

Determinants of Engagement with a Web-Based Interactive Therapeutic Education Platform among End-Stage Renal Disease Patients

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- End-stage renal disease (ESRD) in France accounted for an estimated financial burden of €4.4 billion in 2023.
- Effective management of ESRD:
 - Enhances patient's ability to manage their condition.
- Use of Therapeutic Patient Education (TPE):
 - Improves ESRD management and health outcomes.
- Web-based TPE:
 - Provides patients with information and updates about their disease.
 - Allows interaction with the care team and peers.
 - Helps delay disease progression.
 - Reduces the need for emergency hospitalizations.
- The cost-effectiveness of web-based TPE depends on the degree of patient adherence.

- To identify and analyse the determinants influencing the utilisation of the web-based interactive TPE platform among ESRD patients.
- To assess the effect of COVID-19 on patient engagement.

- Diop, M., et al. (2024). "Cost-Utility Analysis of a Web-Based Interactive Patient Education Platform: Evidence from a Randomized Clinical Trial for End-Stage Renal Disease Patients." *Publication in process*.

This study demonstrates that integrating a web-based TPE platform for ESRD patients can be cost-effective and potentially dominant, provided a careful selection of patients to ensure platform usage.

- Xie, L., Itzkovitz, A., Roy-Fleming, A., Da Costa, D., Brazeau, A. (2020). "Understanding Self-Guided Web-Based Educational Interventions for Patients With Chronic Health Conditions: Systematic Review of Intervention Features and Adherence." *Journal of Medical Internet Research*.

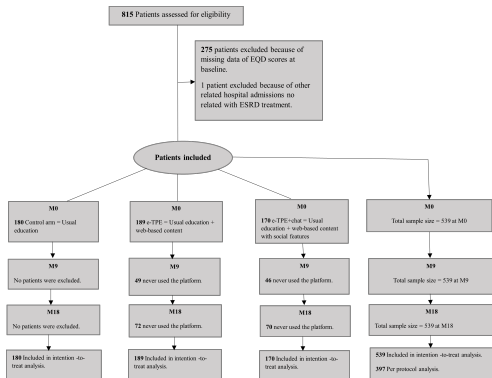
The study concludes that the design of web-based interventions should be tailored to the target population's needs, balancing the benefits and drawbacks of human involvement, and minimizing technical barriers.

- Donkin, L., Christensen, H., Naismith, S., Neal, B., Hickie, I., Glozier, N. (2011). "A Systematic Review of the Impact of Adherence on the Effectiveness of e-Therapies." *Journal of Medical Internet Research*.

This review evaluates the association between adherence and the outcomes of e-therapies, highlighting the importance of adherence in the effectiveness of these interventions.

- Diop, M., et al. (2024); Xie, L., Itzkovitz, A., Roy-Fleming, A., Da Costa, D., Brazeau, A. (2020): Highlights the importance of tailored interventions and patient engagement in web-based TPE for cost-effectiveness and improved outcomes.
- Donkin, L., Christensen, H., Naismith, S., Neal, B., Hickie, I., Glozier, N. (2011): Indicates that time spent online is influenced by factors such as processing speed, cognitive ability, reading aptitude, and familiarity with computers, which are likely affected by psychological health.
- Our work builds on these studies by shedding light on key factors associated with engagement and participation in digital healthcare, specifically focusing on the determinants influencing the utilization of a web-based interactive patient education platform among ESRD patients.
- This research aims to provide a deeper understanding of how to enhance patient engagement and optimize the effectiveness of such interventions.

- PIC-R trial: a prospective multicentre study, conducted in 12 French nephrology centres.
- Aimed to assess both the economic impact and effectiveness of integrating an online interactive TPE platform
- Two interventions group: TPE & TPE with community features into the care pathway of patients with ESRD.



- A total of 359 patients were included: e-TPE (n=189) and e-TPE+chat (n=170).
- Patients were aged at least 18 years, with a severe ESRD (transplanted or undergoing dialysis treatment or neither).
- All patients had computer literacy and Internet access.
- Almost 30% of patients reported not having used the platform over the 18 months.
- The most frequently stated reason for not using the platform was that therapeutic information was readily available from other sources (71%).
- Utilisation of the platform between September 2018 and January 2022.
 - Enables comparison of platform usage before and after the COVID-19 outbreak

■ Determinants

$$\text{Utilisation}_i = \beta_0 + \beta_1 X_i + \beta_2 \text{Smok}_i + \beta_3 P_i + \beta_4 \text{KC}_i + \beta_5 \text{FAC}_i + \epsilon_i$$

- Utilisation_i : Outcome of interest, a binary variable taking the value one if the individual used the platform.
 - X_i : Variables related to socioeconomic dimensions (Age, gender, income, Marital Status, Education and Profession).
 - Hab_i : Smoker or not
 - P_i : Variables related to the individual's personality traits (Extraverti, Reserved, Friendly, Enthusiastic, Tenacity and "Risk attitude").
 - KC_i : knowledge of their condition.
 - SN_i : Use of social network (Facebook account).
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- **Average COVID-19 Effect: Propensity Scores Matching.**

$$\text{COVID-19 effect} = \{\text{Utilisation}_{\text{post March 17th, 2020}}\} - \{\text{Utilisation}_{\text{until March 17th, 2020}}\}$$

Table 1: Determinants (Part 1).

