

Differential effects of text message reminders on non-attendance and late cancellations in a paediatric outpatient clinic

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ABSTRACT

INTRODUCTION: SMS text appointment reminders reduce non-attendance rates in outpatient paediatric settings. The potential effect on late cancellation rates, however, has not been assessed. The aim of the present study was to assess if SMS text messaging reminders affect non-attendance and late cancellation rates in a secondary paediatric outpatient centre.

METHODS: Non-attendances and late cancellations in children and adolescents aged 0-19 years of age were recorded prospectively during a year before and after the introduction of automatic SMS text messaging reminders. In a telephone interview, the families of late-cancelling patients were asked about the reasons for their cancellation.

RESULTS: During the year before the introduction of SMS reminders, the clinic had 4,556 scheduled appointments in 1,466 patients (878 boys (59.9%) and 588 girls (40.1%); the year after the introduction, the clinic had 4,464 scheduled appointments in 1,424 patients (828 boys (58.1%) and 579 girls (41.9%). Before the introduction, 163 (4.3%) non-attendances and 162 (3.5%) late cancellations were recorded; after the introduction, 67 (1.5%) ($p < 0.001$) non-attendances and 177 (4.0%) ($p = 0.28$) late cancellations were recorded. During the no-SMS and SMS period, a total of 85 (52.5%) and 115 (65%) ($p = 0.26$), late cancelling families, respectively, said that they had forgotten the appointment and could not manage to visit.

CONCLUSIONS: SMS text reminders only improved the non-attendance rate; they did not influence the late cancellation rate. Most late cancellations were explained by forgetfulness.

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Non-attendances and late cancellations of appointments may disturb the management of outpatient clinics and are associated with unnecessary healthcare costs [1-3]. Recently, considerable focus has been given to improving non-attendance rates by sending out electronic reminders to patients. A systematic review identified 11 studies that used SMS reminders [4]. All studies found a statistically significant improvement in non-attendance rates. Ten of the studies were

conducted in adult patient populations, only one in children. A tertiary general paediatric referral centre intervention study found that the mean non-attendance rate improved by approx. 40% [5]. The potential effect of SMS text reminders on the rate of late cancellations, however, was not assessed. To the best of our knowledge, data on SMS text reminders in secondary paediatric settings have yet to be published. The aim of the present study was to assess if SMS text messaging reminders affect non-attendance and late cancellation rates in children in a secondary paediatric outpatient centre.

METHODS

During the period from 1 March 2016 to 28 February 2017, non-attendances and cancellations of appointments within 24 hours before the time of appointment (late cancellations) in children and adolescents aged 0-19 years of age were recorded prospectively. This was part of a protocolled daily routine, and patients and families were not informed hereof.

From 1 March 2017, automatic SMS text messaging reminders from our electronic booking system were sent out to all patients 24 hours before their appointment. The reminders were sent to one of the parents. During the following year, prospective recording of non-attendances and late cancellations were continued until 28 February 2018. As during the no-SMS period, late cancellations were defined as cancellations within 24 hours before the time of the appointment. When families called the clinic to cancel an appointment, they were interviewed about the reason for their cancellation.

During the first period of the study, families attending the clinic were informed that if they were given appointments after 1 March 2017, automatic SMS text messaging reminders would be introduced, and they all gave written consent to the procedure. Non-attending and late-cancelling families during the no-SMS period as well as new referrals attended during both periods were asked to give oral consent to the procedure on the phone and they all consented.

Data were recorded in an electronic database and were processed and analysed using R version 3.3.2.

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TABLE 1 / Distribution of scheduled appointments, non-attendances (NA) and late cancellations during the year before (no SMS) and after the introduction of SMS reminders about scheduled appointments (SMS).

	No SMS, n (%)	SMS, n (%)	Pearson's χ^2 test	p-value
Appointments	4,566 ^a	4,464	-	-
<i>NA and late cancellations</i>				
NA	196 ^a (4.3)	67 (1.5)	58.7	< 0.001
Late cancellations	162 (3.5)	177 (4.0)	1.1	0.28
Total	358 (7.8)	244 (5.5)	17.9	< 0.001

a) Previously published in [9]. Reproduced with permission by Danish Medical Journal.

Comparisons of frequencies were tested by Pearson's χ^2 test. A 5% significance level was used.

Trial registration: not relevant.

RESULTS

During the period from 1 March 2016 to 28 February 2017, the clinic had 4,556 scheduled appointments in 1,466 patients (878 boys (59.9%) and 588 girls (40.1%)). During the SMS messaging reminder period from 1 March 2017 to 28 February 2018, the clinic had 4,464 scheduled appointments in 1,424 patients (828 boys (58.1%) and 579 girls (41.9%)). **Table 1** presents numerical data, frequencies and statistical test results of the comparisons of non-attendances and late cancellations between the non-intervention and the SMS text messaging intervention periods. During the no-SMS reminder year, 167 patients (129 (77.2%) boys; 38 (22.8%) girls) had 196 non-attendances, and 152 patients (102 (68.4) boys; 48 (31.6%) girls) had 162 late cancellations. During the SMS reminder year, 67 patients (46 (68.7%) boys; 21 (31.3%) girls) had one

non-attendance each; similarly, a total of 177 patients (99 (55.9%) boys; 78 (44.1%) girls) had one late cancellation each; i.e. during the intervention year no patients had more than one non-attendance or one late cancellation. Reasons for late cancellations are given in **Table 2**.

