臺灣大學附設醫院護理部

Title of Presentation

Implementation Chatbot in PD Nursing Care Experience from National Taiwan University Hospital

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National Taiwan University Hospital 健康守護 醫界典範

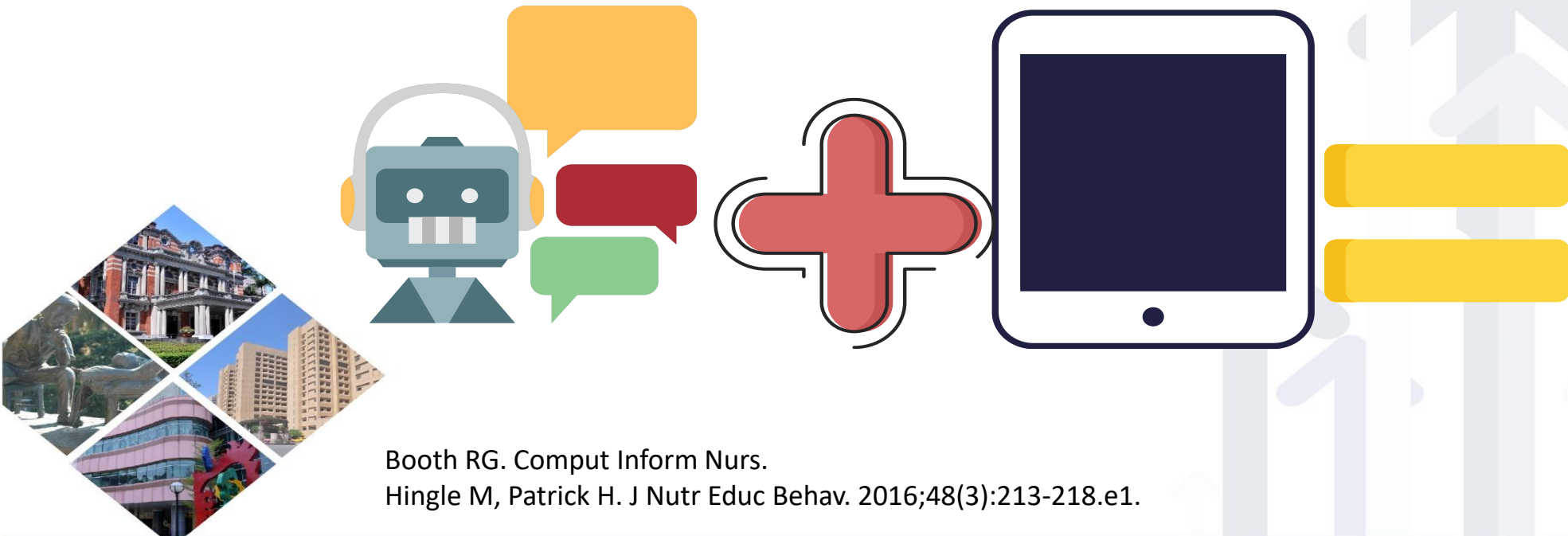# Chatbot of NTUH_CAPD sharing

- **Introduction**

- **Purpose**

- **Research Design**

- **Result**

- **Conclusion**

Introduction

- Digital technology has been widely applied in healthcare.

- Chatbots integrated into smart devices can enhance health education and improve learning motivation and efficiency.

Booth RG. Comput Inform Nurs.
Hingle M, Patrick H. J Nutr Educ Behav. 2016;48(3):213-218.e1.

Creative insight

- Developing tool that provide PD education and training for patients.

- Provide patients with easily accessible and usable education tools for PD care.

- Develop applications on the "LINE" that provide health education and training for PD patients.

APP
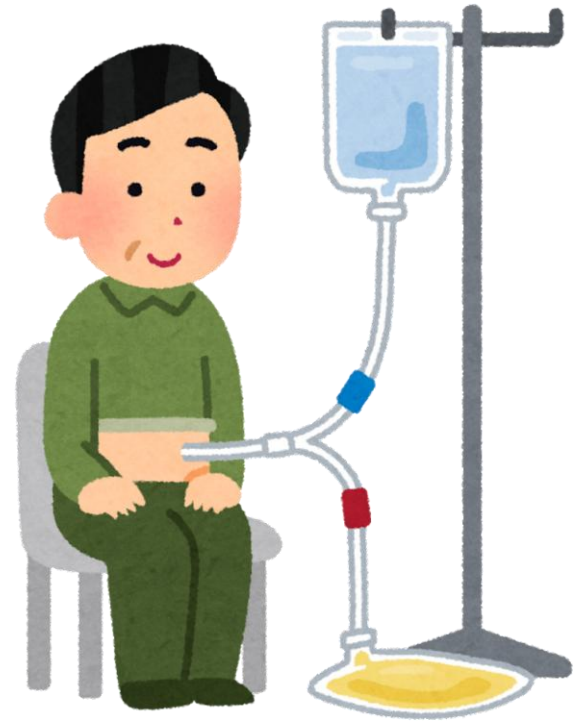
Miyamoto SW, Henderson S, Young HM, Pande A, Han. J .JMIR Mhealth Uhealth. 2016;4(1):e5.

