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ORIGINAL RESEARCH

Impact of an SMS reminder service on outpatient clinic attendance rates by patients with HIV followed-up at Pointe-à-Pitre University Hospital

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Objective: By the end of 2014, 23% of people living with HIV (PWHIV) who had had a scheduled appointment at our outpatient clinic had not attended. We implemented an SMS reminder service and assessed its impact on medical consultation-attendance rate.

Methods: The intervention was directed at all PWHIV with a scheduled appointment between March and April 2015 at our infectious diseases department. Two days before the scheduled visit, an appointment reminder SMS was sent to every other patient at random. On the visit day, a questionnaire was used to determine patient perceptions regarding the SMS.

Results: A total of 224 patients (126 males, 98 females, mean age 52 years, 94% taking antiretroviral therapy) were selected to take part in the study. The medical consultation-attendance rate was 76% in the SMS reminder read group (87 patients) and 72% in the SMS reminder not sent or not read group (137 patients, P=0.6). Among the 66 SMS reminder read patients who attended their consultation and answered the questionnaire, 51% reported that the SMS had contributed to their attendance.

Conclusion: Sending an SMS reminder had no significant impact on clinic attendance rates. This may have been due in part to the sociocultural characteristics of our patients. Further research should investigate other tools to improve attendance rates.

Keywords: adherence, antiretroviral treatment, SMS, HIV, Guadeloupe

Introduction

Whatever the relationship between a patient and his/her doctor, a lack of therapeutic adherence by the patient renders the best efforts of the physician ineffective. Consequences of lack of attendance of consultations include delays in diagnosis and initiation of treatment, medication-dose adjustment,[1] and waste of resources.[2] The World Health Organization estimates that adherence to treatment in chronic diseases is as low as 50%.[3] A meta-analysis of eight studies conducted in Australia, the US, Scotland, Malaysia, China, and Kenya showed that on average only 68% of patients had good adherence to medical follow-up, based on rate of attendance to scheduled clinic visits.[1]

Various strategies can be implemented to improve outpatient-clinic attendance, including the use of appointment-management software or manual or automatic appointment reminder systems by either email, phone call, or SMS. At Pointe-à-Pitre University Hospital (PAPUH), a large number of patients followed by the Department of Infectious Diseases and Tropical Medicine (DIDTM) do not attend their scheduled consultations. A preliminary study that we conducted in November 2014 showed that 70 of 307 (23%) patients with HIV (PWHIV) with a scheduled outpatient-clinic visit did not attend.

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In Guadeloupe, the rate of mobile-phone use is high: 86% of individuals aged 12 years and older have at least one personal mobile phone and four in five people with mobile phones send SMSs or MMSs.[4] Reflecting this, most patients followed by the DIDTM of PAPUH own a mobile phone whose number is recorded in their electronic medical record system (EMRS) file. Although a few studies have demonstrated that texting may significantly enhance consultation-attendance rates,[2,5–9] others have shown no significant improvement,[10] which is why we decided to conduct this study before possibly using SMS reminders routinely. Our aim was to measure the impact of sending an SMS reminder on the attendance rate of the population of PWHIV followed by the DIDTM of PAPUH.

Methods

We performed a prospective comparative study at PAPUH from March 18 to April 24, 2015. We studied all PWHIV aged 18 years and older equipped with a mobile phone and with a scheduled appointment at the DIDTM during this period. Patients who did not have a personal mobile phone, those coming for the first time to the DIDTM, and couples were not eligible.

We assembled and compared two groups: one SMS+ group and one SMS− group. An appointment reminder SMS was sent to, delivered, and read by all patients of the SMS+ group, while no intervention was done or an SMS was sent but not read by the patients of the SMS− group. Selection of SMS addressees was done at random by picking every second name entered in each DIDTM consultant's electronic diary for each day of the study period. The SMSs were sent 2 days before the scheduled appointment. No SMSs were sent during weekends or holidays. The sending of SMSs was done via Skype software. The identity of the SMS sender appeared as "medical secretary". An "acknowledgment of receipt" was requested. All SMSs were archived and traced in a mailing-list report in which each SMS appeared with its status, which could be "read", "delivered but not read", or "not delivered". The content of the SMS was concise, without mention of the name of the patient, or references to the hospital or to the disease: "Dr N reminds you of your appointment on [day] at [time]".

