Observational study identifies non-attendance characteristics in two hospital out-patient clinics

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ABSTRACT

INTRODUCTION: Non-attended hospital appointments are receiving increasing attention in times when rapid access and efficient service delivery at public hospitals are on the agenda. The aim of this study was to investigate the extent of non-attendance in a Danish outpatient setting and its association with user-level and provider-level characteristics.

METHODS: The study was based on appointments scheduled from June 2013 to March 2015 at an orthopaedic and a radiologic outpatient clinic. Data on outcomes of cancellation on the part of the user or the provider, and non-attendance without giving notice were collected from administrative systems along with appointment characteristics. Logistic regression was used for statistical analysis.

RESULTS: Of the 54,987 and 31,538 appointments scheduled at the two departments, 4,524 (8%) and 5,479 (17%) were cancelled and 2,905 (5%) and 1,249 (4%) were unattended without notice. The latter was significantly associated with male gender, younger age and longer time since referral. Other characteristics were identified as significant, but differed between departments.

CONCLUSION: There seems to be a potential for a targeted effort aiming to reduce non-attendance and thereby to improve the efficiency of Danish outpatient services. Future studies should investigate the effect of initiatives such as nudging and fines targeting the appointments that have the highest non-attendance rates.

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Non-attendance poses a challenge for public hospitals because it limits the efficiency of production, thereby leading to an inefficient use of healthcare resources. Furthermore, non-attendance may impact users' clinical outcome, prolong waiting lists and consequently affect users' access to care [1, 2].

Evidence from the United Kingdom shows that approximately 20% of all scheduled appointments are unattended [1]. Cancellation of the appointment before the appointment date accounts for about two thirds of unattended appointments, whereas non-appearance accounts for about one third, and is estimated to cause productivity losses of a production value approaching £ 790 million annually. While the economic rationale for preventing non-attendance is clear, there could be inefficiencies related to the former type of non-attendance as well, e.g., postponement of an appointment by the provider could affect users' accountability with respect to future attendance and cancellations might not always be in time for the user or the provider to be able to exploit the cancelled time slot for other purposes.

Non-attendance has been associated with male gender [3, 4] and younger age of the user [2, 3, 5, 6], longer distance from residence to hospital [6, 7] and good public transportation [6, 8]. These characteristics, however, appear to be highly context-specific both in terms of the type of provider and the type of health problems addressed, as well as in terms of societal norms and values. The external validity across healthcare systems is therefore questionable, and only limited evidence is available for the Danish context.

The aim of the present study was to investigate the extent of cancellation and non-attendance in a Danish outpatient setting and its association with user-level and provider-level characteristics. If certain characteristics explain non-attendance, policies can be targeted to counter non-attendance and thereby limit its negative impact on the efficiency of the healthcare sector.

A better understanding of non-attendance in a Danish context may provide information allowing us to decide which action areas to focus on to decrease non-attendance. E.g. nudging-based reminders in the form of a phone call, mail, short message service (SMS) or email could be considered for a special group of users or it may be considered to involve a coordinator to help the group of users attend their appointments. Another possibility may be more flexible appointment planning on e.g. special weekdays or for patients living far away from the hospital. They might have bigger planning issues related to attending than patients living close to the hospital.

METHODS

This was a register-based study of appointments scheduled at the outpatient clinics of the Department of Radiology, Silkeborg Regional Hospital (DR) and the Department of Orthopaedic Surgery, Viborg Regional Hospital (DOS), Denmark, from June 2013 to March 2015.

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Setting

The two outpatient clinics have approx. 30,000 and 17,000 scheduled annual appointments, respectively. The majority of appointments are scheduled via appointment letters generated in an electronic booking system. Besides regular scheduling, DR offers open access during morning hours as well as flexible user booking via an online booking system. Open access is a time-limited offer. Non-attendance therefore occurs if a user fails to show up during the open window period assigned by the provider.

Cancellation and non-attendance without notice are registered daily. Cancellation on the part of the user is accepted right up to the time of appointment by email anytime or by telephone between 07:45 and 14:30 at DOS and 07:30 and 15:30 at DR on weekdays.

TABLE 1

Characteristics of consecutive appointments included in the study. The values are n (%).

