





RESEARCH PAPER

 OPEN ACCESS 

Empathy in vaccination counselling: a survey on the impact of a three-day residential course

Massimo Maurici ^a, Michele Arigliani ^b, Valentina Dugo^c, Carlo Leo^d, Valentina Pettinicchio^c, Raffaele Arigliani^e, and Elisabetta Franco ^a

^aDepartment of Biomedicine and Prevention, University of Rome Tor Vergata, Italy; ^bDepartment of Clinical and Experimental Medical Sciences, University Hospital of Udine, Italy; ^cDepartment of Biomedicine and Prevention, Specialization School for Hygiene and Preventive Medicine, University of Rome Tor Vergata, Rome, Italy; ^dDepartment of Clinical and Experimental Medical Sciences, University Hospital of Udine, Italy TO Department of Medicine, Udine, Italy; ^eDepartment of Biomedicine and Prevention, Specialization School for Hygiene and Preventive Medicine, University of Rome Tor Vergata, Rome, Italy

ABSTRACT

Background: In an era of hesitance to use vaccines, the importance of effective communication for increasing vaccine acceptance is well known.

This study aimed to assess the impact of a three-day residential course concerning empathy and counselling abilities on patients' ratings of the level of empathy of physicians and nurses working in vaccination centers.

Methods: The empathy of healthcare providers was evaluated using the Adapted Consultation and Relational Empathy (CARE) Measure. The survey involved 20 healthcare workers, doctors, and nurses in three immunization services of a Local Health Unit in South Italy. Before and after attending the course, all of them administered the questionnaire to 50 consecutive parents of vaccinated children.

Statistical tests were used to assess the homogeneity of pre- and post-course samples, to measure the level of empathy perceived by parents in doctors and nurses in pre- and post-course evaluations, and to compare the average CARE Measure scores among groups.

Results: Analysis of the questionnaires showed an increase of "excellent" scores and statistically significant differences between the pre- and post-course median values.

Statistically significant differences between doctors and nurses were shown in almost all questions pre-course and in only four questions post-course.

Conclusions: This study demonstrated that a residential course is effective at improving patient-rated empathy of doctors and nurses working in vaccination centers and could result in an increase of parents' adherence to vaccination programs.

ARTICLE HISTORY

Received 25 June 2018
Revised 21 September 2018
Accepted 10 October 2018

KEYWORDS

empathy; vaccination; questionnaire; health education

Introduction

In an era of vaccine hesitancy, defined as "delay in acceptance or refusal of vaccination despite availability of vaccination services",¹ the search for effective strategies to increase vaccine acceptance is a priority for public health.^{2,3} Previous studies in developing countries showed the utility of communication tool-based training for healthcare workers to improve vaccination adherence.^{4–6} However, none of these studies tested the impact on immunization dropout of improving communication skills of healthcare staff involved in vaccinations. There is evidence that providing hesitant parents with detailed information about the benefits of immunization is not sufficient to address their concerns.^{7–9} The quality of the parents–healthcare provider relationship is also very important as a good interaction strengthens the motivation in support of immunization and urges hesitant parents toward vaccine acceptance^{10,11} while poor communication increases the risk of refusal.^{12–14} Effective communication requires an empathic approach

by the healthcare provider, who should understand parents' beliefs and concerns about vaccines, tailoring the counselling to the family's perspective and sociocultural context.^{15–18} Empathy and communication abilities are influenced by the characteristics and experience of the healthcare providers even if the patient-perceived level of empathy of doctors and nurses does not seem to be influenced by the professional role.¹⁹ There are, however, professional skills that can be improved through professional training, something that is progressively being implemented in the academic teaching and continuous medical education of healthcare professionals in several countries.^{20–24}

This study aimed to assess the impact of a three-day residential course on empathy and counselling abilities²⁵ on the parent-rated level of empathy of healthcare staff working in vaccination centers in the south of Italy. Empathy was measured using the Consultation and Relational Empathy (CARE) Measure,²⁶ whose application to the vaccination field was tested through the study.

