

E-mail messages can be effective to make the health education activity of family pediatricians more effective

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Abstract

Background. Not all family pediatricians carry on their health education tasks constantly and they do not often use effective communication strategies. To deal with this situation it is useful to find ways that are easy to implement, reproducible in the most diverse contexts and that can be accepted even by the least motivated pediatricians.

We have been experimenting a training method, based on sending a series of e-mail messages, assessing their feasibility and effectiveness.

Study design. Experimental approach.

Methods. The intervention consisted of sending 21 email to 141 family pediatricians. In order to assess the intervention effectiveness, we first select randomly 20 pediatricians out of the 141 and before the intervention we interviewed in their offices 400 parents of 2-14 years-old children (20 parents for each of the 20 family pediatricians); similarly 5-6 months after the intervention, we selected randomly other 20 pediatricians and interviewed 355 parents. The emails mentioned the 5 A's model as well as the motivational interview, the model of the stages of change and the counseling techniques. They also enclosed communication material to be reproduced and given to the parents, as well as recommendations and guidelines. Five messages contained self-assessment tests.

Results. Following the intervention, out of 26 questions asked to mothers, there was a significant improvement in the response to 10 questions and a worsening in the response to a single question. The overall difference between before and after the intervention is very significant ($p < 0.0001$).

Conclusions. The intervention was proved to be very effective and easily reproducible. It is necessary to confirm these findings with further studies based on the use of a control group too.

It appears to be the first time that email messages are sent in order to train family pediatricians on the behavior change counseling.

Introduction

The family pediatrician (FP) is a central figure in relation to the developmental age health education in Italy. He is an important point of reference for parents and he is in charge of the child from birth to the end of

adolescence. Scheduled health checks for children aged 2, 3 and 5 years specifically provide health education interventions in connection with the prevention of overweight and accidents, while those related to children aged 8 and 10 also prescribe advice on dental hygiene (1). The FPs should thus possess the

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communicative, relational and educational skills necessary to perform their role as health educators, which their traditional training course does not guarantee.

We have previously carried out two different case studies by interviewing FPs and parents of patients (children and teenagers aged 2 to 14) assisted by them, and a rather critical picture emerged: about a third of the parents did not receive active advice in relation to food education; 62% of parents declared they have not received advice on teeth brushing; only a minority of FPs investigated whether their messages were well understood and very few checked whether the parents encounter difficulties while putting into practice the advice and prescriptions they receive (2, 3). It is necessary to find strategies to ensure that all FPs perform their role as health educators in a consistent and competent way. It is therefore useful to try and find training methods that are easy to implement, inexpensive, reproducible in the most diverse contexts and that are accepted even by the least motivated FP.

Sending e-mail messages meets these requirements and it has been used in various fields as a medical training tool with satisfactory results (4-8). This tool does not seem to have been used to train general healthcare practitioners on health education practice. For the above mentioned reasons we have decided to experiment with it in order to verify its feasibility and effectiveness.

Methods

Twenty-one e-mail messages have been prepared as follows:

1. message illustrating the purpose and structure of the “training course” and which aims at gaining the attention and trust from the FPs;
2. summary on efficacy studies on the

educational activity performed by the primary care physician (message aiming at motivating to carry out health education activities);

3. summary of guidelines on proper nutrition;
4. summary of guidelines on oral hygiene;
5. summary of guidelines on the prevention of accidents;
6. “minimal advice” (5 A’s model);
7. Prochaska-Di Clemente’s model of the stages of change;
8. statement on how to assess the availability to change;
9. how to communicate with parents who are not willing to change;
10. statement on how to detect self-efficacy and increase it;
11. active listening;
12. non-verbal communication;
13. counterproductive communication methods;
14. importance of narration and good use of time;
15. statement on how to use flyers and brochures;
16. summary and closure message (with all the previous messages sent attached);
- 17-21. five messages with exercises aiming at checking one’s own preparation.

As it appears from the titles of the messages, reference was made above all to the model of the stages of change (9-11), to motivational interviews (12-14), to the 5 A’s model (15) and to counseling (16).

