etc.**

12.8% **Not drinking too many sugary drinks**

22.0% **Reminder of insufficient water intake**

20.0% **Emotional adjustment and stress release to achieve mental balance**

27.2% **Adjustment of sleep habit or patterns**

6.2% **Remember to take medicine on time**

37.4% **Clear understanding of menstrual periods as a guideline for pregnancy or contraception**

57.4% **Others**

engaging in outdoor activities or trips can be caught off guard by their periods, which can cause great embarrassment if blood stains appear on their clothing. Regular recording of menstrual cycles facilitates the calculation of the period start date, which ensures mental preparedness and helps prevent predicaments.

These apps also facilitate adjustment of sleep routines. Nurses on rotating three-shift schedules frequently experience sleep disorders such as insomnia or shallow

Q4 | The Health Management App(s) you use?
(N = 305, multi-choices)

Apple Health App 48.2%

Xiaomi App 31.5%

Dietary Management App 14.4%

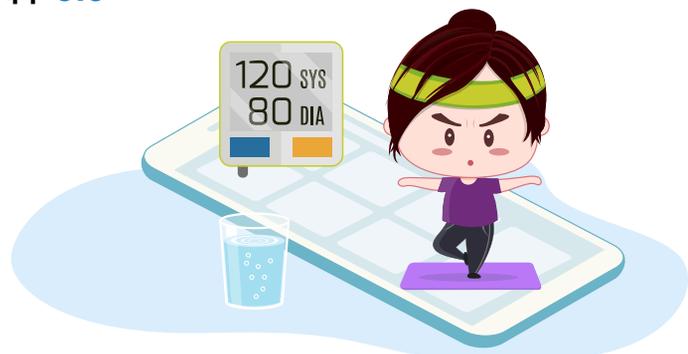**Water intake App 13.8**%

Sleep tracking App 9.5%

Daily Yoga App 4.9%

Meditation/Mindfulness App 3.3%

Others 14.8%

120 SYS
80 DIA

sleep. Such disorders can be mitigated through sleep records created in Health Management Apps. Sleep aid functions of certain apps such as sounds of nature (forests or rivers) and white noise background music are highly conducive to relaxation, deep sleep, and enhancement of sleep quality.

"Reminders of insufficient water intake" is another extremely useful function. It is a well-known fact that RNs have very high workloads. In addition to caring for patients, they have to create countless records and accomplish a wide range of tasks. Their schedules are often so hectic that they have no time to eat, drink water, or go to the bathroom. A sufficient water intake is conducive to the discharge of metabolic waste and mitigation of fatigue. In the long run, an inadequate water intake has a detrimental impact on our health and well-being. Monitoring, recording, and reminders of water consumption therefore represent an essential feature of such apps.

It should be noted that 57.4% selected the "others" option, specifying a wide range of answers. Some respondents stated that they use these apps to record health-related data, while others use them in a more flexible manner (e.g., combination with game apps for exercise purposes). For instance, yoga course Apps feature virtual yoga instructors who assist in the planning of daily exercise patterns and times and provide guidance in workouts for rarely used muscles. Some yoga Apps even offer relaxing music.

As a matter of fact, the first choice of this question was "firm grasp of personal health status (e.g., heart rate, blood pressure, blood glucose, blood oxygen saturation, and weight), but it is not listed in the image since it was not selected by any respondent. We interpret this as follows: Nurses are generally young and therefore have no need for chronic disease management. Consequently, they don't use these apps to maintain a firm grasp of their health status. Another possible explanation is that they regularly monitor their health status at the workplace.

The three most frequently used apps are the Apple Health App, the Xiaomi App, and the Dietary Management App in descending order. The Apple Health App and Xiaomi App are capable of long-term recording and monitoring of physiological conditions such as heart rates, blood pressure, sleep, and exercise. These apps are also among the most well-known mobile Health Management Apps available on the market. They offer an incentive and reward mechanism that encourages users to strengthen or maintain their current workout routine and motivates them to adopt health-promoting lifestyles.

Only 60% Are Willing to Recommend Specific
Chronic Disease Management Apps

It is evident from available data and statistics that certain hospitals and clinics have already designed chronic disease apps to facilitate disease management by patients. Relevant apps include Dalin Tzu Chi – Your Health LINE, Tri-Service General Hospital – Home Dialysis App, Kaohsiung Medical University Chung-Ho Memorial Hospital – iCKD, Veterans General Hospital Home Pharmacist App, Kaohsiung Veterans General Hospital – Integrated Radiation Oncology Information System of the Oncology Team, Changhua Christian Hospital- Joint Gestational Diabetes Mellitus (GDM) Cloud-based Care System. We further asked RNs who have experience using Health Management Apps whether they would recommend such apps to their patients while performing clinical tasks. 63.6% stated that they would, while 36.4% would select not to recommend such apps to their patients.

