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Intervention

Effectiveness of a short course in clinical communication skills for hospital doctors: Results of a crossover randomized controlled trial (ISRCTN22153332)

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ABSTRACT

Objective: To test the hypothesis that a 20-h communication skills course based on the Four Habits model can improve doctor–patient communication among hospital employed doctors across specialties.
Methods: Crossover randomized controlled trial in a 500-bed hospital with interventions at different time points in the two arms. Assessments were video-based and blinded. Intervention consisted of 20 h of communication training, containing alternating plenary with theory/debriefs and practical group sessions with role-plays tailored to each doctor.
Results: Of 103 doctors asked to participate, 72 were included, 62 received the intervention, 51 were included in the main analysis, and another six were included in the intention-to-treat analysis. We found an increase in the Four Habits Coding Scheme of 7.5 points ($p = 0.01$, 95% confidence interval 1.6–13.3), fairly evenly distributed on subgroups. Baseline score (SD) was 60.3 (9.9). Global patient satisfaction did not change, neither did average encounter duration.
Conclusion: Utilizing an outpatient-clinic training model developed in the US, we demonstrated that a 20-h course could be generalized across medical and national cultures, indicating improvement of communication skills among hospital doctors.
Practice implications: The Four Habits model is suitable for communication-training courses in hospital settings. Doctors across specialties can attend the same course.

1. Introduction

Good communication is an important element of health care quality and patient safety [1,2]. The main features of good communication in medical encounters include: building a relationship, using open-ended questions initially, exploring the patient's perspective, displaying empathy, checking for understanding, reaching agreements on problems and plans, and providing closure. These features have been established in consensus statements and systematic reviews of the literature [3–6].

Different postgraduate teaching and training methods have been developed to improve patient–doctor communication either by educating doctors [7,8], patients [9,10], or both [11,12]. Intervention intensity has been moderate to high and the training has addressed a limited set of communication skills. The effects have been variable. Most of the studies that have demonstrated a positive effect have provided 18 h, or more, of training [3].

The majority of intervention studies have focused on primary care doctors or residents, and, except in oncology, senior doctors have rarely been included [3]. It is of interest to also observe senior doctors as they are important role models in hospitals, and are observed by younger colleagues in a variety of situations. Evaluations of the interventions have mainly focused on one clinical setting, e.g. delivering bad news or patients with specific problems. Few empirical studies have covered the range of doctor–patient encounters in hospitals, across disciplines, including in the emergency room, bedside on rounds, when performing diagnostic procedures (e.g. echocardiography, electromyography), at discharge, or at outpatient clinics. If one generic teaching program could be shown to improve the communication skills of all affiliated doctors, it would simplify the implementation of training programs for hospital doctors.

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In Kaiser Permanente (KP) , the largest health care organization in the US, Frankel, Stein et al. developed The Four Habits model – an approach to effective clinical communication [13,14]. In this model, skills and behaviors, established in the literature as beneficial, are organized into four main groups (habits) for didactic purposes; invest in the beginning of the encounter to create rapport and set an agenda (Habit I), elicit the patient's perspective (Habit II), demonstrate empathy to provide opportunity for patients to express emotional concerns (Habit III), and invest in the end to provide information and closure (Habit IV). A 5-day course in KP called Communication Skills Intensive in Kaiser Permanente for doctors who had acknowledged communication problems showed a positive effect on patient and doctor satisfaction in an observational study [15].

The organization of the daily practice of hospital doctors in the US differs from Norway. In Norway the specialists seeing a patient in the hospital are employed by the hospital, and they know their patients only from within the hospital, not from any private practice outside the hospital as normal in the US. There is, however, in the US a movement toward the use of similar "hospitalist doctors," who are both generalists and specialists and do not have a pre-existing relationship with the patients they care for. As well, attempts to link inpatient and outpatient experiences are currently under way using a conceptual model known as the patient-centered medical home [16].

To explore the feasibility of extending the US-based model to Norway, three US teachers of the Four Habits model (RF, EK, Dana Gelb Safran) ran a three-day pilot course for prospective Norwegian teachers in August 2006. This pilot study showed that the Four Habits model was well received, suggesting that the principles are translatable to contexts outside the US [17]. However, the model has not been tested in a randomized controlled study.