All information messages (messages 2-15) have a non-directive communicative style and present the same pattern (summary of the previous message, presentation of the topic, summary of the above, bibliographic references).

The 5 messages “Check your preparation” contained examples of doctor-parent and doctor-child-parent interview that the family pediatricians had to examine in order to identify critical points and propose valid

alternatives, comparing with those proposed by the organizers.

Supporting material was attached to some of the messages:

1. the data that emerged from our first study on the matter (17);
2. the guidelines on proper nutrition (18);
3. the guidelines on oral hygiene (19);
4. three brochures on accident prevention;
5. a poster on nutrition and a brochure on nutrition, oral hygiene and smoking;
6. the Calgary-Cambridge Guide to the medical interview-communication process modified by the Pediatric Cultural Association (20).

The series of messages was sent twice to all the 141 FPs of the Local Health Trust Napoli 1 Centro, leaving a one-month break between the first and second dispatch. In the first round the emails were sent on a weekly basis, in the second round they were sent every 3-4 days.

The evaluation design consisted of interviewing 400 parents of children aged 2-14 assisted by 20 FPs that were randomly chosen before the intervention (20 parents for each FP) using a questionnaire of 26 questions, and to the same amount of parents with the same characteristics, assisted by other 20 randomly chosen FPs, an identical questionnaire 5-6 months after the end of the intervention. In this way we aimed at investigating the change in the FPs behavior on the health education in medical practice (i.e., level 3 described by Soderlund et al. to evaluate training programs for motivational interviewing) (21).

The questionnaires were constructed on the basis of those used in the pilot study (17).

The administration of the questionnaires took place through interviews carried out in the FP's office. Four *ad hoc* prepared interviewers were employed, who had been trained to follow standard methods of

conducting the interview. The interviewees were not asked their full name, nor their children's, and at the beginning of the interview the interviewer informed the interviewees that the questionnaire would have been anonymous and the data would have been only used to research purpose.

400 parents were interviewed before the intervention (20 parents in each of the 20 FPs' offices) and 355 after the intervention (20 parents for 16 pediatric offices, plus 17 parents and 18 parents in two offices). At the beginning 5 parents refused to be interviewed and were replaced by other parents, 8 parents refused to be interviewed but only 3 of them were replaced by other parents.

The number of interviewed parents is different before and after the intervention also because two pediatricians that were randomly extracted after the intervention refused to have the parents interviewed in their offices.

Since the educational level of the parents interviewed after the intervention was different from that of the parents interviewed before (see supplementary material, Table S1), the data were standardized by qualification and then they were processed using the chi-square test (with the Yates correction for the questions with less than 200 respondents).

Lastly, in order to be able to give an overall opinion on the intervention, we proceeded to sum up all the affirmative and all the negative answers and make the comparison before and after the intervention by applying the chi-square test (see supplementary material, Table S2).

Results

Table 1 shows the data related to the questions regarding the nutrition. They highlight an improvement in the answers to three questions: "Does the FP ask you whether your child usually has breakfast?",

Table 1 - Comparison between the responses regarding nutrition given by parents before and after the intervention (400 parents before, 355 parents after the intervention)

Question	Possible answer	before	after	% before	% after	p
Does your pediatrician give you advice on how to feed your child?	Yes	352	305	88	86	ns
	No	48	48	12	14	
Does your pediatrician ask what your child eats?	Yes	323	290	81	82	ns
	No	77	64	19	18	
Does your pediatrician ask whether your child usually has breakfast?	Yes	221	225	55	63.5	<0.5
	No	179	130	45	36.5	
Does your pediatrician ask what your child eats for breakfast?	Yes	175	194	44	55	<0.01
	No	225	159	56	45	
Does your pediatrician advise you on how to provide a proper breakfast?	Yes	189	210	47	59	<0.001
	No	211	144	53	41	
Does your pediatrician give you advice on how many times per week your child should eat meat, vegetables, fruits, legumes, fish?	Yes	289	260	72	73	ns
	No	111	95	28	27	
Does your pediatrician explain the reasons?	Yes	246	242	62	68	ns
	No	154	113	38	32	
Does your pediatrician advise what food should be provided in limited quantity in order to assure a proper feeding?	Yes	322	281	80	80	ns
	No	78	72	20	20	
Does your pediatrician explain the reasons?	Yes	300	276	75	78	ns
	No	100	78	25	22	

“Does the FP ask you what your child usually eats for breakfast?” and “Does the FP provide any advice on how to make a proper breakfast for your child?”.