	All	TPE	TPE + Community features
AGE	0.023*** (0.006)	0.102*** (0.014)	-0.007 (0.008)
SEX	-0.479*** (0.083)	-0.876*** (0.211)	0.110 (0.128)
Married	0.409*** (0.089)	-2.550*** (0.304)	1.772*** (0.141)
Higher Education	-0.011 (0.099)	0.165 (0.307)	0.518*** (0.141)
Executive and liberal profession	0.889*** (0.142)	0.822* (0.451)	2.289*** (0.208)
Employee	0.663*** (0.115)	0.777** (0.345)	0.812*** (0.169)
Between €2,000 and €5,000	1.932*** (0.119)	3.098*** (0.335)	1.256*** (0.170)
<€ 5,000	0.726*** (0.148)	3.133*** (0.486)	-0.527** (0.224)
Smokers	-1.103*** (0.122)	-4.105*** (0.369)	-0.132 (0.218)

Table 2: Determinants (Part 2).

	All	TPE	TPE + Community features
Risk attitude	0.226*** (0.019)	0.153*** (0.048)	0.311*** (0.035)
Critical and aggressive	0.239*** (0.025)	0.661*** (0.101)	0.255*** (0.036)
Reserved, calm	-0.137*** (0.025)	0.272*** (0.062)	-0.168*** (0.038)
Friendly	0.201*** (0.037)	0.090 (0.112)	0.502*** (0.057)
Enthusiastic	0.168*** (0.026)	0.662*** (0.078)	-0.411*** (0.046)
Tenacity	-0.112*** (0.014)	-0.378*** (0.042)	-0.066*** (0.017)
Knowledge of the condition	-0.351*** (0.057)	-0.181 (0.155)	-0.602*** (0.099)
Facebook account	0.648*** (0.092)	1.632*** (0.272)	0.503*** (0.142)
Covid	0.262* (0.137)	0.060 (0.271)	-0.651*** (0.231)
Obs.	352	185	167
Pseudo R2	0.21	0.18	0.12

- **Age:** Positive and significant for "All" and "TPE", suggesting older age increases engagement, but not significant for "TPE + Community".
- **Sex:** Negative and significant for "All" and "TPE", indicating males are less likely to engage, no significant effect in "TPE + Community".
- **Married:** Positive and significant for "All" and "TPE + Community", negative for "TPE", indicating marital status has a differential impact.
- **Higher Education:** Not significant for "All" and "TPE", positive and significant for "TPE + Community", suggesting higher education increases engagement in community features.
- **Profession:** Positive and significant across all categories, especially for "Executive and liberal profession", indicating professional status positively affects engagement.
- **Income:** Positive and significant for income categories, with higher income associated with higher engagement.

- **Smoking:** Negative and significant for "All" and "TPE", suggesting smokers are less likely to engage, no significant effect in "TPE + Community".
- **Risk Attitude:** Positive and significant across all categories, indicating higher risk tolerance increases engagement.
- **Personality Traits:** Varying impacts with traits like critical and aggressive being positive and significant, while reserved and calm being negative for "All" and "TPE + Community".
- **Knowledge of Condition:** Negative and significant for "All" and "TPE + Community", suggesting more knowledge reduces engagement.
- **Facebook Account:** Positive and significant, indicating social media presence increases engagement.
- **COVID-19:** Positive and significant for "All", not significant for "TPE", and negative for "TPE + Community", showing varied impacts of the pandemic.

Overall Effect:

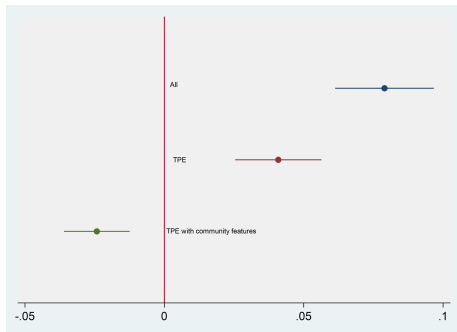
- The coefficient for COVID-19 impact on platform use is positive and highly significant ($\beta = 0.079$, $p < 0.001$).
- Indicates that COVID-19 increased the likelihood of using the platform by approximately 7.9

TPE Only:

- The coefficient is also positive and significant ($\beta = 0.041$, $p < 0.001$), but smaller than the overall effect.
- Suggests a 4.1

TPE with Community Features:

- The coefficient is negative and significant ($\beta = -0.024$, $p < 0.001$).
- Indicates that COVID-19 decreased the likelihood of using the platform by 2.4



- Our early exploration underscores the importance of patient selection to optimize outcomes.
- The pandemic significantly reduce the use of across TPE with community features group.
- Tailor content to different age groups to meet preferences; alternatively
- Provide content suitable for varying educational backgrounds to enhance accessibility
- Enhancing engagement through personalized user experiences tailored to attitudes towards risk and personality traits.

Thank you for your attention!

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