Innovative Portfolio

台大 醫院 NTUH

健康守護 醫界典範

Easily to use

👍 **Click of Option**

👍 **Key word**

👍 **Mobile Handbook**

Frist Block Category	Technique Operation video	Clinical Reminder	Home PD Caring	Hospital Registration Service	Dietary Guideline	APD Guidance
	Technique operation video 技術影片	Clinical reminder 小叮嚀	Home PD Caring 居家自我照顧	Hospital registration service 網路相連	Dietary guideline 腹膜透析飲食指導	APD guidance APD狀況排除
Content	Manual exchange APD Operation EXIT SITE CD Shower Protect Technical of IP	Prevent peritonitis Catheter Self Care Dietitian education Home Injection Clearance collect	Drain and Fill Contamination Dialysate turbid Hemoperitoneum Peritonitis / ESI	Hospital Registration Medication query Dietitian Education Monthly Theme	High Protein Diet Anemia Diet Low Phosphate Diet Low Potassium Diet Water Restriction	Board and Receive APD Q&A Common Warning Common Mistakes Power Failure
Second Block Category (Example)						

Purpose

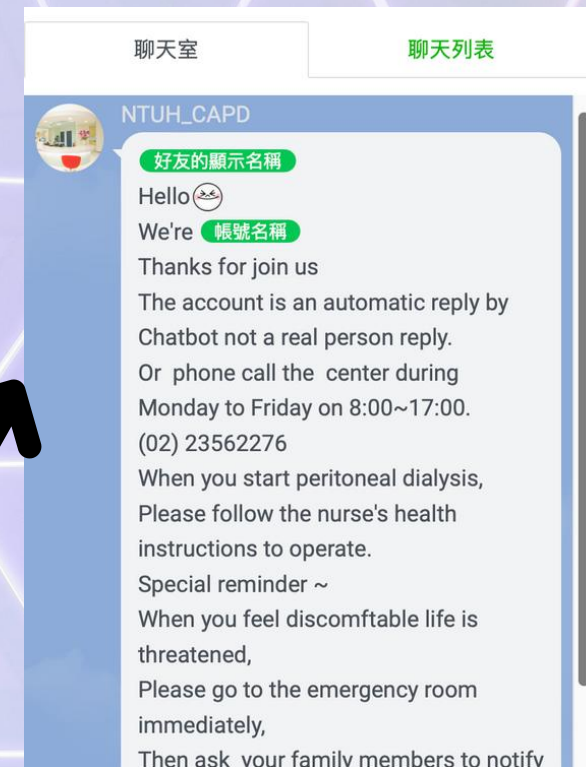- We hypothesize that a chatbot for Peritoneal Dialysis could enhance patients' self-care abilities.

- PD chatbot integrates nursing practices, ensuring patient privacy, data security, and service quality.