Every day, the outpatient-clinic secretary received a list of expected patients, with a mention of which SMS group he/she had been assigned to. She gave each patient a questionnaire upon their arrival at the clinic. Questionnaire forms were different for SMS+ and SMS− patients. None mentioned HIV or AIDS for the sake of confidentiality, as the patients filled out the questionnaire in the waiting room. At the beginning of the medical consultation, the physician collected each questionnaire and could help the patient complete the form, should he/she experience difficulties understanding or reading the questions. SMS+ questionnaires explored patient satisfaction regarding the intervention, the time between SMS and date of appointment, their feelings about confidentiality, and their desire to receive further SMSs in the future. SMS− questionnaires explored patients' willingness to receive SMS reminders, and should this happen, their wishes regarding the optimal time between the SMS and appointment dates.

The primary end point was the rate of patients who attended their consultation. We compared this rate between the SMS+ and SMS− groups. During the exploratory study carried out over the third quarter of 2014 at the DIDTM, the rate of PWHIV who attended their consultation was 77%. We aimed to increase this rate to 90% by the use of an SMS. The study was stopped when 224 patients participated. This was the required number of subjects to demonstrate that the difference between 90% and 77% would be significant, with an α-risk of 0.05 and power of 0.85 using a one-tailed test. This calculation was performed with BiostaTGV.

In order to adjust for factors potentially associated with nonattendance at consultations, patient data were retrieved from their EMRS records and analyzed: age, sex, country of birth, occupation, last CD4 count, last plasma HIV viral load, history of opportunistic infections, and antiretroviral treatment. The variables were compared between the two groups of patients using χ^2 and Mann–Whitney tests as appropriate.

Results

Of the 297 PWHIV (n=297) who had an appointment scheduled between March 18 and April 24, 2015, 73 (25%) were not considered for the study for the following reasons: 50 had no known mobile-phone number, and 23 either were not follow-up appointments, attended as a couple, or had a repeat appointment over the period of study. Of the 224 PWHIV (126 men and 98 women) who were enrolled, an SMS was sent to 123 patients (55%) and no SMS was sent to 101 (45%). All 87 patients who received and read the SMS, as proved by the reception of a delivery report, were assigned to the SMS+ group (n=87), and all those who did not receive any SMS were assigned to the SMS− group (n=137) (Figure 1). There were no significant differences in patient characteristics between the two groups (Table 1).

The attendance rate at consultations was 76% in the SMS+ group and 73% in the SMS− group (P=0.57). Based on delivery reports, 40% of patients who attended had received an SMS compared with 60% of those who did not attend (P=0.63). In total, 72% of patients who attended completed