The aim of this study was to provide a rigorous evaluation of the course to determine whether the intervention could improve the performance of doctors across clinical disciplines (except psychiatry) in their daily work.

2. Methods

The study took place in a large general teaching hospital of 500 beds in the capital area of Norway. Six participants from the pilot course [17] were recruited as teachers for the intervention.

2.1. Study design

We considered a classic randomized controlled trial (RCT) with parallel groups, but had two main concerns. The first was regarding possible selective attrition when it came to participation of doctors. We were afraid doctors would be more likely to drop out of the study, some because they would find it OK just to be filmed, but not if they had to attend two days of training as well, and some because they would feel being filmed throughout a year without getting any training would not be worth it. The second concern was regarding the possibility that the working conditions might change during the year of observation. For example – if the workload in the hospital is generally lower after the time of intervention one could maybe expect the doctors to perform better because they have more time, and not because of the intervention. Due to these concerns we decided to make it clear to all doctors everybody would receive the intervention, and we decided we would use the doctors as their own controls. This led us to the design of an RCT with crossover design. The participating doctors were randomized into two groups which both received the intervention, but at different points in time (Fig. 1). All included doctors had two encounters videotaped before the first course (period A – baseline). After the first course, all doctors had four encounters videotaped (period B). Then the doctors who had not participated in the first course received the intervention, followed by the videotaping of another two encounters for all doctors (period C).

2.2. Intervention

Doctors participated in the 20-h (a 45 min) course over two consecutive days. The decision to spend two days was mainly based on what was possible to achieve considering the practical implications it has to take doctors out of their daily work. The course consisted of a 50/50 mix of theory and 45 min group sessions (3–7 participants and two teachers per group) including role-plays, with plenary debriefs after each group. The theory based plenary sessions were about the core issues of good communication, structured according to the principles of the Four Habits.

Our course was based on the same content as the 5-day course Communication Skills Intensive offered by Kaiser Permanente [15]. The main differences were that our plenary sessions were more compressed and that the group sessions had less focus on the individual doctors' development. We did not videotape any of the doctors as part of the training, and in the role-plays doctors played patients or themselves, so we did not use actors. Clinical scenarios suited for training of each habit were available, and adjusted to the specialty of the doctor playing him/herself. Some instructions were given separately to the two role players. The patient instructions included imagination of the patient's family situation, beliefs, expectations, and emotions, as well as basic symptom descriptions. After feedback, role-plays were rerun by the same players or by a

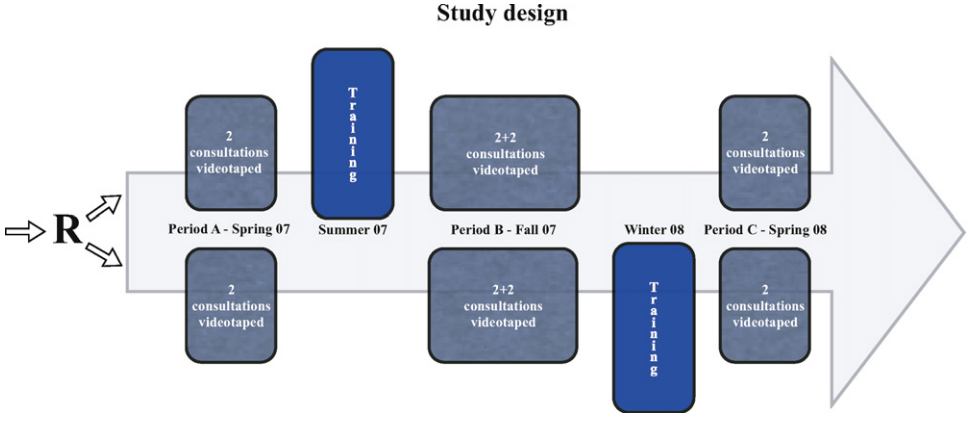

Fig. 1. Illustration of the crossover design showing interventions at different time points in the two groups.

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new pair, depending on what would likely be most instructive. Most participants acted at least once as doctor and as patient during the course.

