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Can WhatsApp messages help kidney transplant patients take their anti-rejection medicines?

Submission date
13/10/2026

Recruitment status
No longer recruiting

Registration date
14/10/2026

Overall study status
Ongoing

Last Edited
13/10/2026

Condition category
Other

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
People who receive a kidney transplant must take anti-rejection medicines (such as tacrolimus) every day to protect the new kidney. Missing or delaying doses can put the transplant at risk, and forgetting is common. Short WhatsApp messages could help people remember and keep up the habit. In a small earlier pilot, most patients found the messages useful. This study tests whether a 6-week programme of WhatsApp messages, designed using behaviour change science, helps patients take their medicines as prescribed, compared with their usual care.

Who can participate?
Adults with a kidney transplant (done up to January 2026) who are followed at the Nephrology Centre of the Hospital de Clínicas in Montevideo, Uruguay, take tacrolimus, have a smartphone with WhatsApp, and have already signed consent for the wider NefroNudge project.

What does the study involve?
Participants will be allocated by chance to one of two groups. One group receives their usual care plus 18 WhatsApp messages over 6 weeks (3 per week, from 26 October to 4 December 2026), sent by the research team. Participants can react to each message with an emoji to say whether it was useful, and are asked at the end to rate their experience from 1 to 10. The other group continues with their usual care and receives no messages during the 6 weeks; they will be offered the messages in 2027. At the end, between 4 and 18 December 2026, everyone is asked by WhatsApp about how they took their medicines in the last 4 weeks. A nephrologist and a nurse, who do not know which group each person is in, also rate each person's adherence from the medical record. A separate group of 52 patients who took part in an earlier pilot will also receive the messages, and will be described separately. Tacrolimus blood levels measured in routine care will be reviewed as background information until May 2027.

What are the possible benefits and risks of participating?
We cannot promise a benefit, but participants may find the messages help them take their medicines regularly, and the results may help future transplant patients. The risks are small: receiving messages on a phone, and the privacy of phone numbers, which are handled according to Uruguayan data protection law. The messages do not contain medical information. Participants can leave at any time without any effect on their care.

To keep the risk of unsuitable messages low, every message was checked in four steps before being used. First, messages were drafted with artificial intelligence language models (Gemini 3.5 flash, Claude Fable 5 and others), using ten behaviour change techniques chosen according to the needs identified by the clinic's staff and expert advice; around 20,000 candidate messages were generated and compared. Second, each message was checked for meaning against a set of quality criteria, and only those that met all of them were kept. Third, an automatic check of how easy each message is to read removed those that were hard to read or raised concerns. Fourth, two nephrologists independently reviewed the remaining messages, scoring them on four aspects including relevance and suitability for patients, and the best-rated messages were selected.

Where is the study run from?
Institute of Health Psychology (Instituto de Psicología de la Salud) and Social Experimentation and Innovation Centre (Centro de Experimentación e Innovación Social, CEIS), Faculty of Psychology, Universidad de la República, Montevideo, Uruguay, together with the Medical Psychology Unit (Unidad de Psicología Médica) of the Hospital de Clínicas and the Faculty of Chemistry (Facultad de Química), Universidad de la República. Participants are recruited from the Nephrology Centre of the Hospital de Clínicas.

When is the study starting and how long is it expected to run for?
Participants are allocated to groups in October 2026. Messages run from October to December 2026. Data are collected until May 2027.

Who is funding the study?
Comisión Sectorial de Investigación Científica (CSIC), Universidad de la República (Research and Development Projects 2024).

Who is the main contact?
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Additional identifiers

CSIC (Universidad de la República) R&D Projects 2024 grant number
22520240100656UD

Ministry of Public Health of Uruguay (MSP) research registry number
9078271

Study information

Scientific Title
Preliminary efficacy of a 6-week behaviour change technique-based WhatsApp messaging intervention versus usual care on self-reported adherence to immunosuppressive medication in adult kidney transplant recipients: a two-arm randomised controlled tria

Acronym
NefroNudge

Study objectives
1. To estimate the preliminary efficacy of a 6-week WhatsApp messaging intervention based on behaviour change techniques, added to usual care, on self-reported implementation of immunosuppressive medication (BAASIS), compared with usual care alone, in adult kidney transplant recipients. Hypothesis: fewer participants in the intervention arm will report any implementation problem in the last 4 weeks (BAASIS©) than in the usual care arm.
2. To compare the two arms on clinician-rated adherence (secondary objective)
3. To describe how acceptable participants find the intervention and its messages, and which behaviour change techniques (BCT) they find most useful
4. To describe the same outcomes in a separate group of 52 patients who took part in an earlier pilot
5. To describe tacrolimus trough levels recorded in routine care before the intervention (historical series) and after it, as contextual follow-up data not tied to a specific measurement window

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 29/04/2025, Comité de Ética de la Investigación, Hospital de Clínicas (Hospital de Clínicas Research Ethics Committee) (Av. Italia s/n, Montevideo, 11600, Uruguay; 1953- 4817; comite.eticahc@gmail.com), ref: 43-24

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Blinded (masking used)

Control
Active

Assignment
Parallel

Purpose
Supportive care

Study type(s)

Health condition(s) or problem(s) studied
Kidney transplantation, adherence to immunosuppressive medication

Interventions
Participants are adult kidney transplant recipients followed at the Nephrology Centre of the Hospital de Clínicas (Montevideo, Uruguay), all of whom signed informed consent for the framework project before registration. Allocation takes place after registration, between 19/10 /2026 and 23/10/2026. Of 252 eligible participants, 200 will be randomised 1:1 to the intervention or usual care arm, stratified by time since transplant (<2 vs ≥2 years at 26/10/2026), using permuted blocks of variable size. The sequence is generated and held by an independent person who has no contact with participants and takes no part in outcome assessment.