	Radiology clinic (N = 54,987)	Orthopaedic clinic (N = 31,537)
Gender of user		
Male	24,115 (43.86)	15,329 (48.61)
Female	30,872 (56.14)	16,209 (51.40)
Age of user, yrs		
< 20	4,299 (7.82)	4,257 (13.50)
21-30	3,990 (7.26)	2,923 (9.27)
31-40	5,334 (9.70)	3,223 (10.22)
41-50	8,799 (16.00)	4,979 (15.79)
51-60	9,851 (17.92)	5,790 (18.36)
61-70	11,855 (21.56)	5,319 (16.87)
71-80	8,095 (14.72)	3,636 (11.53)
≥ 81	2,764 (5.03)	1,411 (4.47)
User's travel time to hospital, min.		
< 12	16,260 (29.57)	7,392 (23.44)
12-24.99	13,253 (24.10)	7,291 (23.12)
25-35.99	13,122 (23.86)	7,465 (23.67)
≥ 36	12,352 (22.46)	9,390 (29.77)
Day of the week		
Monday	13,486 (24.53)	6,285 (19.93)
Tuesday	11,092 (20.17)	7,088 (22.48)
Wednesday	11,394 (20.72)	4,520 (14.33)
Thursday	8,837 (16.07)	6,880 (21.82)
Friday	9,003 (16.37)	6,478 (20.54)
Weekend	1,175 (2.14)	287 (0.91)
Appointment previously postponed		
No	38,093 (69.28)	18,085 (57.35)
Yes	16,894 (30.72)	13,453 (42.66)
Time of day		
Morning	30,511 (55.49)	20,730 (65.73)
Afternoon	24,476 (44.51)	10,808 (34.27)
Time since referral, weeks		
≤ 4	38,393 (69.82)	14,969 (47.46)
5-7	8,264 (15.03)	6,397 (20.28)
8-10	2,759 (5.02)	3,056 (9.69)
11-13	1,875 (3.41)	2,230 (7.07)
≥ 14	3,696 (6.72)	4,886 (15.49)
Season		
Spring	10,295 (18.72)	5,977 (18.95)
Summer	13,330 (24.24)	7,849 (24.89)
Autumn	17,045 (31.00)	9,302 (29.49)
Winter	14,317 (26.04)	8,410 (26.67)
Orthopaedic subspeciality		
Hip	–	1,814 (5.75)
Hand	–	3,294 (10.44)
Knee	–	6,761 (21.44)
Back	–	2,481 (7.87)
Shoulder/elbow	–	7,578 (24.03)
Foot	–	3,924 (12.44)
Scapula alata	–	63 (0.20)
Arm	–	287 (0.91)
Leg	–	394 (1.25)
Unspecified	–	4,942 (15.67)
Orthopaedic appointment type		
Follow-up	–	16,058 (50.92)
Treatment	–	4,488 (14.23)
Diagnostics	–	9,585 (30.39)
Surgery	–	1,407 (4.46)
Radiologic focus		
Shoulder	5,398 (9.82)	–
Arm/arm/hand	4,661 (8.48)	–
Pelvis/hip	5,182 (9.42)	–
Thorax	7,525 (13.69)	–
Abdomen	7,166 (13.03)	–
Back	5,725 (10.41)	–
Head/neck	2,240 (4.07)	–
Leg	16,881 (30.70)	–
Unspecified	209 (0.38)	–
Radiologic appointment type		
Outpatient	54,182 (98.54)	–
Research	90 (0.16)	–
Online booking	386 (0.70)	–
Open access	329 (0.60)	–
Radiologic imaging type		
CT	6,482 (11.79)	–
MRI	11,948 (21.73)	–
Ultrasound	8,187 (14.89)	–
Unspecified	28,370 (51.59)	–

CT = computed tomography; MRI = magnetic resonance imaging.

Population

The population consisted of all appointments scheduled by appointment letter from 1 June 2013 to 31 March 2015. Appointments for acute health problems, physiotherapy, occupational therapy and for users with residence in Greenland were excluded from the study.

Statistical analysis

Non-attendance was categorised hierarchically: 1) cancellation by the hospital, 2) cancellation by the user, and 3) non-attendance without notice. In the case of late appearance (showing up during opening hours on the appointment date), the appointment was registered as attended.

Frequency tables were used to describe appointment characteristics and logistic regressions were estimated separately for each of the three types of non-attendance as compared with attendance, and separately for the two departments included in the study. Explanatory variables were informed by information from the hospitals' routine electronic user files and included characteristics suggested by the literature to play a role [3, 4, 6-8], as well as more detailed appointment and provider characteristics.

$p < 0.05$ was considered statistically significant, based on robust standard errors to take into account the hierarchical nature of data where appointments are not necessarily independent because the same user and provider (might) occur more than one time in the data. All statistical analyses were conducted using Stata version 13.1.

Trial registration: not relevant.