There were six group sessions; one for each habit, one for specific training based on participants' interests, and one dedicated to further post-course training. At the conclusion of the course, all participants received a one-sheet overview of the Four Habits to carry in their pockets as reminder in everyday work.

2.3. Outcomes

Improvement of communication skills in real encounters was considered the primary outcome, while global patient satisfaction and use of time in the encounters were secondary outcomes.

To evaluate the doctors' communication skills, we used the Four Habits Coding Scheme (4HCS), developed by Krupat et al. [18]. In the 4HCS, videos are rated using a 23-item scale, with item scales from 1 (not very efficient behavior) to 5 (highly efficient behavior). The habit scores consist of six items for Habit I, three for Habit II, four for Habit III, and ten for Habit IV. Four experienced students educated in psychology were trained to use the 4HCS. Videotapes were rated in groups of 20 until acceptable interrater reliability (IRR) (Pearson's $r > 0.70$) was achieved. The full procedure with regard to IRR, together with the rationale for using Pearson's r, is described in a separate paper [19].

Raters were blinded to all information about the doctors and the encounters, including whether the video was made before or after the intervention. The 4HCS total score was defined as our primary outcome.

After the encounter, patients completed a questionnaire in which they responded to the global satisfaction measure of the Consumer Assessment of Healthcare Providers and Systems (CAHPS); "using any number from 0 to 10, where 0 is the worst doctor possible and 10 is the best doctor possible, what number would you use to rate this doctor?" [20].

The exact duration of each encounter was determined from the videotapes, by recording when the doctor or patient entered and left the room. No correction was made for interruptions, since this was expected to happen at random before or after the intervention.

Immediately before and after doctors attended the course they completed a questionnaire that included the question: "Do you think you can improve communication with patients by attending a course like this?" with answering options "to a high degree" interpreted as high expectations, "to some degree" interpreted as moderate expectations, and "not very much" and "not at all," interpreted as low expectations. They also gave information about prior pre- or postgraduate communication skills training.

2.4. Sample size computations

We decided that a small to medium effect size could be considered a clinically significant improvement; hence we assumed a learning effect of 40% of the standard deviation. The learning effect was defined as the expected improvement with the course less the expected improvement without, while the standard deviation was that of one before–after measurement for a single doctor. Our design was to measure a total of eight videos for each doctor. We based our computations on a multilevel analysis format with doctors as the upper and patients as the lower, assuming an intraclass correlation of 0.1. This was conservative, as it did not utilize the doctors as their own controls, which is a benefit from the crossover design, and may have resulted in a slightly over-powered trial. We set the significance level alpha to 0.05, the power to 80%, and assumed two-tailed tests. These computations led to a sample size of 64 doctors with eight videos per doctor, leading to a need for 512 encounters to be videotaped.

2.5. Randomization

All authorized staff doctors <60 years of age working in clinical departments (anesthesiology, pediatrics, surgery, internal medicine, gynecology/obstetrics, neurology, orthopedics, ear–nose–throat (ENT)) by February 2007 were available, since the hospital administration endorsed the study and instructed department heads to allow doctors leave to receive the intervention. From this body of 249 doctors, our statistician provided a stratified (department, status (consultant, resident)) random sample from which doctors were recruited. Anticipating a 10% loss to follow-up, 72 doctors should be enough to secure data for the sample size of 64. 72 (70%) doctors had agreed after 103 doctors had been asked to participate (Fig. 2). The doctors were randomized to receive the intervention in the summer of 2007 or the winter of 2008.

2.6. Data

Videotapes were collected between April 2007 and June 2008. The researchers (BFJ, PG) contacted the doctor before planned data collection to secure presence in an agreed time interval. Patients were included consecutively if they consented as described in a previous paper [21]. Encounters included outpatient contacts as well as bedside visits on rounds and inpatient encounters as part of diagnostic or therapeutic procedures.