Judging from our work experience, it is apparent that all case managers wish they had a health management App to significantly raise the effectiveness of their case management tools.

The Time-Consuming Creation of Health Management Tools
Can Help Save Time

The final question aimed to determine the reasons why respondents currently don't use Health Management Apps (N = 841). Close to a half (49.1%) claimed that they don't have enough time. The percentages for the remaining options were not very high. "Concerns about personal information leakage", "app functions don't meet my needs", "it is a hassle to use different apps to accomplish different tasks; I'm waiting for improved apps to become available", and "I have given up using these apps since they are not user-friendly enough" were selected by 16.9% , 14.0%, 13.4%, and 12.1%, respectively.
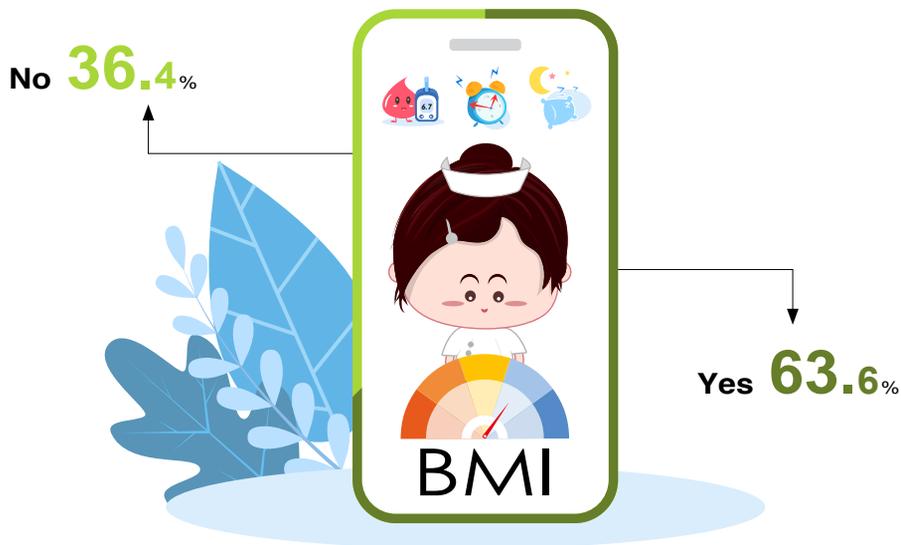
The fact that health-related apps require users to log in and necessitate the provision of basic user information could give rise to concerns about information leakage if the software development company provides insufficient privacy protection for remote network users, which ultimately affects the willingness to use the software. On top of that, scamming has become more and more rampant and the hacking of the LINE and Facebook accounts of friends and relatives is quite common.

In addition, negative user experiences and lack of user-friendliness result in nurses

Q5

In clinical work, will you recommend patients to use disease-related Health Management APP?

(ex. Dalin Tzu Chi - Your Health Doctor LINE, Tri-Service General Hospital - Home Dialysis APP, Gaoyi Shenhao - iCKD; Rong Zong Smart Home Little Pharmacist APP, Kaohsiung Veterans General Hospital-all cancer team swollen information integration system, etc.) (N = 305)

No 36.4%

Yes 63.6%

BMI

discontinuing the use of such apps. Other issues include the unavailability of the desired language, excessively complex menu functions and categories, or the necessity to enter data manually. The time-consuming process of learning app operations can cause difficulties and frustration for the hard-working nurses, which tends to result in app abandonment.

Miss Tsai, a RN who I met frequently these days during my teaching internship, is a typical representative of the results of this questionnaire survey.

Miss Tsai, who is in her early twenties, is so busy gaining clinical experience that she has no time to drink water and her menstrual cycle has become irregular. On top of that, she is currently preparing for her N3 clinical professional competence examination

Q6 | Why you choose not to use Health Management APP?