RESULTS

The characteristics of included appointments are shown in **Table 1**. The users with appointments at the DR are generally older, have a longer travel time and have more postponements than the users at the DOS. The extent of cancellation and non-attendance is shown in **Table 2**. Of 54,987 and 31,538 appointments scheduled at the two departments, 4,524 (8%) and 5,479 (17%) were cancelled and 2,905 (5%) and 1,249 (4%) were unattended without notice.

For both DR and DOS, the user characteristics found to be associated with non-attendance were male gender and younger age. Provider characteristics included time from referral to appointment and type of appointment (surgery, follow-up and imaging). Specifically for DR, winter season was associated with non-attendance. Specifically for DOS, afternoon appointments and previous postponement were associated with non-attendance (see **Table 3** and **Table 4**).

TABLE 2

Extent of appointments not conducted as planned. The values are n (%).

	Radiology (N = 54,987)	Orthopaedics (N = 31,537)
Cancelled		
By hospital	3,016 (5.48)	3,881 (12.31)
By user	1,508 (2.74)	1,598 (5.07)
Not cancelled but unattended	2,905 (5.28)	1,249 (3.96)

DISCUSSION

This study showed that the extent of cancellation and non-attendance at two large Danish outpatient clinics is comparable to international figures [1] with between 14% and 21% of appointments being cancelled (fully or rescheduled). Furthermore, between 4% and 5% of the remaining non-cancelled appointments were unattended. The study also identified a number of characteristics that seem to explain cancellation and non-attendance. These characteristics could be relevant for planning of targeted policy initiatives aiming to reduce the inefficiency of provision that ensues from appointments not being conducted as planned.

Some of the main strengths of this study are the consecutive nature of appointments over a recent time period. In addition, the data quality with a large sample and few missing values along with comprehensive analytical efforts in terms of the specification of the regression models support the credibility of our findings. The study does not, however, include potentially dependent user-level socio-economic variables, e.g. income and education, living in a multiple-person household with someone to support att endance. Such variables should be included in future studies. Furthermore, based on the relatively low pseudo r^2 of the logistic regressions, the presence of important, unobserved explanations for cancellation and non-attendance cannot be excluded. This could be related to aspects such as culture, norms, ideology, past experience, influence of the user's family and friend network, etc. It should be noted that unless such factors modify the effect of the observed explaining factors, the unobserved explaining factors do not affect the validity of findings.

In agreement with a number of international reports [3, 5, 6], our results showed that younger users (20-40 years) were less likely to attend appointments than other age groups. At both clinics, non-attendance among males was significantly more frequent than among females. However, other studies have reported a higher non-attendance among both females [3] and males [4]. A good public transport system and a short travel time have been shown to be associated with

TABLE 3

Appointment characteristics associated with cancellation or non-attendance at the radiology outpatient clinic. The values are odds ratio (standard error).