2.7. Analysis

For each doctor we first computed the average 4HCS total scores for the periods A, B and C, denoted a, b, and c, respectively. For a doctor randomized to the summer course $(b - a)$ was the estimated improvement over the treatment period, while $(c - b)$ was the estimated improvement over the control period. Using this approach, the estimated treatment effect was $\Delta = (b - a) - (c - b) = -a + 2b - c$. Note that if we split B in two parts B1 and B2, with average scores b1 and b2, and define the treatment effect estimate as $(b1 - a) - (c - b2)$, this equals $-a + 2b - c$. For doctors randomized to the winter course, the treatment effect estimate was $\Delta = a - 2b + c$. The null hypothesis H0 was that the treatment had no effect, which means that the expected treatment effect estimate would be zero: $E(\Delta) = 0$. The H1 hypothesis was that the treatment had positive effect: $E(\Delta) > 0$. We estimated $E(\Delta)$ as a weighted average d of the individual Δ values. For robustness, we used a standard two-tailed t-test. Note that the multi-level issue indicated in the sample size section is handled implicitly, in that the observation unit is the doctor.

2.8. Ethics and privacy

The study was approved by The Regional Committee for Medical Research Ethics of South-East Norway (1.2007.356), and privacy measures accepted by the Privacy Ombudsman for Research in Norwegian universities (NSD approval 16423/2007).

3. Results

3.1. Response rates and descriptive statistics

Of the 72 doctors included, ten did not receive the intervention (Fig. 2). In the final analysis we included 51 doctors (26 in the summer course group, 25 in the winter course group) representing 405 encounters. Compared to the 52 doctors that were asked to participate but not included in the final analysis, doctors in surgical

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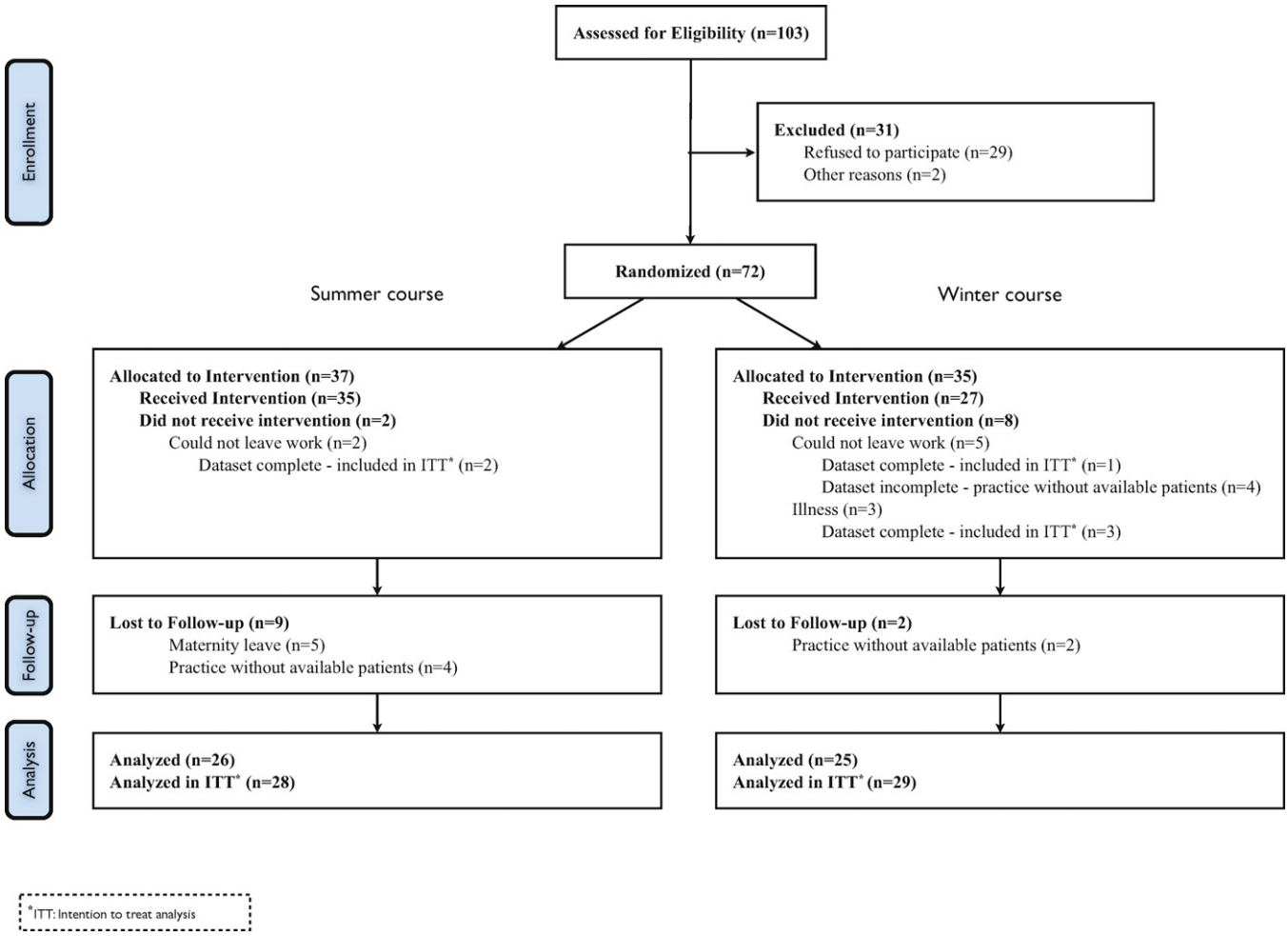