Results

We collected 950 pre-intervention and 950 post-intervention questionnaires from 11 nurses and 8 out of 9 doctors. One of the doctors did not complete the study, and his questionnaires were not considered in the analysis.

Reliability of the CARE measure for vaccination

Cronbach's alpha was 0.94 for the overall scale, and it was reduced slightly if any of the 10 items was removed; to investigate the reliability of each item, the item-total correlations were calculated. They were similarly high for all items (> 0.7 ; Table 1).

Demographic characteristics

The main sociodemographic characteristics of the children and interviewed parents are summarized in Table 2.

Distribution by age and sex of parents and their children in pre- and post-course evaluation was similar without statistically significant differences.

About half of the children were male, and 45.5% pre- and 45.8% post-course were included in the 2–12-month-old age group.

In both pre- and post- course evaluations, the majority of the parents were in the 30–39-year-old age group, and almost half had a high school degree.

More than half of those interviewed had more than one child, and over 90% were Italian.

Care measure

Analysis of questionnaires

At pre -course, the mean total CARE Measure score was 42.70 (DS ± 7.12), ranging from 19 to 50; at post -course, it was 44.49 (DS ± 6.18), ranging from 20 to 50. Analysis of the questionnaires

Table 2. Demographics characteristic of vaccinated children and interviewed parents.

Immunized children	Pre n (%)	Post n (%)
Gender		
Male	472 (49.7)	448 (47.2)
Female	460 (48.4)	472 (49.7)
Missing	18 (1.9)	30 (3.2)
Age		
0–1 months	7 (0.7)	6 (0.6)
2–12 months	432 (45.5)	435 (45.8)
13–60 months	299 (31.5)	281 (29.6)
6–10 years	74 (7.8)	85 (8.9)
11–18 years	127 (13.4)	120 (12.6)
Missing	11 (1.2)	23 (2.4)
Parents		
Age (years)		
< 20	167 (17.6)	131 (13.8)
20–29	211 (22.2)	174 (18.3)
30–39	417 (43.9)	424 (44.6)
40–49	115 (12.1)	143 (15.1)
≥ 50	21 (2.2)	18 (1.9)
Missing	19 (2.0)	60 (6.3)
Educational level		
Primary school	39 (4.1)	19 (2.0)
Secondary school	262 (27.6)	216 (22.7)
High school	445 (46.8)	469 (49.4)
University	156 (16.4)	212 (22.3)
Missing	48 (5.1)	34 (3.6)
More than one child		
Yes	514 (54.1)	519 (54.6)
No	402 (42.3)	363 (38.2)
Missing	34 (3.6)	68 (7.2)

showed high scores before the course with mean scores ranging from 4.23 (items 9 and 10, DS 0.93 and DS 0.97, respectively) to 4.37 ± 0.83 (item 8) and median scores ranging from 4 (items 2, 5, 6, 9, and 10) to 5 (items 1, 3, 4, 7, and 8) (Table 3).

At post -course, there was an improvement in scores in items 2, 5, 6, 9, and 10, and frequency distribution showed an increase of “excellent” scores and a decrease of “poor”/“fair” scores with mean values ranging from 4.41 ± 0.75 (item 2) to 4.54 ± 0.70 (item 8) and a median score of “5” for all items.

Statistically significant differences between the pre- and post -course median values were found for all items.

Table 1. Validation of CARE measure adapted to vaccination setting in Italy.