	Cancelled		
	by hospital (n = 54,986; r^2 = 0.08)	by individual (n = 51,970; r^2 = 0.03)	Non-attended (n = 50,462; r^2 = 0.04)
Gender of user[a]			
Female	1.10 (0.04)*	1.14 (0.06)*	0.75 (0.03)**
Age of user, yrs[b]			
21-30	0.98 (0.09)	1.15 (0.16)	1.49 (0.13)**
31-40	0.84 (0.08)	1.34 (0.17)*	1.21 (0.10)*
41-50	0.86 (0.07)	1.18 (0.14)	0.87 (0.07)
51-60	0.73 (0.06)**	0.98 (0.12)	0.67 (0.05)**
61-70	0.73 (0.06)**	0.89 (0.1)	0.48 (0.04)**
71-80	0.77 (0.07)**	0.72 (0.10)*	0.41 (0.04)**
≥ 81	0.87 (0.10)	1.18 (0.19)	0.57 (0.066)**
User's travel time to hospital, min.[c]			
12-24.9	0.92 (0.06)	0.95 (0.08)	0.86 (0.05)*
25-35.9	1.26 (0.07)**	1.20 (0.09)*	0.93 (0.05)
≥ 36	1.53 (0.09)**	1.26 (0.10)**	0.82 (0.05)**
Day of the week[d]			
Tuesday	1.05 (0.06)	0.91 (0.07)	0.88 (0.05)*
Wednesday	1.12 (0.07)*	0.95 (0.07)	0.94 (0.05)
Thursday	1.16 (0.07)*	0.86 (0.07)	0.91 (0.06)
Friday	0.99 (0.06)	0.81 (0.07)*	0.98 (0.06)
Weekend	1.01 (0.13)	0.95 (0.18)	1.13 (0.14)
Appointment previously postponed[e]			
Yes	1.40 (0.06)**	1.28 (0.07)**	0.99 (0.05)
Time of day[f]			
Afternoon	0.75 (0.03)**	0.95 (0.05)	0.97 (0.04)
Time since referral, weeks[g]			
4-6	1.14 (0.06)*	1.37 (0.10)**	1.07 (0.06)
7-9	1.63 (0.12)**	1.82 (0.19)**	1.38 (0.11)**
10-12	2.02 (0.17)**	1.87 (0.25)**	1.58 (0.16)**
≥ 13	2.73 (0.16)**	2.40 (0.22)**	2.11 (0.15)**
Season[h]			
Summer	1.00 (0.06)	1.07 (0.09)	1.01 (0.06)
Autumn	0.88 (0.05)*	1.18 (0.10)*	1.03 (0.06)
Winter	0.87 (0.05)*	1.25 (0.10)**	1.13 (0.06)*
Radiologic focus[i]			
Arm/hand	0.55 (0.05)**	0.51 (0.07)**	1.00 (0.09)
Pelvis/hip	0.50 (0.04)**	0.56 (0.07)**	0.81 (0.07)*
Thorax	0.50 (0.04)**	0.86 (0.09)	1.26 (0.11)*
Abdomen	0.53 (0.06)**	0.67 (0.09)**	0.90 (0.11)
Back	0.39 (0.03)**	0.50 (0.06)**	0.85 (0.08)
Head/neck	0.78 (0.09)*	0.84 (0.14)	0.97 (0.14)
Leg/foot	0.55 (0.03)**	0.53 (0.04)**	0.86 (0.062)*
Unspecified	0.85 (0.28)	0.87 (0.34)	0.81 (0.34)
Appointment type[j]			
Research	0.70 (0.32)	2.11 (0.97)	0.75 (0.45)
Online booking	0.29 (0.13)**	1.10 (0.41)	0.87 (0.19)
Open access	2.03 (0.51)**	0.79 (0.36)	0.54 (0.22)
Imaging type[k]			
CT	0.81 (0.07)*	0.65 (0.08)**	0.46 (0.04)**
MRI	0.53 (0.03)**	1.19 (0.09)*	0.35 (0.02)**
Ultrasound	0.51 (0.05)**	1.323 (0.16)*	0.67 (0.06)**

CT = computed tomography; MRI = magnetic resonance imaging.
*) p < 0.05; **) p < 0.01.
a) Reference is male; b) Reference is ≤ 20 yrs; c) Reference is < 12 min; d) Reference is Monday; e) Reference is no; f) Reference is morning; g) Reference is ≤ 3 weeks; h) Reference is spring; i) Reference is shoulder; j) Reference is standard outpatient; k) Reference is unspecified.

TABLE 4

Appointment characteristics associated with cancellation or non-attendance at the orthopaedic outpatient clinic. The values are odds ratio (standard error).