Fig. 2. Flow chart.

disciplines were underrepresented (Table 1). Details of the loss to analysis are given in Fig. 2.

The raters reached a pair wise IRR ranging from 0.72 to 0.89 after having rated 60 videotapes. We checked for drifting after the rating of 200 encounters, and the pair wise IRR was then 0.76–0.87 [19].

Mean (SD) doctor level 4HCS score (minimum score 23 and maximum score 115) of the initial two videos (baseline) was 60.3 (9.9) (Table 2). For the 15 doctors that were lost to follow up because it was not possible to film them in all periods, 11 received the intervention and four did not – for characteristics see Table 1. Of the ten doctors who did not receive intervention, six were observed throughout the observation period and were included in an intention-to-treat (ITT) analysis. The baseline scores of these doctors are given in Table 1. The baseline score for those with prior communication skills training did not differ from the rest (Table 2).

3.2. Main outcome

We found significant improvement in 4HCS by $d = 7.5$ points ($p = 0.01$, 95% confidence interval (CI) 1.6; 13.3) (Table 2). Changes in communication skills were fairly evenly distributed between subgroups, except for the doctors with low expectations for improvement. The subgroup of doctors with prior training made a particularly strong improvement. The ITT analysis did not alter the conclusion; an improvement in 4HCS of 6.5 points ($p = 0.02$, 95% CI 1.0; 11.9) was still significant.

3.3. Secondary outcomes

The duration of encounters (min:sec) did not change significantly (−1:03 ($p = 0.69$, 95% CI −6:13; 4:07)) from pre to post, and neither did patient global satisfaction (0.3 ($p = 0.38$, 95% CI −0.3; 0.8)).

4. Discussion and conclusion

4.1. Discussion

4.1.1. Findings

We found a significant mean improvement in communication behavior among hospital doctors after a 2-day course based on the Four Habits model. To our knowledge this is the first communication skill training RCT that has included hospital doctors across all non-psychiatric clinical specialties, residents as well as consultants, with video assessment of behavior. The applicability of the Four Habits model is supported by the fact that we have proven its effect in a state run European specialist health care system while it was developed in a private organization in the US.

From earlier research [22] we could expect that female doctors scored better on communication skills than male doctors at baseline. This difference was however not significant in our study.

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Table 1
Characteristics of participating vs. nonparticipating hospital doctors.[a]

