



## RESEARCH ARTICLE

### TO EVALUATE THE EFFICACY OF MOBILE PHONE MESSAGING REMINDERS FOR ASSESSING THE PATIENT COMPLIANCE

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#### ABSTRACT

Missed appointments are a major cause of inefficacy in healthcare delivery, leading to delays in diagnosis and appropriate treatment. Patient reminders help reducing missed appointments. Mobile phone messaging, has shown to be a effective reminder in reducing non-attendance. Mobile phone text messaging, a telecommunication technology, offers an alternative strategy to the conventional reminder systems. Studies have also shown that using text messaging reminders was more cost-effective than telephone reminders. Text messaging potentially improves patient care by specifically targeting a population that would benefit most from attending.

**Aim:** To determine effectiveness of mobile phone text messaging in improving the attendance of the patients reporting to the Department of Periodontology.

**Material and Methods:** A total of 300 subjects reporting to the Department of Periodontology from December 2015 to February 2016 were included in the study and were randomized into two groups: text messaging reminder and no reminder.

Inclusion criteria-age group 25 to 50 years

Test group- 150 Subjects receiving mobile phone message reminder for the appointment.

Control group- 150 Subjects not receiving any reminder.

The participants returning for the appointments from both group, were included in Compliant groups and who didn't return for the appointment were included in Non-Compliant.

**Result:** Test group – 118 patients out of total of 150 returned for the appointment.

Control group – 84 patients out of total of 150 returned for the appointment.

**Conclusion:** The SMS reminders to the patient improved the attendance along with the compliance.

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#### INTRODUCTION

A major cause of inefficiency in healthcare delivery are the missed appointments, that affects the costs to health systems, along with the delays in diagnosis and appropriate treatment for the non-attending patient. Mobile phone messaging is one of the important means communication globally for humans.

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The use of mobile phone is rapidly increasing, particularly in the Asia-Pacific region, including 90% of the global population and 80% of rural population having access to a mobile networking service. Mobile phone messaging has been used to give appointment reminders to the patients, to improve compliance of the patient with medications and also to offer psychological support, to monitor chronic conditions. Text messaging, a newer technology in the field of telecommunication, provides an alternative strategy for the conventional reminder systems (Castano, 2006, Downer,

2005). A study showed that the use of telephone reminders along with text messaging reminders significantly decreased the rate of nonattendance of patients in seven primary care clinics, when compared to patients with no reminders. The study also showed that text messaging reminders for the non-attending patients was more cost effective than the use of telephone reminders. The text messaging technology has been proposed to be useful in patients with chronic disease for improving the compliance (Leong, 2006). Text messaging is known for its speed and easy accessibility. The healthcare system is beginning to test and subsequently apply the use of this technology in different ways so as to improve the overall patient care. Text messaging could potentially bring a decrease in the costs and improve patient care by specifically targeting the particular population suffering from chronic disease, that would benefit most from attending follow-up (Leong KC, 2006). The present study is important as it attempts to investigate the efficacy of using this new technology in health service delivery to reduce nonattendance. It was believed that text messaging reminder was comparatively efficient than no reminder (control). Short messaging service (SMS) has the capacity to reach a large population at a relatively low cost. In recent years, many studies have been conducted that support the hypothesis that the use of SMS text messaging for sending an appointment reminders is efficient in improving attendance rate.

## MATERIAL AND METHODS

In the present study patients reporting to the Department of Periodontology from December 2015 to February 2016 were included. A total of 300 subjects in the age group of 25 to 50 years were included in the study and were randomized into two groups – test group and control group. The test group consisted of 150 Subjects receiving mobile phone message reminder for the appointment, whereas the control group consisted 150 Subjects not receiving any reminder. All participants were provided informed consent. In SMS group participants received text messaging delivered through a mobile telephone. The reminder content included participant's name and appointment detail and was delivered in the local language. Successful contact was assumed when the mobile phone indicated 'message sent' in the SMS group. A reminder was sent 48 hours prior to the appointment. In the control group, participants received no reminder. Data were collected at consecutive appointments prospectively, including participant age and sex, whether SMS reminder was successfully made or whether there was no reminder and whether the participant showed up for the scheduled appointment subsequently. The participants returning for the appointments from both group, were included in Compliant groups and who didn't return for the appointment were included in Non-Compliant.

### Statistical Analysis

Descriptive statistics were expressed as mean  $\pm$  standard deviation (SD) for each group. The effectiveness of mobile phone text messaging was assessed by comparison of compliance rates. Chi square test was applied along with Odds Ratio and Confidence Interval for intergroup comparison. In the above test, p value less than or equal to 0.05 ( $p \leq 0.05$ ) was taken to be statistically significant. All analyses were performed using SPSS software version

## RESULTS

A flowchart of study participations is shown in Fig.1. A total of 300 members were enrolled for the final analysis: test group ( $n=150$ ), and control group ( $n=150$ ).