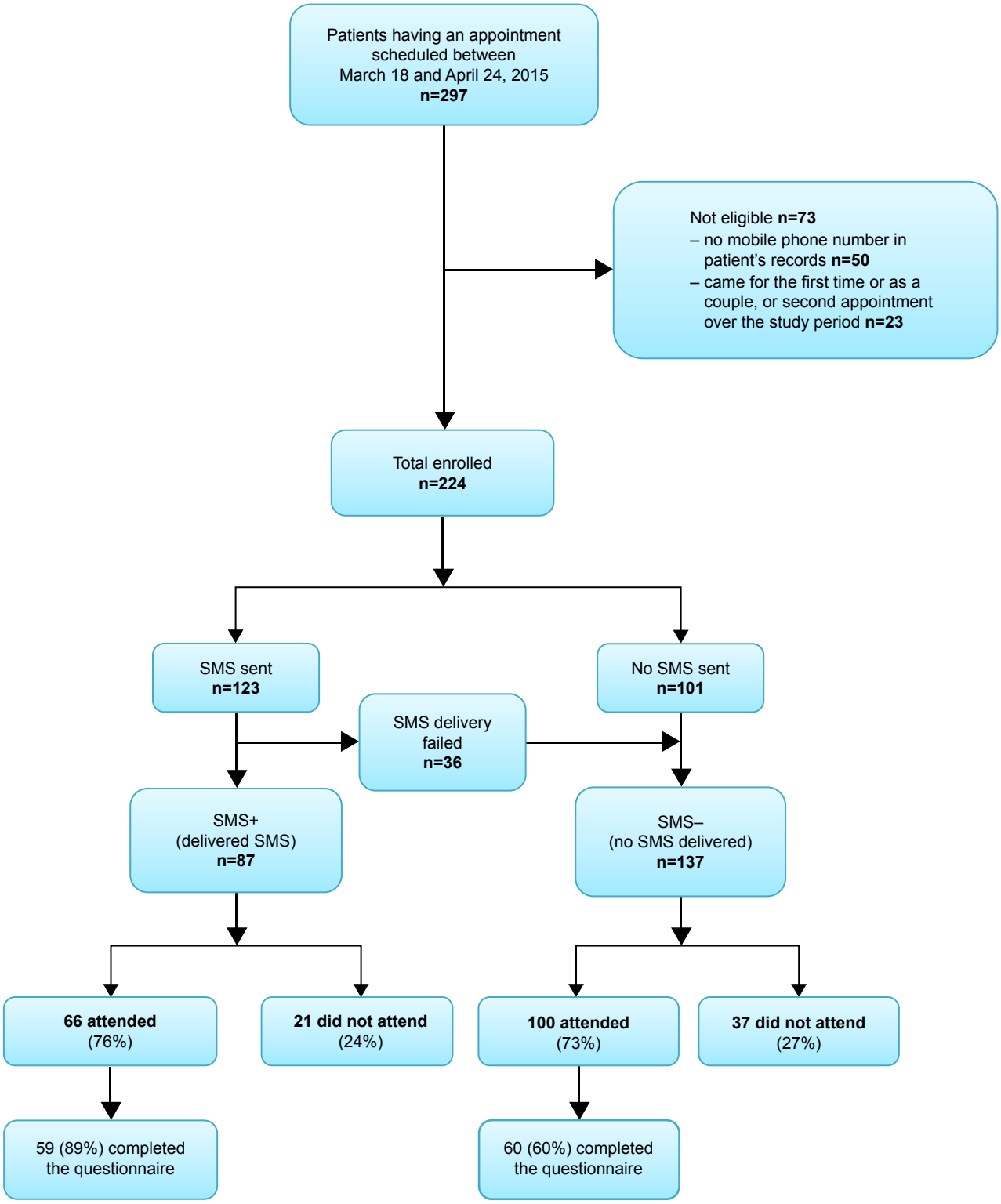

Figure 1 Study flowchart.
Abbreviations: SMS+, appointment reminder SMS was sent to, delivered, and read by patients; SMS–, no intervention was done or an SMS sent but not read by the patients.

the questionnaires: 89% in the SMS+ group and 60% in the SMS– group (Figure 1). More than half the patients in the SMS+ group (51%, n=30) felt the intervention made them more likely to attend. However, 42 (71%) declared that they would be happy to keep on receiving SMS reminders in future. In the SMS– group, 86% of patients (n=52) who answered the questionnaires declared that they wished they had received SMS reminders. None of the patient characteristics analyzed (age, sex, geographic origin, occupation, immune status, history of opportunistic infections,

Table 1 Patient characteristics

	SMS+ (n=87)	SMS– (n=137)	*P*-value
Sex, n (%)			
Male	45 (52%)	81 (59%)	0.27
Female	42 (48%)	56 (41%)	
Median age, years (SD)	48 (13)	48 (27)	0.84
Place of birth, n (%)			
Guadeloupe	38 (44%)	56 (41%)	0.86
Haiti	33 (38%)	52 (38%)	
Other	16 (18%)	29 (21%)	
Employed, n (%)	41 (47%)	50 (36%)	0.11
History of opportunistic disease, n (%)	48 (55%)	78 (57%)	0.79
CD4 count >200/mm^3, n (%)	74 (85%)	116 (85%)	0.94
Viral load <50 copies/mL, n (%)	62 (71%)	105 (76%)	0.37
Receiving antiretroviral treatment, n (%)	79 (91%)	132 (96%)	0.08

Abbreviations: SMS+, appointment reminder SMS was sent to, delivered, and read by patients; SMS–, no intervention was done or an SMS sent but not read by the patients.

antiretroviral treatment) differed significantly between those who attended and those who did not (Table 2).

Discussion

The main finding of this study is that sending an SMS reminder had a small but not significant positive impact (+3%) on the attendance rate of the population of PWHIV followed in our outpatient HIV clinic. One strength of our study was that it addressed a large sample of patients, thus providing sufficient statistical power. It was conducted in one of the two reference centers of care for PWHIV in Guadeloupe, thus providing representative sociodemographic and immunovirological characteristics of the general population of PWHIV in Guadeloupe.[11] The study period (March 18 to April 24, 2015) was long enough to obtain representative and interpretable results. SMS reminders did not disclose sensitive information, and patient data were extracted via the EMRS used in DIDTM, known for its reliability, completeness, security, and confidentiality.[12]

We acknowledge that our study has some limitations. The two groups were not well balanced (137 patients in the

Table 2 Factors associated with attendance rate

	Attended (n=166)	Did not attend (n=58)	*P*-value
SMS group			
SMS+	66 (40%)	21 (36%)	0.63
SMS–	100 (60%)	37 (64%)	
Sex, n (%)			
Male	92 (55%)	34 (59%)	0.67
Female	74 (45%)	24 (41%)	
Median age, years (SD)	48 (13)	48 (13)	0.55
Place of birth, n (%)			
Guadeloupe	76 (46%)	28 (48%)	0.63
Haiti	65 (39%)	19 (33%)	
Other	25 (15%)	11 (19%)	
Employed, n (%)	65 (39%)	26 (45%)	0.45
History of opportunistic disease n (%)	98 (59%)	28 (48%)	0.16
CD4 count >200/mm^3, n (%)	140 (84%)	50 (86%)	0.73
Viral load <50 copies/mL, n (%)	126 (76%)	41 (71%)	0.43
Receiving antiretroviral treatment, n (%)	156 (94%)	55 (95%)	0.81

Abbreviations: SMS+, appointment reminder SMS was sent to, delivered, and read by patients; SMS–, no intervention was done or an SMS sent but not read by the patients.