	Not included in main analysis				Included in main analysis $n=51$	p[b]
	Refused to participate $n=31$	Included in ITT $n=6$	Lost to follow-up $n=15$	Sum not included $n=52$		
Mean age (SD)	43 (9)	44 (9)	38 (8)	41 (9)	41 (9)	0.66[c]
Sex						
Female	12 (39)	1 (17)	12 (80)	25 (48)	18 (35)	0.19
Male	19 (61)	5 (83)	3 (20)	27 (52)	33 (65)	
Status						
Resident	13 (42)	1 (17)	9 (60)	23 (44)	23 (45)	0.93
Consultant	18 (58)	5 (83)	6 (40)	29 (56)	28 (55)	
Specialty						
Medical[d]	9 (29)	1 (17)	4 (27)	14 (27)	20 (39)	0.006[f]
Surgical	17 (55)	4 (67)	7 (47)	28 (54)	12 (24)	
General[e], orthopedics, ENT	10 (32)	4 (67)	3 (20)	17 (33)	11 (22)	
Anesthesiology	7 (23)	0 (0)	4 (27)	11 (21)	1 (2)	
Other	5 (16)	1 (17)	4 (27)	10 (19)	19 (37)	
Neurology	2 (6)	0 (0)	1 (7)	3 (6)	7 (14)	
Pediatrics	0 (0)	1 (17)	1 (7)	2 (4)	7 (14)	
Gynecology	3 (10)	0 (0)	2 (13)	5 (10)	5 (10)	
Baseline score (4HCS)		49.7 (10.3)	59.6 (11.5)		60.3 (9.9)	

[a] Characteristics of doctors included in main analysis (participants) and doctors that were asked to participate, but where sufficient data were not possible to collect, doctors were not able to receive intervention, or they refused (nonparticipants). Data presented as No. (%) except as noted.
[b] Pearson chi-square between the groups included ($n=51$) and not included ($n=52$).
[c] Independent sample t test.
[d] Cardiology, respiratory diseases, General Internal Medicine common, nephrology, endocrinology, infectious diseases, hematology, gastroenterology.
[e] Gastro surgery, urology, vascular surgery.
[f] Pearson chi-square between the groups included ($n=51$) and not included ($n=52$) for the specialty sub classification medical, surgical, or other.

Maybe the biomedical focus and teamwork in hospitals reduce the gender difference in communication. Younger doctors scored better than older doctors. This could not be attributed to previous communication skills training, since those with and without such training did not perform differently at baseline. However, we observed a booster effect on those with such training, suggesting that repeated communication skill training is important.

A substantial number of participants had only moderate expectations for learning anything from a communication course. Even if this is not considered a good starting point for learning, it is a likely situation one would meet when introducing communication skills courses for all doctors in a hospital. Substantial behavior change in the right direction for these doctors is an advantage of this teaching model. Those with the low expectations, who also demonstrated a low baseline communication skills score, did not improve. In the observational study from KP [15] those who performed worse improved the most. In KP, these doctors received a particularly intensive course over five days. Our findings suggest that a more intensive intervention is necessary for these doctors.

We found that the observed changes were distributed quite equally across sex, age, status, and specialties, including senior doctors. This is important since senior doctors act as role models and should be able to explain to junior doctors why they communicate the way they do. Since clinical communication is a skill, it needs training, and if junior doctors are not encouraged to train and given competent advice, they are likely to forget what they have learnt. This could be one possible reason why those with pregraduate communication skills training did not perform better at baseline than the rest. A main intended quality of the Four Habits model is to represent a generic educational program across specialties and levels of clinical experience. This seems possible to achieve.

The relationship between communication skills and patient satisfaction is equivocal [23]. We could not demonstrate significant improvements in patient satisfaction. However, the well-known skewed distribution of patient satisfaction with a strong ceiling effect, also present in our study with a baseline score of 8.6, makes such an improvement difficult to achieve. Patient satisfaction depends on several factors, and should not be the main motivation for training.

The intervention did not affect the duration of the encounters, as has been demonstrated in some previous studies from primary care [7,24]. There is still a widely held belief among doctors that a more patient centered communication style is more time consuming. In a review of the literature, Stewart et al. found that patient centered encounters on average lasted 1 min longer than encounters applying a more conventional biomedical emphasis [4]. Important elements in patient centered communication are active listening when taking history, taught in Habit I, and shared decision-making, taught in Habit IV. Shared decision-making seems to demand more use of time [4]. Our findings should encourage doctors to change to a more patient centered behavior when taking history, without fear of losing time.