	Appointments cancelled		
	by hospital (n = 31,538; r^2 = 0.12)	by individual (n = 27,657; r^2 = 0.04)	Non-attended appointments (n = 26,059; r^2 = 0.05)
Gender of user[a]			
Female	1.12 (0.04)**	0.94 (0.05)	0.67 (0.04)**
Age of user, yrs[b]			
21-30	0.98 (0.08)	0.99 (0.11)	1.74 (0.19)**
31-40	1.08 (0.09)	1.03 (0.11)	1.54 (0.17)**
41-50	1.11 (0.08)	0.93 (0.09)	0.84 (0.09)
51-60	1.10 (0.08)	1.02 (0.09)	0.61 (0.07)**
61-70	0.93 (0.07)	0.80 (0.08)*	0.39 (0.05)**
71-80	0.77 (0.06)**	0.84 (0.09)	0.38 (0.06)**
≥ 81	1.04 (0.11)	0.96 (0.14)	0.74 (0.13)
User's travel time to hospital, min.[c]			
12-24.9	0.97 (0.05)	0.89 (0.07)	0.73 (0.07)**
25-35.9	1.06 (0.06)	0.95 (0.07)	0.91 (0.08)
≥ 36	1.18 (0.06)**	0.96 (0.07)	0.89 (0.08)
Day of the week[d]			
Tuesday	1.09 (0.06)**	1.08 (0.09)	1.04 (0.10)
Wednesday	1.01 (0.07)	0.86 (0.09)	0.87 (0.10)
Thursday	1.11 (0.06)	1.31 (0.11)**	0.92 (0.09)
Friday	1.01 (0.07)	0.93 (0.09)	0.85 (0.09)
Weekend[e]	0.50 (0.12)**	0.22 (0.13)**	1.00 (0.32)
Appointment previously postponed[f]			
Yes	0.97 (0.05)	0.93 (0.06)	1.21 (0.10)*
Time of day[g]			
Afternoon	1.02 (0.04)	1.09 (0.06)	1.14 (0.07)*
Time since referral, weeks[h]			
4-6	1.27 (0.07)**	1.44 (0.11)**	1.07 (0.09)
7-9	2.10 (0.14)**	1.75 (0.16)**	1.54 (0.16)**
10-12	2.91 (0.20)**	2.31 (0.23)**	2.18 (0.25)**
≥ 13	5.71 (0.30)**	3.99 (0.28)**	2.86 (0.25)**
Season[i]			
Summer	0.99 (0.05)	0.70 (0.06)**	1.02 (0.09)
Autumn	0.86 (0.05)**	1.30 (0.09)**	0.89 (0.08)
Winter	0.85 (0.05)**	0.67 (0.06)**	1.03 (0.09)
Orthopaedic focus[j]			
Hip	0.83 (0.08)	0.75 (0.12)	0.88 (0.15)
Hand	0.81 (0.08)*	1.32 (0.16)*	0.98 (0.13)
Knee	0.98 (0.08)	1.02 (0.11)	0.68 (0.08)**
Back	0.63 (0.06)**	1.50 (0.19)**	0.78 (0.12)
Shoulder/elbow	0.97 (0.08)	1.06 (0.12)	0.84 (0.10)
Foot	0.74 (0.07)**	1.11 (0.14)	0.71 (0.09)**
Scapula alata	0.22 (0.13)*	0.25 (0.25)	0.56 (0.42)
Arm	0.58 (0.21)	1.16 (0.36)	0.78 (0.28)
Appointment type[k]			
Treatment	2.65 (0.15)**	1.20 (0.10)*	0.90 (0.10)
Diagnostics	2.53 (0.14)**	1.36 (0.09)**	1.14 (0.11)
Surgery	1.20 (0.14)	0.54 (0.10)**	0.28 (0.07)**

*) $p < 0.05$; **) $p < 0.01$.

a) Reference is male; b) Reference is ≤ 20 yrs; c) Reference is < 12 min.; d) Reference is Monday; e) Saturday and Sunday are defined as weekend, it is not standard procedure to book patients on Sundays; f) Reference is no; g) Reference is morning; h) Reference is ≤ 3 weeks; i) Reference is spring; j) Reference is unspecified; k) Reference is unspecified.

lower non-attendance [6, 8]. However, these trends were not found because non-attendance was not significantly higher for users with a longer distance from their residence to the hospital. In the case of provider-level characteristics, we found that users at the DOS were less likely to attend their appointments during the after-

Future studies should investigate the effect of initiatives such as nudging and fines targeting non-attended appointments. Drawing by Sine Claudell.

noon. Users at the DOS, whose initial appointment had been postponed, tended not to attend their rescheduled appointment and non-attendance increased with time since referral. Therefore, it is suggested that users should be reminded about their appointment if it is scheduled more than three weeks into the future and especially if it is scheduled more than three months into the future. Similarly, we found some evidence that afternoon appointments and appointments that had previously been postponed were more often non-attended; these appointments may also hold a potential for intervention.

Non-attendance without giving notice is a challenge to efficient healthcare delivery. This study has identified relevant action areas that may serve to contain the non-attendance problem; differentiated action for different users and appointments. According to previous studies, charging a monetary fee for non-attendance caused a decrease in the non-attendance rate of 14% and 54% respectively [9, 10], but it is uncertain whether a monetary fee targets particular groups of users and whether these groups are the ones that do not attend in the Danish setting. A randomised controlled trial examining the effects of fines is on-going in the Danish context [11]. A recently finalised qualitative study of users' attitudes towards fees for non-attendance has shown that users are positive towards implementation of a monetary fee for non-attendance [12]. Other approaches include nudging-based reminders in the form of a phone call, mail, SMS or email, and provision of open-access scheduling. A systematic review showed that such interventions are associated with a modest reduction in non-attendance [9].

The main limitation of this study is that a substantial difference was observed for the two contexts studied; generalisation to other medical specialities should therefore be made with caution.

CONCLUSION

Overall, the nature of non-attendance appears to depend on the type of healthcare service provided; however, gender, age and time from notice to appointment were consistently associated with non-attendance. The study therefore suggests that planning actions should incorporate gender, age and time since referral to reduce non-attendance. There seems to be a potential for targeted efforts to reduce non-attendance and thereby improving the efficiency of Danish outpatient services. Future studies should investigate the effect of initiatives such as nudging and fines targeted the appointments that are most frequently affected by non-attendance.

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