Table 2 shows the data concerning physical activity, oral hygiene, accidents, smoking and vaccination. The analysis of the table highlights a significant improvement in the answers concerning the advice to practice physical activity, the indications to prevent accidents and the question “Does your FP inform you about the damage caused by smoking?”.

Table 3 shows the answers concerning some of the FPs’ communication methods. After the intervention, the number of parents who declare that the FP asks “Is anything of what I said still unclear?”, “Do you face any difficulty in following my advice?” and

“How did it go after the advice I provided you with?” significantly increases, while the number of parents declaring that the FP asks “What do you already know about nutrition?” decreases.

Overall, following the educational intervention, we noticed an improvement in the response to 10 questions and a worsening in the response to 1 question, while 15 other answers do not show any significant improvement or deterioration.

Adding up all the affirmative and all the negative responses and making the comparison before and after the intervention (Table S2), a very significant difference can be observed ($p < 0.0001$). This significant difference is evident both by standardizing the data by qualification and by not standardizing them.

Table 2 - Comparison between responses concerning physical activity, oral hygiene, accidents, smoking and vaccinations given by parents before and after the intervention (400 parents before, 355 parents after the intervention)

Question	Possible answer	before	after	% before	% after	p
Does your pediatrician ask whether your child exercises (walking, running, cycling, time spent watching tv, etc.)?	Yes	281	244	70	69	ns
	No	119	111	30	31	
Does your pediatrician advise you to make sure your child is exercising/doing sport every day?	Yes	227	235	57	66	<0.05
	No	171	119	43	34	
Does your pediatrician ask whether your child brushes his/her teeth?	Yes	258	239	64.5	66	ns
	No	142	120	35.5	34	
Does your pediatrician advise on how to brush your child's teeth?	Yes	150	150	38	42	ns
	No	248	205	62	58	
What is the proper way of brushing teeth?	Wrong answer	384	341	96	97	ns
	Correct answer	16	11	4	3	
Does your pediatrician advise you on how to prevent your child from getting hurt (falling down, getting burnt, best way of carrying your child while driving etc.)?	Yes	122	171	30	48	<0.001
	No	278	184	70	52	
Does your pediatrician ask whether you/your husband smoke?	Yes	250	224	63	63	ns
	No	147	130	37	37	
Does your pediatrician inform you about damage caused by smoke?	Yes	115	134	40	59	<0.001
	No	173	92	60	41	
Does your pediatrician provides you with advice on how to quit smoking?	Yes	52	54	18	24	ns
	No	233	173	82	76	
Does your pediatrician provide you with informations on vaccinations?	Yes	371	331	93	93.5	ns
	No	27	23	7	6.5	

Discussion

In our study the sending a structured series of e-mail messages can lead to a significant improvement of the FPs' health education activity.

One might wonder whether a parent is a good source for investigating the health education activity carried out by the FP. We think they are. We actually believe that their statements are more reliable than those of FPs, because they have no interest in making false statements and because what is important is not what the FP thinks he does and reports doing, but what is perceived by parents.

From a research we had previously carried out, in which we compared the answers given by parents with those provided by the FPs of their children to similar questions concerning the health education activity carried out by the FPs, it emerged that there is never a significant agreement. The percentage of FPs who report carrying out all their tasks is much greater than the percentage of parents who confirm this. This occurs at all times, with the exception of the questions relating to the presence of information material in the offices and the following questions: "Did the FP ask you whether you or your husband/wife smoke?", "Did the FP provide you with any advice on how to stop smoking?".