(N = 841, 3 choices at most)

Have to pay for the App 7.8%

Once used, feel inconvenient and abandoned 12.1%

Worry about my personal data leakage 16.9%

APP functions don't fit my needs 14.0%

Smart phone/pad space not enough to download APP 5.2%

Too young to manage my health 2.4%

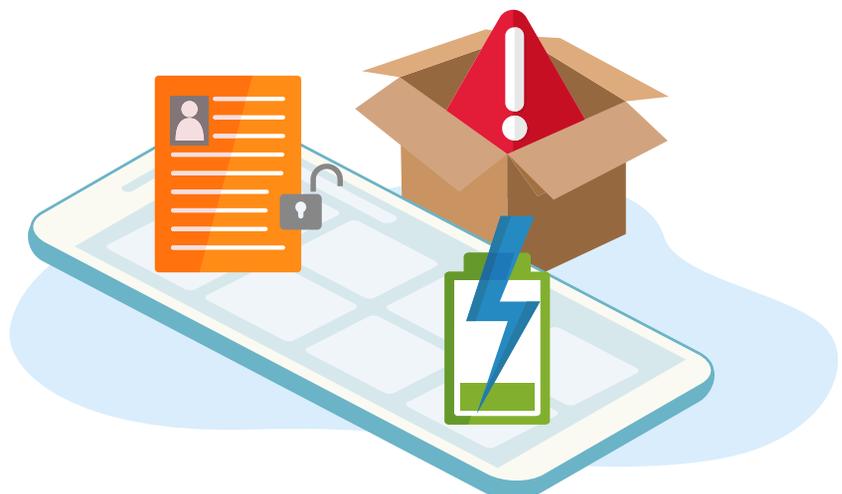**No integrated funcitons, waiting for better App(s) 13.4%**

No time to use it 49.1%

Electricity consuming 7.0%

Others 10.9%

and therefore has to search for and organize existing research literature for her case report. She is under a lot of pressure due to the pressing deadline. As a result, she suffers from sleep disorders such as insomnia and shallow sleep. Her ward colleagues have suggested that she give Health Management Apps a try. Since she cannot carry a smartphone with her at work, she decided to buy a smart wristband. She feels that the most useful functions are menstrual period and sleep tracking.

Miss Tsai points out that the sleep management feature of this App allows her to determine whether she has entered the core sleep stage. When the monitoring record reveals that she has accumulated too much "sleep debt", the App reminds her to go to bed earlier. Her sleep quality has improved significantly due to this App, and her mood has stabilized too.

After realizing how useful this App is, she downloaded the Plant Nanny App from the App Store to track and record her water intake and set drink water reminders at intervals of several hours. Due to the cute interface design, she no longer forgets to drink water, which makes the plants on the interface appear healthy. Consequently, her physical well-being has improved considerably, which has given her a great sense of achievement.

The Future of Smart Health Management for Patients

As researchers and clinical instructors in the field of renal disease management, our joint vision is to design an app tailored to the needs of chronic renal patients. However, patients will not be willing to use the app if RNs are reluctant to recommend it. It is therefore of paramount importance to gain the approval of RNs.

Despite the fact that the majority of chronic patients are seniors, it is very likely that they will enjoy using the app if the interface is simplified and user-friendly since this cohort is also becoming more and more smartphone literate.

Since clinical personnel are very close to their patients, they have the best understanding of their symptoms and health needs. When enlisting information engineering experts for the design and development of apps for different diseases, the clinical experience of medical teams is crucial. The participation of physicians and RNs in the core design process is therefore a key prerequisite for the successful development of an app that perfectly fits the needs of patients.

In this era of ubiquitous smartphone and Internet use, Health Management Apps greatly facilitate the maintenance of perfect health and well-being. As far as chronic

patients are concerned, mobile Health Management Apps represent a human-centered and user-oriented healthcare service.

The design and development of disease management software is based on the core concept of a patient- and family-centered health care system. Digital and mobile information services provide patients with disease-related knowledge and facilitate the monitoring of physiological data, real-time communication with professional caregivers, and effective health maintenance.

They are capable of providing and exchanging information in all healthcare fields and raise the level of participation of patients, families, and communities in disease management, which results in enhanced timeliness and effectiveness of disease diagnosis, monitoring, and management.

Such services have already been applied in diabetes, hypertension, stroke, and asthma patients. They enable users (patients and family members) to obtain disease- and health-related information, monitor and report their physiological health status in a real-time manner, and enhance their knowledge, skills, and competence in the field of self-disease management. They also provide valuable support for clinical decision

Tzu Chi University of Science & Technology Nursing School designs tutoring apps. Photo shows the interface & process of Pediatirc Nursing.

The teacher (left) and nursing students using the app in the class.

making, drug management and administration, risk screening, and rehabilitation in addition to fostering communication between healthcare professionals and patients.

Furthermore, they improve the quality and expand the scope of provided care with the ultimate goal of mitigating and deferring disease severity and facilitating early detection of deteriorating physical conditions. Finally, they encourage positive lifestyle changes and serve as powerful tools for improved chronic disease management. We eagerly anticipate the availability of various apps that help chronic patients prolong their lives and maintain their health.