Item Number	Question	Corrected item-total correlation	Cronbach's alpha if item deleted
1	Making you/your child feel at ease (being friendly and warm towards you/your child. treating you/your child with respect. not cold or abrupt)	0.743	0.941
2	Letting you tell doubts/questions/curiosity about vaccinations (giving you time to fully describe doubts/questions/curiosity about vaccinations)	0.769	0.94
3	Really listening (paying close attention to what you were saying; not looking at the notes or computer as you were talking)	0.777	0.94
4	Being interested in you and in your child as a whole person (asking/knowing relevant details about your life. your situation; not treating you as 'just a number')	0.766	0.94
5	Fully understanding your concerns (communicating that he/she had accurately understood your concerns about vaccination ; not overlooking or dismissing anything)	0.781	0.939
6	Showing care and compassion (seeming genuinely concerned. connecting with you and your child on a human level; not being indifferent or 'detached')	0.784	0.939
7	Being exhaustive (properly discussing benefit and side effects of vaccination) ; being honest but not negative about your problems)	0.796	0.939
8	Explaining things clearly (fully answering your questions. explaining clearly. giving you adequate information; not being vague)	0.795	0.939
9	Helping you to take control (exploring with you what you can do about your child vaccination ; encouraging rather than 'lecturing' you)	0.787	0.939
10	Making a plan of action with you (discussing and planning the vaccination. involving you in decisions as much as you want to be involved; not ignoring your views)	0.742	0.941

Changes from the original CARE Measure are in bold

Table 3. Mean and median score in pre and post course.

Item number*	PRE COURSE	POST COURSE	PRE COURSE	POST COURSE
	Mean score (± SD)	Mean score (± SD)	Median score	Median score
1	4.35 (± 0.81)	4.50 (± 0.68)	5	5
2	4.28 (± 0.83)	4.41 (± 0.75)	4	5
3	4.32 (± 0.83)	4.49 (± 0.69)	5	5
4	4.30 (± 0.92)	4.45 (± 0.78)	5	5
5	4.28 (± 0.91)	4.43 (± 0.75)	4	5
6	4.27 (± 0.91)	4.45 (± 0.71)	4	5
7	4.31 (± 0.86)	4.49 (± 0.73)	5	5
8	4.37 (± 0.83)	4.54 (± 0.7)	5	5
9	4.23 (± 0.93)	4.46 (± 0.75)	4	5
10	4.23 (± 0.97)	4.48 (± 0.72)	4	5

*see Table 1

In items 1, 3, 4, 7, and 8, where the median score was the same (5, “excellent”) pre- and post -course, a Wilcoxon test showed statistically significant differences.

Analysis of parent’s characteristics

At the pre-course evaluation, the mean total score in the lower educational level group (primary or secondary school) was 41.87 (DS ± 7.44), and that in the higher educational level group (high school or university) was 43.15 (DS ± 6.87). A significant difference was found between these two groups ($p = 0.01$). At the post -course evaluation, these differences disappeared; the mean total scores in the two groups were very similar (44.44 vs. 44.54).

Stratifying for parent’s age pre-course, the mean total score ranged from 42.26 ± 7.2 in the 20–29-year-old group to 43.41 ± 6.8 in the 40–49-year-old group with no significant statistical differences ($p = 0.155$).

Multivariate analysis pre -course confirmed significant differences between low and high educational level in the total CARE Measure score and assessed differences between parents’ age groups ($p < 0.05$).

Analysis of healthcare workers characteristics

CARE Measure score distributions for medical doctors and nurses are reported in Table 4.

The 400 questionnaires obtained by medical doctors indicated a statistically significant increase of medians from 4 to 5 in all items post -course.

Although nurses obtained high scores at the pre -course evaluation (medians were 5 for all items except 9), statistically significant differences for all items between pre- and post -course were observed.

At the pre -course evaluation, statistically significant differences between doctors and nurses were shown in all questions except 5 and 6. At the post -course evaluation, only the scores for questions 2, 3, 9, and 10 were different.

Discussion

Improving counselling and empathy skills of healthcare workers involved in immunization programs is particularly

important in a historical moment characterized by vaccine hesitancy and spreading of anti-vaccination movements.^{27,28}

The ability to transmit information, knowledge, and personal experiences can improve empathy in doctors and nurses. Empathy may be a natural talent, but specific techniques can be learned through courses, lectures, and workshops to acquire or improve the ability to understand and share emotions.²⁰ This may be even more difficult for healthcare personnel working in services in which there is no specific link with individual patients, like immunization programs. In an Italian study, a low proportion of parents mentioned public vaccination services (33.4%) among the three main sources of information on vaccinations.²⁹

This study evaluated the impact of a counselling educational course in increasing the empathy of healthcare workers working in vaccination centers.