Table 3 - Comparison between the responses concerning the way the pediatrician communicates given by the parents before and after the intervention (400 parents before, 355 parents after the intervention)

Question	Possible answer	before	after	% before	% after	p
Does your pediatrician ask you what you already know about nutrition?	Yes	224	170	56	48	<0.05*
	No	176	184	44	52	
Does your pediatrician ask you what you already know about teeth brushing?	Yes	131	117	33	33	ns
	No	269	238	67	67	
Does your pediatrician ask you what you already know about cigarette smoke?	Yes	126	90	31.5	25.5	ns
	No	274	264	68.5	74.5	
Does your pediatrician ask you whether you already know how to prevent your child from getting hurt?	Yes	83	105	21	30	<0.01
	No	317	249	79	70	
Does your pediatrician ask whether something he/she explained to you is still unclear?	Yes	278	303	69	85	<0.01
	No	122	52	31	15	
Does your pediatrician ask you if you find following his/her advice hard?	Yes	156	209	39	59	<0.0001
	No	244	146	61	41	
Does your pediatrician ask "how did it go after following my advice"?	Yes	319	314	80	88.5	<0.01
	No	81	41	20	11.5	

* After the intervention the parents' answers indicate a worsening

The agreement among answers about the presence of informative material, something tangible and verifiable by the interviewer himself, and on the advice to quit smoking, an activity that is probably perceived by FPs to be alien to their own tasks, being addressed to adults, seems to confirm that FPs tend to overestimate the activity they performed or even tend not to declare that they have not performed tasks assigned to them (3).

Not having interviewed the same sample before and after the intervention protects from possible distortions such as the coherence with what was previously declared, the effect of compliance with the interviewer's or the FPs' expectations and the fatigue effect.

Our study did not include a control group and this can be considered a partial limitation, because a control group (parents of children assisted by FPs not recipient of the 21 email messages) could have informed us about pre-post changes not due to the educational e-mails).

The use of email to educate patients on better lifestyles and on a more careful management of their diseases is spreading and there are several studies on the subject that highlight the effectiveness of such a practice (22-26).

The e-learning courses are now widespread, even those aimed to improve the communication skills of healthcare professionals and they seem to have results that are comparable to the residential courses (27-30).

Sending e-mail messages was used to train doctors in various fields (management of diabetic patients, correct prescription of drugs, screening, interpretation of cytological samples, etc.), with satisfactory results (4-8). Examining the reviews on studies concerning training on motivational interviewing (21, 30, 31) and questioning PubMed in various ways ("electronic-mail" or "e-mail" and "behavior change communication"; "electronic-mail" or "e-mail" and "motivational interviewing"; "e-learning" and "behavior change

communication”; “e-learning” and “doctor-patient communication”; “e-learning” and “e-mail” or “electronic-mail”) we have not found any study on the use of e-mail to improve skills on counseling on behavioral change and on the practice of health education, so it seems that our work could be the first of its kind. Sending a structured series of e-mail messages has several advantages compared to online training courses. In fact, the latter are usually joined by people who are interested in the captioned topic and this implies that they already have at least a “sensitivity” for these aspects of their profession, or maybe they already possess skills and they wish to improve them. On the other hand, e-mail messages sent to all healthcare workers in a given area will reach also those healthcare workers who are less attentive to communication aspects and, probably, less competent. That is, those who most need training in this field. Furthermore, while there is always a possibility that they could delete or not read the messages sent, it is likely that at least some of the messages get read (especially if they are accompanied by communication material for the patient or recommendations and guidelines) and this could help to raise an interest for such an important aspect of the profession.

Our intervention, in addition to being effective, is easily reproducible and less expensive than other types of intervention that also seem effective, such as role-playing with actors who play the role of the patient (32), interactive seminars (33), e-learning courses (27-29, 34) and supervision and coaching activities (35-37). Furthermore the number of participants in these courses is rather low: between 7 and 87 in the review of Soderlund (21) and between 19 and 60 in Dragomir’s (30). This is due either to the nature of the course itself (courses based on role-playing

games, supervision and coaching activities must necessarily allow participation to a small number of participants) or because a small amount of doctors (those most interested in these topics and, therefore, probably those who have less need of it) enroll in e-learning courses. On the other hand, sending e-mail messages allows for a large number of learners to be involved with rather easily and with low costs.