使用者主畫面

Main screen of User interface
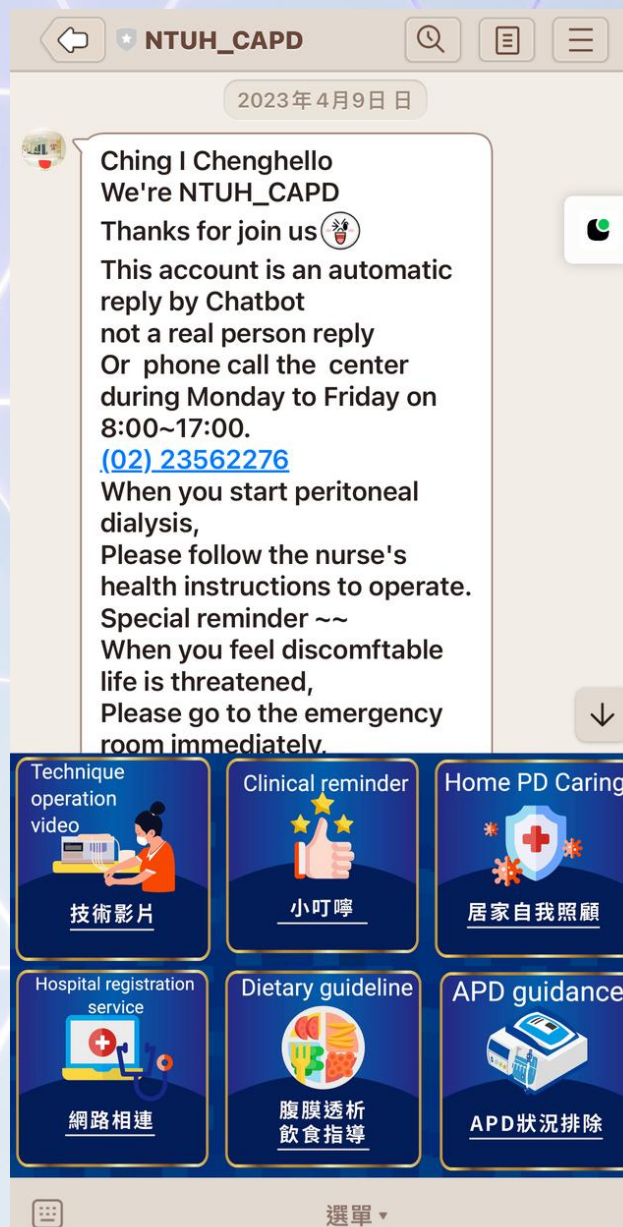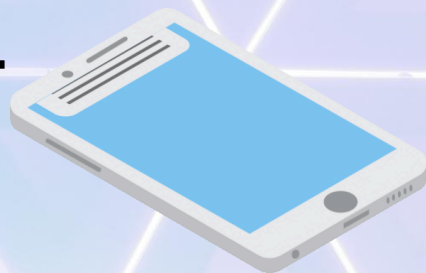
使用者介面，依照並需求來作區塊點擊，加入時提醒病人為系統自動回覆，非真人回覆，如遇緊急事件請撥打緊急電話聯繫腹膜透析護理師

點擊技術影片

click of Technique operation video
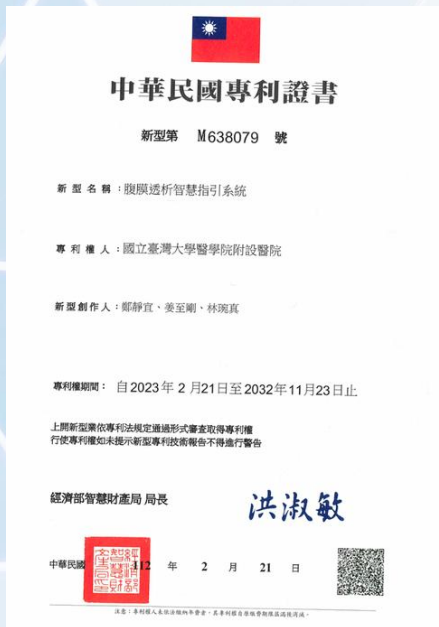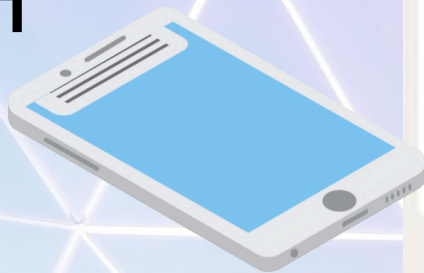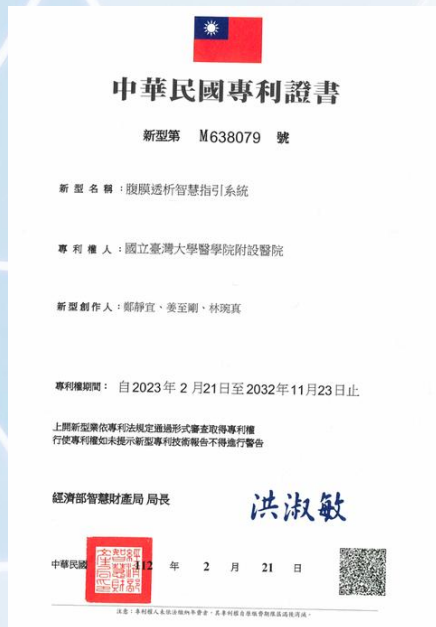
點擊腹膜透析技術影片，內建腹膜透析常見技術影片，提供病人居家複習觀看，不受時間、空間限制