4.1.2. Strengths and limitations

Although we could not require the randomly drawn doctors to participate, the characteristics of the participants included in the analysis were not significantly different from the rest of the sample, except that surgical disciplines were underrepresented. The baseline score of doctors included in the ITT analysis was lower than for the participants, suggesting selective attrition. All other doctors that did not complete the study for different reasons had baseline scores on a par with participants included in the main analysis, hence they were not very different regarding communication skills. Based on these observations, we conclude that the doctors included in the main analysis constituted a representative sample of the population of doctors in this hospital, except for the surgical disciplines.

The 4HCS has been validated for verbal behavior by comparison with the well established Roter Interaction Analysis System (RIAS) and backchannel responses, and for non-verbal indicators (smiles, nods, eye contact) [18]. We needed more training than did Krupat et al. to achieve an acceptable IRR, which might be explained by the much wider heterogeneity of our material. Since the videotapes were allocated randomly to the raters, any systematic difference between them could not have affected the conclusions.

The main limitation of the study is that we could not collect data about medical outcomes of the patients, since such a wide variety of doctors were involved and the patient problems they treated covered such a wide array that medical outcome measures could not

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Table 2
Score at baseline and change in Fours Habits Coding Scheme, patient satisfaction and duration of encounter.

	n	Score Four Habits Coding Scheme (scale 23–115)[a]				Patient satisfaction score (scale 0–10)[b]				Duration of encounter (min:sec)			
		Baseline		Change (95% CI)	p^e	Baseline		Change (95% CI)	p^e	Baseline		Change (95% CI)	p^e
		Mean (SD)[c]	p^d			Mean (SD)[c]	p^d			Mean (SD)[c]	p^d		
All doctors	51	60.3 (9.9)		7.5 (1.6–13.3)	0.01	8.6 (1.4)		0.3 (−0.3 to 0.8)	0.38	21:34 (09:23)		−01:01 (−06:11 to 04:07)	0.69
Age range 28–58, mean 41 years (SD 9)													
28–40	28	63.2 (9.2)	0.02	8.4 (−1.1 to 17.8)	0.08	8.3 (1.5)	0.10	0.4 (−0.6 to 1.4)	0.37	21:04 (09:08)	0.68	−01:15 (−09:04 to 06:33)	0.74
41–58	23	56.7 (9.6)		6.4 (−0.4 to 13.3)	0.07	9.0 (1.0)		0.0 (−0.6 to 0.6)	0.87	22:11 (09:51)		−00:45 (−07:50 to 06:19)	0.82
Sex													
Female	18	62.8 (10.3)	0.18	9.0 (−1.2 to 19.1)	0.08	9.2 (0.7)	0.03	−0.2 (−1.2 to 0.8)	0.63	23:20 (09:39)	0.33	−02:17 (−13:06 to 08:30)	0.66
Male	33	58.9 (9.5)		6.7 (−0.9 to 14.2)	0.08	8.3 (1.5)		0.5 (−0.2 to 1.3)	0.16	20:37 (09:14)		−00:20 (−06:12 to 05:31)	0.90
Status													
Resident	23	62.4 (9.6)	0.16	10.7 (0.1–21.4)	0.05	8.4 (1.4)	0.24	0.6 (−0.5 to 1.7)	0.25	21:51 (09:39)	0.85	−00:03 (−09:06 to 08:58)	0.99
Consultant	28	58.5 (9.9)		4.8 (−1.8 to 11.4)	0.15	8.8 (1.3)		0.0 (−0.7 to 0.6)	0.92	21:20 (09:19)		−01:49 (−08:09 to 04:29)	0.56
Specialty													
Medical[f]	20	62.2 (9.1)	0.27	6.8 (−4.0 to 17.5)	0.20	8.5 (1.5)	0.75	0.2 (−1.1 to 1.5)	0.75	23:25 (10:10)	0.35	03:41 (−06:56 to 14:21)	0.48
Surgical[g]	12	56.3 (6.2)		7.6 (−4.4 to 19.6)	0.19	8.9 (1.1)		−0.1 (−0.9 to 0.7)	0.75	18:23 (09:37)		−04:14 (−11:58 to 03:29)	0.25
Other[h]	19	60.8 (12.1)		8.2 (−1.8 to 18.1)	0.10	8.5 (1.4)		0.6 (−0.3 to 1.4)	0.17	21:38 (08:15)		−03:56 (−11:44 to 03:50)	0.30
Doctor expectation[i]													
High	10	63.3 (9.6)	0.12	3.6 (−11.9 to 19.1)	0.61	8.9 (0.6)	0.76	0.2 (−1.1 to 1.4)	0.79	25:18 (09:53)	0.32	−08:27 (−24:17 to 07:22)	0.26
Moderate	34	60.8 (10.2)		11.3 (4.2–18.4)	0.003	8.5 (1.3)		0.5 (−0.3 to 1.2)	0.24	20:16 (09:10)		00:20 (−05:52 to 06:33)	0.91
Low/do not know	7	53.6 (6.0)		−5.1 (−21.3 to 11.0)	0.47	8.6 (2.2)		−0.5 (−2.4 to 1.4)	0.54	22:34 (09:29)		02:55 (−10:12 to 16:05)	0.61
Prior communication skills training													
No	36	60.2 (10.1)	0.93	4.6 (−1.7 to 10.9)	0.14	8.8 (1.2)	0.17	0.3 (−0.3 to 0.8)	0.33	21:58 (08:17)	0.64	−01:23 (−07:21 to 04:32)	0.63
Yes	15	60.5 (9.6)		14.4 (0.7–28.1)	0.04	8.2 (1.7)		0.2 (−1.4 to 1.9)	0.76	20:36 (11:53)		−00:07 (−11:38 to 11:22)	0.98