We believe that e-mail messages could also be useful to train other operators on behavioral change and health education counseling, and it would be beneficial to undertake experiments to verify their effectiveness.

Conclusions

Sending a structured series of e-mail messages on health education on behavioral change counseling to FPs (5 A’s model, model of stages of change, motivational interviewing and counseling techniques), including communicative materials for the patient and guidelines, and also including self-assessment exercises, helps to significantly improve the health education activity perceived by the parents of their clients.

This intervention is also inexpensive, easily reproducible and could reach also the less motivated and competent operators, who are more in need of training. It is necessary to confirm these data with more extensive research and also to include a control group as well as to test their effectiveness with other operators as well.

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SUPPLEMENTARY MATERIAL

Table S1 - Characteristics of the interviewed sample (people interviewed: 400 before the intervention, 355 after. Values are expressed as %)

		Before the intervention (in brackets the census data regarding women aged 25-45 years living in Naples)	After the intervention
Sex	Male	6	10
	Female	94	90
Qualification	University degree	19.7 (22)	9.9
	High School degree	37.6 (35)	34.4
	Middle School degree	38.4 (32)	45.3
	Primary School	4.3 (11)	10.4
Number of children	1	28	27.5
	2	53	49.5
	3	15	18.5
	>3	4	4.5
Child age	2-3 anni	26	21
	4-5 anni	36	30
	6-7 anni	19	22
	8-9 anni	11	13
	10-11 anni	6	9
	12-14 anni	2	5

Table S2 - Comparison between all the answers given by parents before and after the intervention (400 parents before, 355 parents after the intervention)

	Before	%	After	%
Yes	5,576	55	5,384	60
No	4,588	45	3,575	40

$p < 0,0001$

Riassunto

I messaggi di posta elettronica possono essere efficaci per migliorare l'efficacia dell'attività di educazione sanitaria da parte dei pediatri di famiglia

Premessa. Non tutti i pediatri di famiglia svolgono con costanza i loro compiti di educazione sanitaria e utilizzano efficaci strategie comunicative. Per affrontare questa situazione è utile trovare modalità che siano di facile attuazione, riproducibili nei più diversi contesti e che raggiungano anche i pediatri meno motivati. Abbiamo sperimentato una formazione basata sull'invio di una serie strutturata di messaggi di posta elettronica, valutandone fattibilità ed efficacia.

Disegno. Studio sperimentale.

Metodi. L'intervento è consistito nell'invio di 21 email a 141 pediatri di libera scelta. Per valutarne l'efficacia abbiamo scelto casualmente 20 pediatri tra i 141 e, prima

dell'intervento, abbiamo intervistato nei loro uffici 400 genitori di bambini di 2-14 anni (20 genitori per ognuno dei 20 pediatri); ugualmente, 5-6 mesi dopo l'intervento, abbiamo selezionato casualmente altri 20 pediatri e abbiamo intervistato 355 genitori. I messaggi trattavano del modello delle 5 A, del colloquio motivazionale, del modello degli stadi di cambiamento e delle tecniche di counseling. Erano allegati anche materiali comunicativi per i pazienti, raccomandazioni e linee guida. Cinque messaggi contenevano test di autovalutazione.

Risultati. Dopo l'intervento, sulle 26 domande poste ai genitori sui comportamenti dei pediatri si evidenzia un miglioramento significativo nella risposta a 10 domande e un peggioramento a una sola domanda. La differenza totale tra prima e dopo l'intervento è molto significativa ($p < 0,0001$).

Conclusioni. L'intervento formativo sperimentato si è dimostrato efficace e facilmente riproducibile. È ne-

cessario confermare tali dati con ricerche che prevedano anche un gruppo controllo.

È forse la prima volta che l'invio di messaggi di posta elettronica viene utilizzato per formare gli operatori sanitari di base sulla comunicazione per cambiare comportamenti poco salutari.

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