點擊小叮嚀

click of Clinical reminder
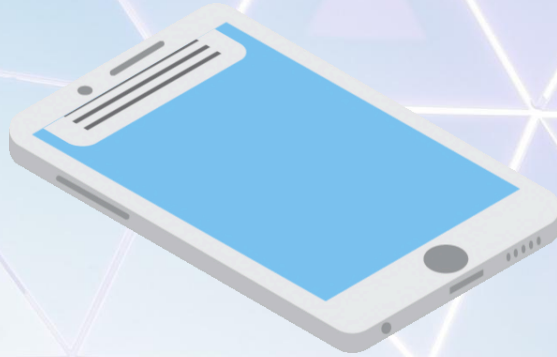
點擊小叮嚀，整合護理師、醫師、營養師等跨領域團隊等主題影片，針對腹膜透析相關知識進行衛教

點擊居家自我照顧

click of
Home PD caring
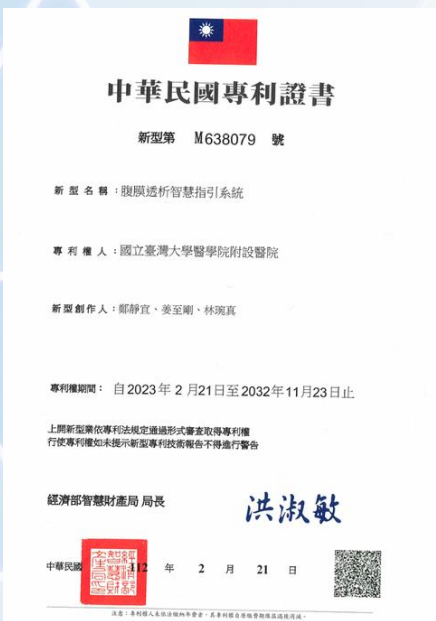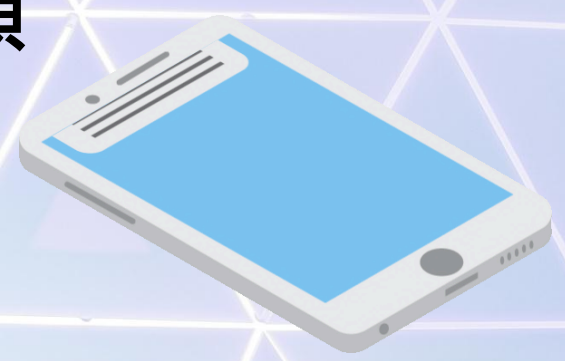
點擊居家自我照顧，內容針對腹膜透析相關衛教，包括腹膜炎或導管出口感染處置、引流注入不順、血性透析處置，針對居家透析狀況排除的技術及知識來建置

點擊網路相連
click of
Hospital Registration
Service

點擊網路相連，網頁連結台大醫院掛號及藥劑部查詢藥物衛教系統，方便病友因就醫需求，減少搜尋及困難掛號的壓力。

點擊
腹膜透析飲食指導

click of Dietary guideline

腹膜透析飲食
蛋白質攝取"按我"
貧血飲食"按我"

腹膜透析飲食
含鉀食物量表"按我"
含磷食物量表"按我"

腹膜透析飲食
高油脂飲食量表"按我"

網路相連　用藥查詢

衛教影片　每月主題

技術影片　小叮嚀　居家自我照顧

網路相連　腹膜透析飲食指導　APD狀況排除

腹膜透析自動回覆▼

下午9:21

台大醫院...透析中心
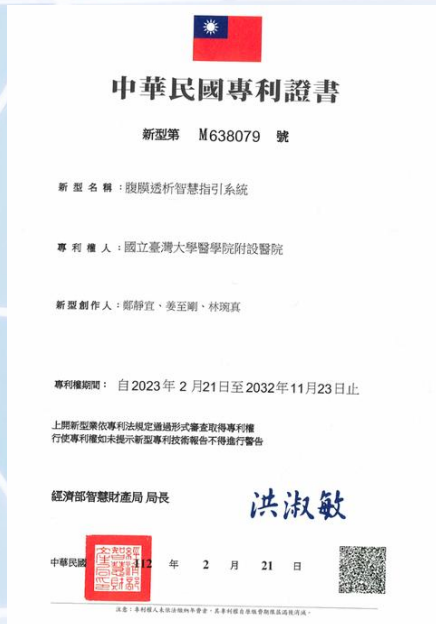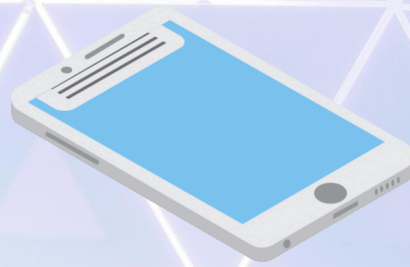
點擊腹膜透析飲食指導內容有腹膜透析營養、貧血飲食補充，及透析限水、限磷飲食原則，提供營養師影片及食物兌換表，供病友隨時取用