Intervention arm: usual care plus a behaviour change intervention delivered as 18 WhatsApp messages over 6 weeks (3 per week), from 26/10/2026 to 04/12/2026. The messages are based on the COM-B model and on ten behaviour change techniques from the BCT Taxonomy v1, chosen according to needs identified by the clinic staff and expert advice. They were generated with large language models and passed a four-stage quality control (semantic validation, automated readability assessment, and independent review by two nephrologists). They are sent by the research team (not hospital staff) from a study phone number through a messaging platform. After each message, participants are invited to react with an emoji: thumbs up (it was useful to me), neutral face (it made no difference to me) or thumbs down (it was not useful to me). Participants can withdraw at any time.

Control arm: usual care of the Nephrology Centre, with no intervention messages and no study contact during the 6 weeks. These participants are contacted only at the end of the intervention period to complete the outcome assessment. The intervention will be offered to this arm in 2027.

Non-randomised pilot cohort: 52 patients who took part in an earlier pilot (and received 3 weeks of pilot messages) will receive the same 6-week intervention without randomisation, and will be analysed descriptively and separately.

Outcomes: after the intervention, from 04/12/2026 to 18/12/2026, the BAASIS© is administered once in both arms by WhatsApp and adherence is rated once by one nephrologist and one nurse. Overall acceptability is rated 1–10 (intervention arm). Tacrolimus trough levels recorded in routine care (historical series before the intervention and the levels available afterwards) are described as contextual follow-up data; they are not a trial outcome. Follow-up of the trial outcomes ends on 18/12/2026; routine tacrolimus levels are extracted from clinical records until 31/05/2027. The clinicians who rate adherence are not told the allocation; participants and the research team sending the messages cannot be blinded. A separate qualitative acceptability

study with voice notes from consenting participants is planned, subject to ethics approval, and is not part of the registered outcomes.

Intervention Type
Behavioural

Primary outcome(s)
1. Self-reported medication implementation problem measured using BAASIS© (2021 written self-report, Spanish translation): any "yes" on items 1A, 1B, 2 or 3 (any missed dose, two or more consecutive missed doses, dose taken more than 2 hours off schedule, or self-altered dose in the last 4 weeks), administered remotely in both arms, at a single time point, after the end of the intervention, from 4 December 2026 to 18 December 2026

Key secondary outcome(s)
1. Individual BAASIS© implementation items (self-reported) measured using BAASIS© (2021 written self-report, Spanish translation): proportion of participants answering "yes" on each of items 1A, 1B, 2 and 3 separately (last 4 weeks), administered remotely in both arms at a single time point, from 4 December 2026 to 18 December 2026

2. Clinician-rated adherence to immunosuppressive medication measured using Five-level ordinal rubric (1 = excellent, 2 = good, 3 = fair, 4 = poor, 5 = very poor; higher score = worse adherence) adapted from the collateral report of Schmid et al. (Am J Transplant 2017;17:1594–1605) and anchored in verifiable chart facts (missed appointments, documented concerns, unexplained trough variability, self-reported dose reduction or suspension), rated independently by one nephrologist and one nurse who are not told the allocation, covering the period from 26 October 2026 to the date of rating and using the patient’s earlier clinical history as reference; ratings are reported separately by rater and are not combined with other adherence measures at a single time point, from 4 December 2026 to 18 December 2026

3. Perceived usefulness of each message, overall and by behaviour change technique (BCT) measured using participant reaction to each WhatsApp message with one of three emojis: thumbs up ("it was useful to me"), neutral face ("it made no difference to me") or thumbs down ("it was not useful to me"), summarised per participant as the proportion of messages receiving a reaction and the distribution of reactions, and per behaviour change technique (each message is mapped to one of 10 techniques) as the proportion of "useful" reactions (intervention arm only) at a time point after each message, throughout the 6-week intervention, from 26 October 2026 to 4 December 2026

4. Overall evaluation of the intervention (acceptability) measured using self-rated overall experience with the messages on a 1–10 scale (1 = very bad, 10 = very good), asked by WhatsApp: "On a scale where 1 is very bad and 10 is very good, how would you rate your experience with the messages?" (intervention arm only) at a single time point, after the end of the intervention, from 4 December 2026 to 18 December 2026

Completion date
31/05/2027

Eligibility

Key inclusion criteria

1. Kidney transplant performed up to January 2026 and followed up at the Nephrology Centre (Centro de Nefrología), Hospital de Clínicas, Montevideo, Uruguay
2. Signed informed consent for the NefroNudge project (obtained at the baseline assessment)
3. Currently treated with tacrolimus as part of the immunosuppressive regimen
4. Owns a smartphone with WhatsApp

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
120 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Hospitalised, not living at home, or with serious medical complications at the time of allocation
2. Unable to read the messages due to physical limitations (e.g. visual impairment)

Date of first enrolment
19/10/2026

Date of final enrolment
19/10/2026

Locations

Countries of recruitment
Uruguay

Sponsor information

Organisation
Universidad La República

ROR
https://ror.org/05xs36f43

Organisation
Hospital de Clínicas “Dr. Manuel Quintela” (Universidad de la República)

Funder(s)

Funder type

Funder Name
Comisión Sectorial de Investigación Científica

Alternative Name(s)
Sectoral Commission for Scientific Research, CSIC

Funding Body Type
Government organisation

Funding Body Subtype
Associations and societies (private and public)

Location
Uruguay

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available