The instrument used for measuring empathy was a patient-rated questionnaire, the CARE Measure, which has been validated across different fields of medicine^{26,30–32} and was slightly modified to better fit the vaccination field. We confirmed the ability of the questionnaire derived from the CARE Measure questionnaire to detect small differences between pre- and post-course scores even if they were already high at baseline.

The choice of recruiting healthcare professionals working in vaccine services who agreed to attend a counselling course might explain the high scores obtained in the pre -course survey. In fact, we can assume that these operators were motivated to improve their counselling abilities and that they already tried to apply an empathic approach in their daily practice before attending the course.

Nevertheless, the educational intervention led to good results in terms of perceived empathy, and median score improvement was detected in all items of the CARE Measure. The level of perceived empathy was similar for different age groups and numbers of children while a lower level was detected in the lower education level and younger age groups pre-course. The difference disappeared post-course, showing that professional empathy was perceived equally by different groups.

An interesting result was observed in comparing nurses’ and doctors’ scores. We expected that the patient-perceived level of empathy of doctors and nurses would not be influenced by the professional role.¹⁹ In our study, however, we found higher rates of empathy in nurses than in doctors; nurses had a better score pre-course, probably due to their more frequent interaction with parents and children; these differences disappear in the post-course evaluation. It seems, therefore, that a residential course may be effective in increasing healthcare professionals’ empathy regardless of the starting level.

The study has some limitations. In pre- and post-course surveys, the questionnaires were administered to two different groups of parents that were similar, coming from the same demographic context and attending the same vaccination services. The two groups consisted of 950 persons each, and there were no statistically significant differences between them in terms of demographic characteristics (see Table 2). Moreover, the study design based on interviewing parents accompanying children to the immunization centers allowed only parents of vaccinated children to be enrolled.

Table 4. Distribution of answers to the CARE measure items in pre and post course: doctors/nurses.

MEDICAL DOCTORS		PRE COURSE								POST COURSE							
Item number*	Poor	Fair	Good	Very Good	Excellent	Missing	Mean score (± SD)	Median score	Poor	Fair	Good	Very Good	Excellent	Missing	Mean score (± SD)	Median score	
1	0	6	78	120	196	0	4.27 (± 0.82)	4	0	1	39	135	225	0	4.46 (± 0.68)	5	
2	0	9	85	124	180	2	4.19 (± 0.9)	4	3	2	50	143	200	2	4.34 (± 0.77)	5	
3	0	8	79	129	184	0	4.22 (± 0.83)	4	2	2	37	136	223	0	4.44 (± 0.72)	5	
4	0	11	73	124	191	1	4.24 (± 0.87)	4	1	2	45	126	224	2	4.43 (± 0.76)	5	
5	0	5	87	119	186	3	4.22 (± 0.9)	4	1	4	42	143	208	2	4.39 (± 0.73)	5	
6	0	15	77	118	188	2	4.20 (± 0.93)	4	0	9	32	142	216	1	4.42 (± 0.73)	5	
7	1	13	90	113	183	0	4.16 (± 0.9)	4	0	7	34	117	241	1	4.48 (± 0.73)	5	
8	1	7	72	128	192	0	4.26 (± 0.83)	4	0	3	38	111	247	1	4.51 (± 0.7)	5	
9	0	18	84	126	170	2	4.12 (± 0.94)	4	0	7	38	136	219	0	4.42 (± 0.73)	5	
10	1	17	86	118	177	1	4.15 (± 0.93)	4	0	1	37	149	213	0	4.44 (± 0.67)	5	
NURSES		PRE COURSE								POST COURSE							
Item number*	Poor	Fair	Good	Very Good	Excellent	Missing	Mean score (± SD)	Median score	Poor	Fair	Good	Very Good	Excellent	Missing	Mean score (± SD)	Median score	
1	1	3	70	168	306	2	4.41 (± 0.79)	5	0	1	54	147	345	3	4.53 (± 0.68)	5	
2	1	7	75	191	276	0	4.33 (± 0.77)	5	1	5	59	159	321	5	4.46 (± 0.74)	5	
3	3	4	63	186	291	3	4.39 (± 0.82)	5	0	2	48	154	343	3	4.53 (± 0.67)	5	
4	6	7	76	158	297	6	4.35 (± 0.95)	5	4	6	51	157	327	5	4.46 (± 0.79)	5	
5	3	9	78	178	277	5	4.32 (± 0.918)	5	1	5	53	171	313	7	4.45 (± 0.77)	5	
6	3	8	81	175	279	4	4.32 (± 0.89)	5	0	3	52	173	314	8	4.47 (± 0.69)	5	
7	0	8	65	166	308	3	4.41 (± 0.82)	5	0	10	45	152	336	7	4.5 (± 0.73)	5	
8	0	6	52	173	314	5	4.47 (± 0.82)	5	0	5	41	137	362	5	4.57 (± 0.7)	5	
9	0	13	78	182	271	6	4.31 (± 0.91)	4	1	8	48	148	337	8	4.5 (± 0.76)	5	
10	2	10	88	167	274	9	4.30 (± 0.99)	5	1	5	42	157	337	8	4.52 (± 0.72)	5	