點擊
APD狀況排除

click of APD guidance
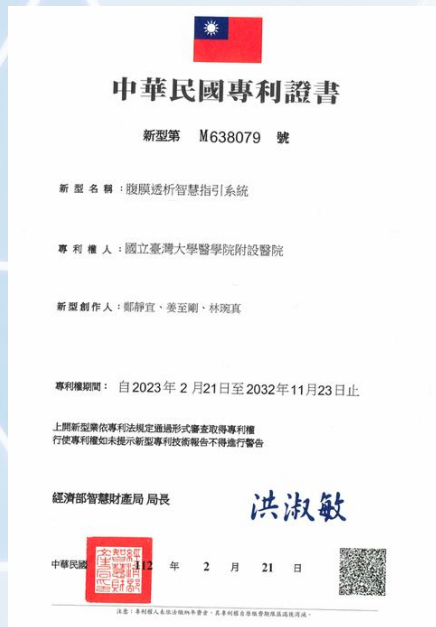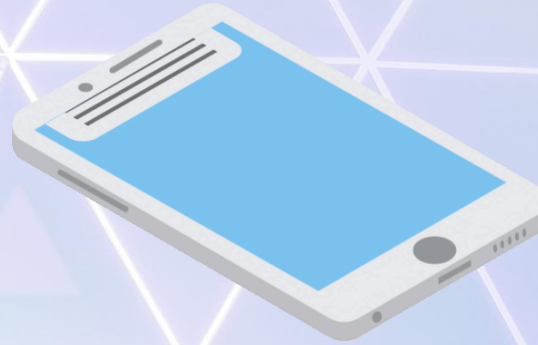
點擊APD狀況排除，提供病友居家進行全自動腹膜透析的狀況排除，包括錯誤代碼及警訊查詢的查檢表，提升病人解決問題的能力

Research Design

We conducted the project since from 1 May 2021 to 30 April 2022.

1. We used a Likert scale (5 points) to survey patients' satisfaction questionnaire after three months of using the LINE chatbot.

2. collected the number of clicks from patients over 12 months and analyzed usage of six option menu.

3. calculated the incidence of peritoneal dialysis-related infections in patients before and after 6 months of using the chatbot.

   1. .

Patient satisfaction

健康守護 醫界典範

We conducted a satisfactory survey of participants   N= 297

Survey patient satisfaction option using PD AI Chatbot			Scale	Number	Percentage	
System quality	1.	I feel that the 'PD AI Chatbot' is easy to use.	5	80	26.9%	94.8%
			4	202	68.0%	
	2.	I am comfortable with using the 'PD AI Chatbot'.	5	79	26.6%	97.3%
			4	210	70.7%	
Information quality	3.	I feel that the 'PD AI Chatbot' is a helpful tool for self-care during home dialysis.	5	92	31.0%	98.3%
			4	200	67.3%	
Service quality	4.	During the COVID-19 pandemic, the 'PD AI Chatbot' has always allowed me access to health education content.	5	94	31.6%	98.6%
			4	199	67.0%	
User benefit	5.	During the COVID-19 pandemic, PD AI Chatbot could help reduce the length of their hospital stay during OPD visits.	5	93	31.3%	93.6%
			4	185	62.3%	
	6.	The use of the 'PD AI Chatbot' during the COVID-19 pandemic has provided me with peace of mind.	5	90	30.3%	96.3%
			4	196	66.0%	
User satisfaction	7.	I am satisfied with my experience using the 'PD AI Chatbot'.	5	90	30.3%	97.6%
			4	200	67.3%	
	8.	I would like to continue using the 'PD AI Chatbot' in the future.	5	96	32.3%	98.6%
			4	197	66.3%	
	9.	Please rate the usefulness of the 'PD AI Chatbot'.	5	177	59.6%	89.6%
			4	89	30.0%	
			3	30	10.1%	