[a] Four Habits Coding Scheme (4HCS) total score (scale 23 (not very effective) – 115 (highly effective)).
[b] Consumer Assessment of Healthcare Providers and Systems global satisfaction score (CAHPS) (scale 0–10).
[c] Observations at baseline, based on the average of two encounters per doctor.
[d] Between group differences – one-way ANOVA.
[e] Change within group – one-sample *t* test.
[f] Cardiology, respiratory diseases, General Internal Medicine common, nephrology, endocrinology, infectious diseases, hematology, gastroenterology.
[g] Orthopedics, ENT, gastro surgery, urology, vascular surgery, anesthesiology.
[h] Neurology, pediatrics, gynecology.
[i] Prior to communication training doctors were asked to what degree they believed a communication training course can improve communication skills.

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be collected or compared. Although 4HCS has been validated, a direct connection between 4HCS scores and hard endpoints will be an important one to establish in the future.

4.2. Conclusion

The general applicability of the Four Habits is supported by the fact that it was developed in the US, and was implemented almost unchanged in a Norwegian hospital. We have provided evidence that hospital doctors' communication skills may be improved by a 20-h intervention according to the Four Habits model, and doctors may confidently apply a more patient centered approach in the beginning of the encounter without fear of losing time.

4.3. Practice implications

The Four Habits training model is suitable for communication-training courses for doctors in hospital settings. Senior and junior doctors across medical and surgical disciplines can be mixed when planning the courses. Our findings suggest that postgraduate communication training is needed and is particularly fruitful for doctors who have had prior training.

Authors' contributions

Bård Fossli Jensen collected most data, organized them, did most of the analyses, and drafted the manuscript. Pål Gulbrandsen designed the study, collected some data, interpreted the data, and drafted the manuscript. Fredrik A. Dahl designed the study including the statistical analyses, provided the randomization procedures, assured correct analytical procedures and interpreted the data. Edward Krupat developed the 4HCS evaluation and interpreted the data. Richard Frankel developed the Four Habits teaching model (with Terry Stein in Kaiser Permanente) and interpreted the data. Arnstein Finset designed the study, drafted the manuscript, and interpreted the data. All authors revised the manuscript for important intellectual content and approved the final version. Bård Fossli Jensen and Fredrik A. Dahl had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Disclosures

Bård Fossli Jensen, Pål Gulbrandsen, and Arnstein Finset were teachers in the courses, but were not reimbursed for this. Bayer Pharma and the Norwegian Chiropractor Association have paid Pål Gulbrandsen and Arnstein Finset/Bård Fossli Jensen, respectively for giving lectures on the Four Habits model.

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