SMS− group vs 87 in the SMS+ group). This resulted mainly from the fact that we reassigned 36 patients who did not receive the SMS to the SMS− group. A number of factors, such as transport problems or sociocultural barriers, shown in other studies to be associated with nonattendance,[8] could not be evaluated here, because the information was not present in the EMRS file. Missed appointments have an indirect but undeniable impact on patient mortality.[13–16] Forgetting appears to be the primary reason for the nonattendance in consultation of patients followed for a chronic disease (33%).[17]

SMS is an attractive tool to remind patients about their appointment, is inexpensive and easy to implement, and may be better suited to patients than a phone call.[2,7–9] The use of SMS for PWHIV may meet several objectives: reduce onward transmission,[18–20] help coordinate care,[21] improve adherence to antiretroviral therapy, [22–26] and improve the outpatient-attendance rate.[27–31] We suggest several theories explaining the ineffectiveness of an SMS reminder tool in our population: the phone itself, its use (in particular the use of the SMS function), or reading the SMS.

Our results cannot be generalized, because of the peculiarities of our patients' population. In the absence of official statistics, some linguists estimate that Creole is the mother tongue of 99% of people living in Guadeloupe.[32] In 2009, 20% of people living in Guadeloupe aged 16–65 years were illiterate and 25% had writing difficulties.[33] The oral tradition is predominant in the Creole culture,[34] which may explain these difficulties in writing. In our study, 42% (n=95) of patients were not formally employed. We know that populations with the most prevalent difficulties are housewives and other economically inactive nonretired people: 38.5% have written language difficulties.[33]

In the studied sample, the proportion of non-Guadeloupean patients (particularly Haitians) is very important, since only 44% (n=98) of patients were born in Guadeloupe and 37% (n=84) had Haitian origin. These data corroborate those of the regional coordination for HIV (COREVIH).[35,36] Indeed, Guadeloupe has 30,000 Haitians for >400,000 inhabitants, ie, 7.5% of the general population,[33] but the literacy rate in Haiti is only 48.7%.[35] Finally, the mean age of patients in our study was 52 years, the median was 48 years, and 17% were aged >60 years. SMS reminders may be less suitable for this older age-group. In 2013, 83% of people living in Guadeloupe aged 65 years and older, and 37% of those aged 50–65 years had never used SMS.[4]

Practice implications

The population of our study was older, had low literacy levels, and was often primarily Creole-speaking. In future, we may choose to adjust the reminder type according to patient demographics. For some patients, young and comfortable with writing, SMS could be helpful. For older or Creole-speaking patients, a voice reminder by a Creole-speaking medical secretary might be a more suitable reminder. The increasing expansion of mobile technologies in populations and the progressive improvement of literacy rates suggest that in future an SMS reminder service will increase the attendance rate of our patients.

Conclusion

Our study shows that in Guadeloupe, SMS does not seem to be effective enough to promote attendance at follow-up appointments for PWHIV. However, our patients appreciated the intervention and were enthusiastic about continuation of the SMS service. It was the first trial of this type of reminder in this population, and repetition of the intervention could have a significant effect in the longer term.

Ethics

Each individual provided written informed consent for abstraction of his/her medical data into the EMRS used in our hospital. The list of data for clinical events, laboratory-test results, and therapeutic history collected in this EMRS has been submitted to and approved by the French National Commission on Informatics and Rights (CNIL registration 2001/762876/nadiscnil.doc). The local ethics committee of PAPUH, France, approved the present study, which was conducted in accordance with the principles of the Declaration of Helsinki. All patients who attended the clinic and participated in this study received oral and written information about the study and provided written informed consent to participate.

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Author contributions

MZ collected the data. MZ and BM designed the study and drafted the manuscript. BB participated in statistical analysis. RO and IL participated in patient enrolment and data collection, and critically reviewed the manuscript. BH supervised the study, drafted the study protocol, reviewed the data and analysis, and participated in writing the manuscript. All authors contributed toward data analysis, drafting and critically revising the paper, gave final approval of the version to be published, and agreed to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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