Survey Patient Satisfaction Option Using Chatbot

User Satisfaction

N=297

User data was collected

Survey Patient Using PD Chatbot **number of clicks** by category
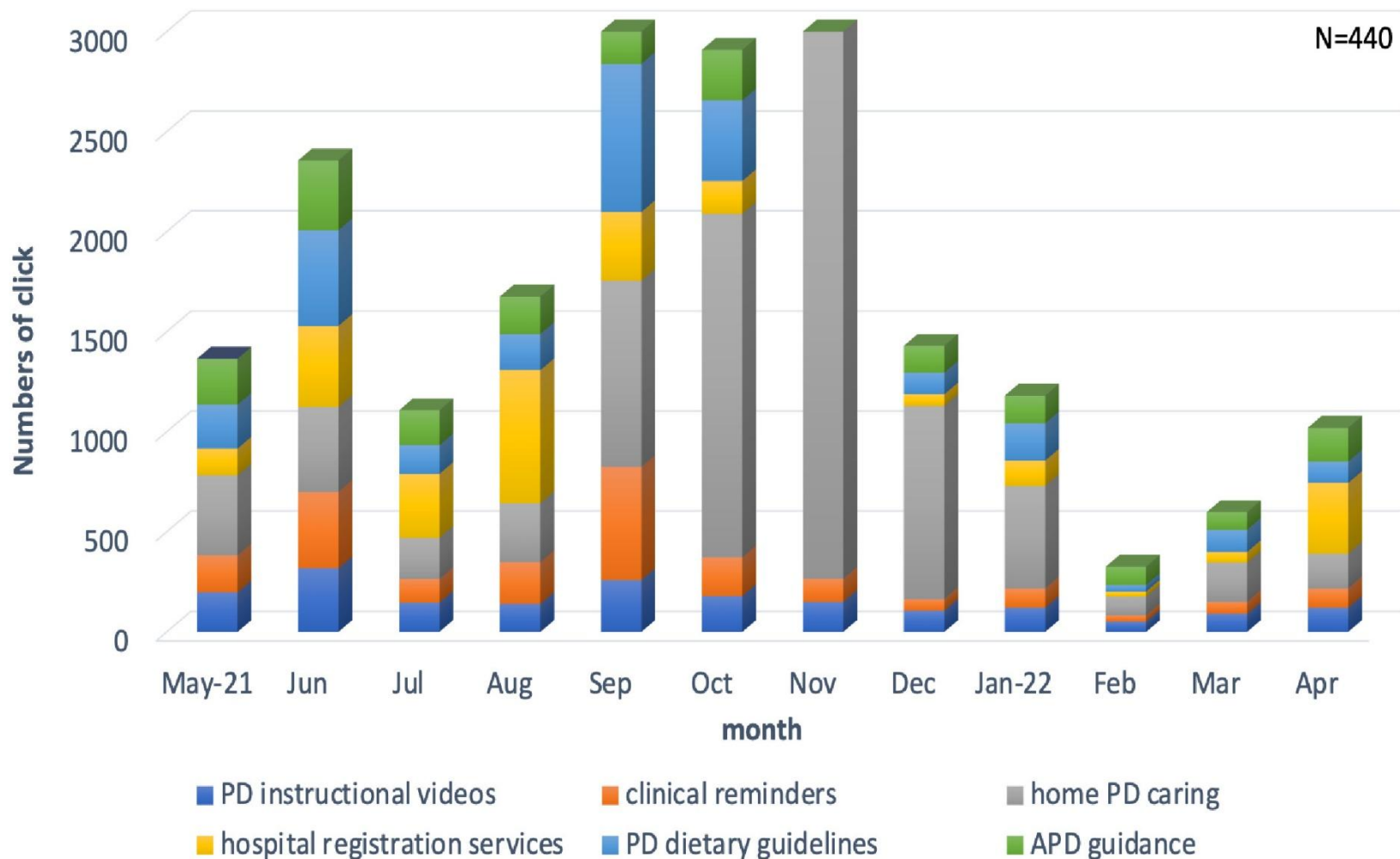
A total of 20,784 clicks were recorded on the PD Chatbot for 12 months.

The three most popular options are:

1. **8679 (41.8%) home PD caring .**

2. **2883 (13.9%) PD dietary guideline.**

3. **2755 (13.3%) outpatient hospital registration service.**

PD-related infection rate

N=440

Comparing infection rates before and after of PD Chatbot implementation

Comparing time	Mean ± SD 100/patient months	Mean Standard Error	Correlation	Significance p value
2020_Jul-Sep_ ESI	.87 ± .44	.256	.366	.761
2021_Jul-Sep_ ESI	.37 ± .34	.199		
2020_Oct-Dec ESI	.67 ± .39	.228	.997	.049*
2021_Oct-Dec ESI	.52 ± .13	.075		
2020_Jul-Sep Tunnel	.29 ± .12	.070	.040	.974
2021_Jul-Sep Tunnel	.67 ± .21	.124		
2020_Oct-Dec Tunnel	.52 ± .12	.075	.999	.024**
2021_Oct-Dec Tunnel	.14 ± .13	.073		

Abbreviations: ESI, Exit Site Infection; Infection Rate Calculation, number of episodes of peritonitis/Number of patient months 100 = 100 patient months of per episode number; Mean, Infection Rate (was months Average); Tunnel, Tunnel Infection.
*p Value ≤0.05 is considered statistically signification.
**p Value ≤0.001 is considered very signification.