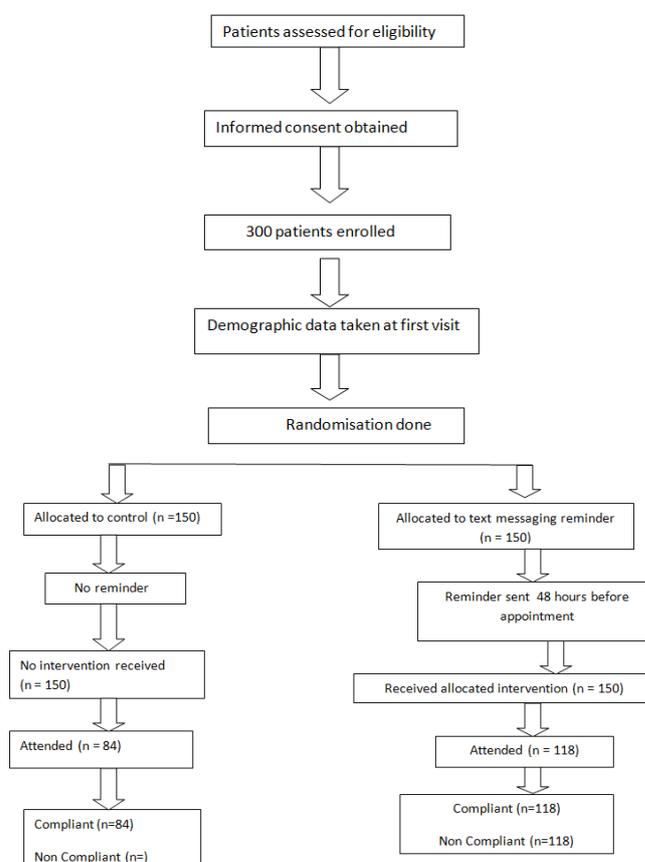


Figure 1

Table 1 shows characteristics of these 2 groups in accordance with age distribution. Comparison of the test groups and the control group shows adequate randomization with fairly equal age distributions.

Table 1. Age distribution of the study participants

	Test group (n)	Control group (n)
25-30 years	33	32
31-35 years	34	37
36-40 years	31	30
41-45 years	27	25
46-50 years	25	26
Total	150	150

Table 2. Comparison of compliance rates among the test and control group

	Compliance		Total	P value (Chi square test)
	No	Yes		
Control group	66	84	150	<0.001*
Test group	32	118	150	
Total	98	202	300	

\* $p \leq 0.05$  is statistically significant

Odds Ratio = 2.90, 95% CI (1.75 - 4.81)

Table 2 shows the comparison of compliance rates among the test group and the control group that was statistically significant.

## DISCUSSION

The results of this study showed that text messaging were effective in reducing non-attendance in people who required follow-up. The decrease in non-attendance by the use of this method, demonstrates that forgetfulness is one of the primary reason for the absence. It was also hypothesized that text messaging was effective way for reminder of the nonattending patient. In our study (Table 1) the effectiveness of this technology is shown which resulted in increase in the compliance. Therefore by the use of SMS, the superior attendance rate among the patients was seen. Many studies of appointment reminders for patients have found decrease in nonattendance rates, including letters, postcards and telephone. Recently, some studies were conducted in which it was found that using SMS text messaging was successful in improving attendance rate. Similar result were obtained in this study (Fig.2). Chen *et al* conducted a randomized controlled trial for reminders in a health promotion clinic and the results obtained showed higher attendance rates for telephone reminders (88.3%; OR = 1.83) and text messaging reminders (87.5%; OR = 1.70) when compared to no reminders. (Downer *et al.*, 2006) The attendance rate in their control group was high at 80.5% compared to the present study and the one of the previous study (Leong *et al.*, 2006). Downer *et al* conducted two studies that showed text messaging to be effective in lowering absence rates from the appointment, but both were conducted in a children and adolescent hospital. The efficacy of text messaging may differ according to the age of the population of the clinic being studied, and this should be investigated in future research (Downer, 2006).

In a study on repeated non-attenders in a general practice in Scotland. In their study, only patients who failed to attend more than two appointments in the preceding 12 months were included. For this group, text messaging showed a 5% absolute decrease in non-attendance when text messaging reminder was compared to a control group, and the difference obtained was not significant. It is possible that in this group of patients, interventions, other than appointment reminders, are required (Fairhurst, 2008). Geraghty *et al.* found SMS reminder to be an effective means of improving outpatient attendance at the ear, nose and throat (ENT) outpatient clinic in Ireland (Geraghty, 2007), while a similar study had done the same at outpatient clinics in the UK national health service (Milne, 2006). Leong *et al.* performed a RCT of SMS reminder calls in comparison with mobile phone reminder calls to improve outpatient attendance in primary care in Malaysia. The study showed that the attendance rate of the SMS group was significantly higher than that of the control group, but there was no difference between SMS group and the telephone group (Leong *et al.*, 2006). They also found that SMS reminder was more cost-effective compared with the telephone reminder. SMS messaging software allows large batches of text messages to be delivered almost instantly, minimizing labor costs (May, 2005).

SMS messages do not require the mobile phone to be active nor necessarily within range and can be held for a number of days until the phone is active or within range (Virtanen, 2007). Furthermore, SMS is also private in a way that telephone calling is often not.

## Conclusion

In the present study it can be concluded that the SMS reminders to the patient improved the attendance along with the compliance. Further work is needed, to consider the use of SMS text messaging to other areas which include patient education, smoking cessation program and chronic disease intervention.

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