DISCUSSION

During the past decade, SMS text message appointment reminders have become attractive for appointment reminding owing to the extensive use of mobile phones. Text messaging is a quite direct and convenient way of communicating simple messages to patients and can be linked to electronic patient files and calendar technologies that allow large numbers of messages to be sent automatically to patients when appointments are booked or at any chosen time interval before the time of the appointment. In studies of adult populations, patients have generally liked to receive text messages about appointments [4]; and in a tertiary paediatric centre study, only 2.6% of families were offended by an SMS reminder [5]. Recently, though, the confidentiality of text messaging has been questioned. General practitioners have been worried about data protection, and potential data leakage has attracted attention [6, 7]. It has been argued that only secure text messaging should be used for physician-patient communication and that consent for SMS messaging must be obtained [7]. In the present study, we complied with such requirements. However, we appreciate that in the future more focus needs to be placed on the potential confidentiality liabilities associated with SMS texting to patients.

In the present study, we sent out SMS reminders 24 hours before the time of the appointment. Previous studies have used a week, three days, two days or one-day reminder intervals [4, 5]. A systematic review, however, found that the duration of the interval did not affect non-attendance rates [4]. The weighted mean relative improvement in non-attendance rates in 11 studies was 34% [4]. This is in line with our finding that the rate of non-attendance and late cancellations was improved by approximately 30% when SMS reminders were sent out. Noteworthy, however, we found that the non-attendance rate specifically was reduced from 4.3% to 1.5%, whereas a statistically significant effect on the rate of late cancellations could not be detected. So, SMS message reminders only improved non-attendance and failed to influence the late cancellation rate.

No studies of differential effects of SMS reminders on non-attendance and late cancellations are available for comparison. The only available SMS text messaging reminder study in children did not record late cancellations [5]. About a decade ago, however, a tertiary gen-

TABLE 2 / Distribution of reasons for late cancellations during the year before (no SMS) and late cancellations during the year following the introduction of SMS reminders about scheduled appointments (SMS).

	No SMS, n (%) (N = 162)	SMS, n (%) (N = 177)	Pearson's χ^2 test	p-value
Appointment forgotten	85 (52.5)	115 (65.0)	1.29	0.26
Patient must attend school	22 (13.6)	11 (6.2)	3.50	0.06
School exams	9 (5.5)	9 (5.1)	3.44	1.00
Parents too busy	11 (6.8)	18 (10.2)	0.71	0.40
Concurrent illness in patient	9 (5.6)	5 (2.8)	0.69	0.35
Concurrent illness in parent	9 (5.6)	5 (2.8)	0.69	0.35
Condition recovered	7 (4.3)	6 (3.4)	0.02	0.89
No specific explanation	11 (6.8)	8 (4.5)	0.37	0.54

eral paediatric outpatient centre study used conventional posted reminders [8]. During a six-month observation period, reminder letters were sent out to families two weeks before the day of their appointment, and non-attendance was compared to a control group. From the results section of the paper, it appeared that late cancellations were understood as cancellations made on the day of appointment. In accord with our results, it was observed that while there was a statistically significant effect of mailed appointment reminders on non-attendance rate, the effect on cancellations made on the day of appointment was considerably lower. A previous study in our secondary paediatric outpatient clinic showed that approx. 65% of non-attendance was due to forgetfulness, 11% to parents' perception that their child had recovered, and few cases were due to other reasons such as parents' illness, busy parental schedules, concurrent disease and school exams [9]. These findings were consistent with observations made in tertiary paediatric settings [10, 11]; they were also largely consistent with the present findings in late-cancelling families. Noteworthy, the relative number of late cancellations in the present study that was explained by forgetfulness was numerically higher during the SMS period (65%) than during the no-SMS period (52.5%) though not statistically significantly higher. This finding may be taken to suggest that SMS reminders may motivate families to call the clinic to a greater extent to explain why they cannot attend. Furthermore, though the duration of the interval between sending out SMS text reminders and the scheduled date of appointment appeared not to affect non-attendance rates [4], it remains to be evaluated if that is true for late-cancelling families. It may be speculated that a longer time interval would give families a better opportunity to make practical arrangements allowing them to attend. Potentially that might influence most of the recorded reasons for late cancelling. Finally, the present study made no evaluation of the potential influence of divorced parents/shared custody relations. It would be interesting to explore this demographic variable in future studies.

The present study has clearly evidenced a differential effect of SMS text reminders on non-attendances and late cancellations rates. In addition, the findings have supported previous observations in adult centres and in paediatric tertiary centres that the problem with non-attending and late-cancelling patients cannot be solved by using SMS text messaging reminders only [4, 5, 12]. To prevent these occurrences, further studies would probably need to focus on possible demographic, socioeconomic and disease severity-associated factors in non-attending and late-cancelling children with the objective of identifying children at risk of not attending or cancelling late.

Finally, the present study was an observational intervention study. As in all observational studies, bias may have been introduced by the Hawthorne (the observer) effect [13]. We cannot rule out that, potentially, the recording per se of non-attendance and late cancellation rates may to some extent have modified the rates. Even so, the observation of no intervention effects on late cancellation rates suggests that the risk hereof is quite limited.

CONCLUSIONS

In the present secondary paediatric referral centre study, SMS text reminders improved the non-attendance rate, but failed to influence the late cancellation rate.

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