PD-related infection rate

Comparing peritonitis reason with PD AI Chatbot implementation (year)

Peritonitis reason (100/patient months)	Before AI Chatbot	After AI Chatbot	RR (post/pre)
Technique-related	0.93	0.80	0.80
Gastrointestinal-related	0.51	0.74	1.35
Total	1.44	1.54	1.06

Note: Infection Rate calculations.

Step 1. Total number KFRT patients undergoing PD days/30.4 days per month = patient months.

Step 2. number of episodes of peritonitis/Number of patient months 100 = 100 patient months of per episode number.

➢ The Relative Risk of peritonitis due to technical issues was also improved.

➢ Learning through chatbots can indirectly enhance their behavioral and cognitive abilities, thereby reducing the risk of technical peritonitis.

Conclusion

- Patients can receive personalized education and problem solutions through chatbots.

- Opportunity to develop new models of health education and telehealth care.

- Chatbots can facilitate self-learning of PD care, collect patient health information, and provide customized health education content to   individual needs.

User data in 2025

A 腹膜透析技術影片
B 小叮嚀
C 居家自我照顧
D 網網相連
E 腹膜透析飲食
F APD上機和狀況排除

A **technical videos**
B **clinical reminders**
C **home PD care**
D **online Registration service links**
E **dietary guideline**
F **APD guidance**

10/01/2024 - 11/01/2025

Selectable time range: 11/01/2021 to Tally end date, Max selectable days: 397 days

Events   Users   Rates

Impressions   A   B   C   D   E   F

LINK to Chatbot video

Implementation of Artificial Intelligence Chatbot in Peritoneal Dialysis Nursing Care : Experience from a Taiwan Medical Center

NEPHROLOGY
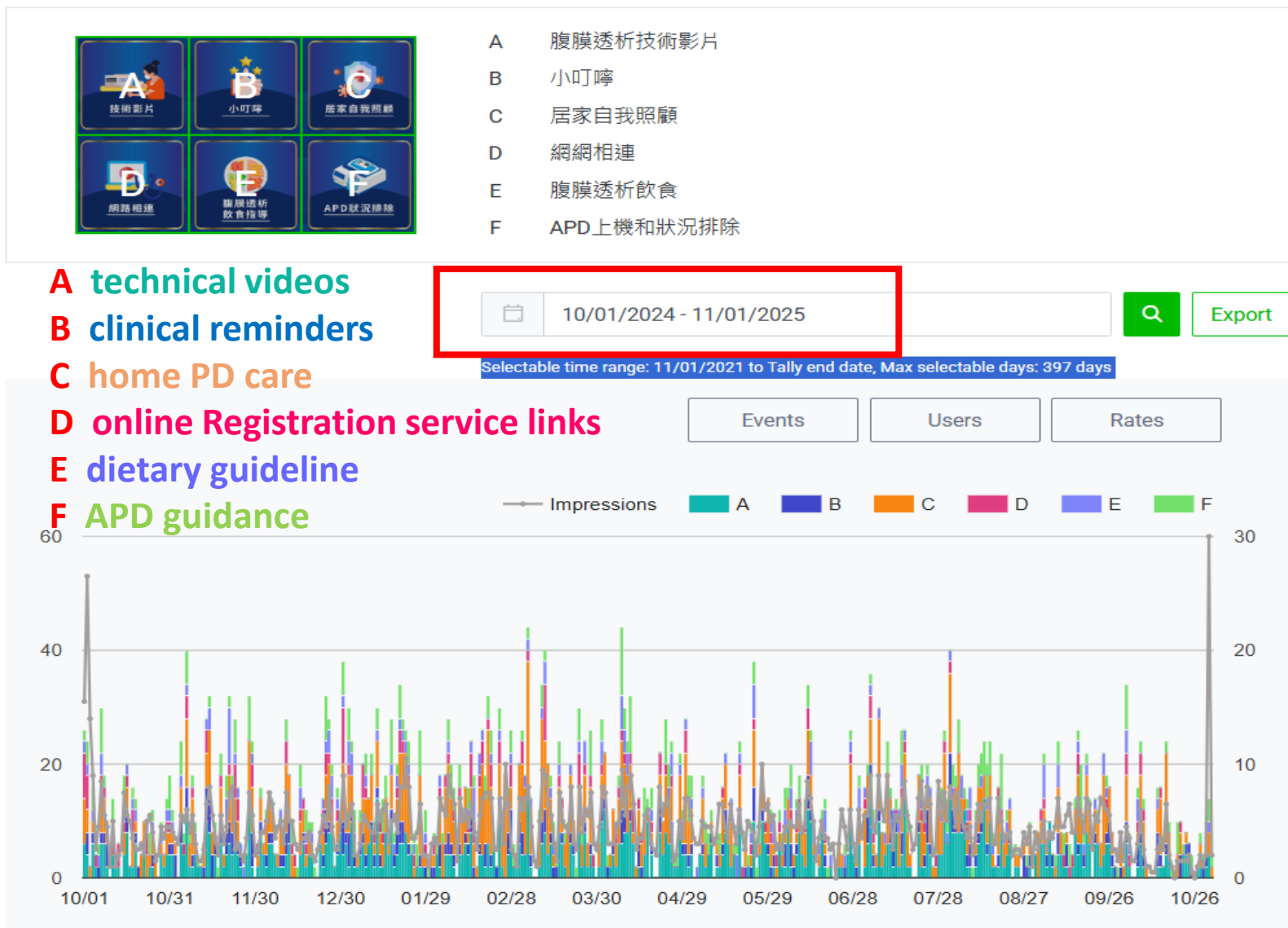
Aim: / Background:

- **Background:**

The COVID-19 pandemic has created an increased demand for effective remote communication and patient education.
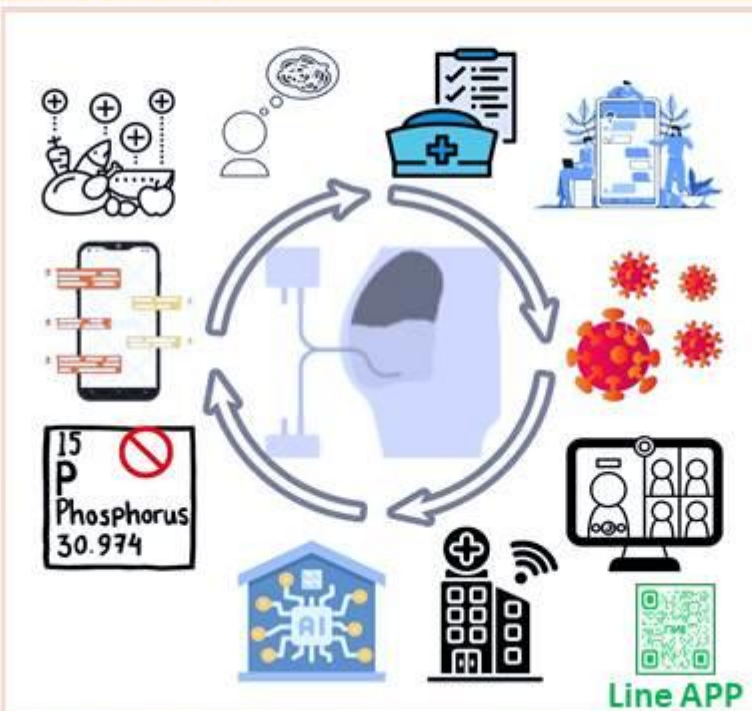
- **Aim:**

Improve Kidney failure with replacement therapy (KFRT) patients undergoing PD self-care and knowledge to reduce peritonitis using AI and social media.

Innovation PD AI Chatbot is divided into user interface has 6 category.

Methods:

Line APP

✓ **Patient + Nurse questionnaire**
✓ **Count patient clicks**
✓ **Infection Rate Comparison**

Outcomes: / Results:

- **Patient Clicks**
  20,784 clicks / year
  From May 1, 2021, to April 30, 2022
- **Patient Questionnaire**
  Education satisfaction of **97.6%**
- **Nurse Questionnaire**
  Innovative satisfaction of **94.3%**
- **Reduce Infection Rate**
  Reduce ESI and tunnel infection.
  Reduce technique-related peritonitis rate from 0.93 to **0.8/ 100 patient month.**

Innovative

Interactive Mobile Handbook

Privacy

Crisis Solving

CONCLUSION: The revolutionary PD AI Chatbot for PD provides remote and digital information, greatly enhancing the self-care capabilities of ESRD patients undergoing PD, resulting in high recognition and satisfaction.

C-I Cheng et al., 2023

Thanks for your Attention