*see Table 1

This study demonstrates that a three-day residential course can be effective at improving patient-rated empathy of doctors and nurses working in vaccination centers.

The approach proposed can lead to further developments; it is desirable that healthcare workers included in immunization programs attend professional counselling residential courses. This could potentially increase parents' compliance and adherence with vaccination programs.³³

Therefore, a natural development of the present work could be a study of the impact of counselling courses on vaccination uptake.

Materials and methods

Study setting and population

The cross-sectional survey was performed between May and August 2015. In May 2015, we recruited healthcare professionals working in three centers of the Immunization Service of the Local Health Unit in Brindisi (South Italy). The healthcare workers (9 medical doctors and 11 nurses) involved in vaccinating children and adolescents administered the study questionnaire to 50 consecutive parents of vaccinated children after their consultation.

In June 2015, the healthcare workers attended a three-day residential course about empathy and communication skill.

After the course, between July and August 2015, the same personnel administered the validated questionnaire to 50 other consecutive parents each.

Course

The course, based on the Rogersian model,³⁴ had the goal to improve the quality of the relationship between the operator

and the patients during the vaccination process within a family and patient centered care (PFCC) approach.³⁵ The rationale is that applying empathy in a vaccination centre, which basically means being interested in parents and children as whole people, listening to them and understanding their expectations and concerns about vaccination, may help the healthcare operator to effectively support parents in making conscious choices about vaccines, preserving their autonomy.

The course was held in a conference room of the Local Health Unit of Brindisi (Italy) and consisted in 18 training hours spread over three days and had 4 sections during 4 or 5 hours each: 1) What is the PFCC and why it is worthwhile. 2) How to improve listening skills. 3) How to improve empathy, including the following sub-sections: a) the importance of the subjective perspective of pain and illness; b) how to overcome barriers to effective communication given by personal judgments or cultural differences. 4) How to communicate correctly about vaccines, including the following subsections: a) provide information about vaccine benefits and side effects; b) dealing with misinformation and prejudices; c) doing a plan of action with parents for future vaccinations.

Overall, a continuous process of dialogue characterized teaching with participants called to intervene directly in every phase of the course and the teacher trying continuously to stimulate active participation and emotional involvement of the students. At the beginning of the course, the first hour was dedicated to let the participants introduce themselves to each other in order to create a friendly and positive atmosphere. Each section started with a lecture providing a review of the literature about the topic and proposing operative instructions to be applied in daily work that were discussed with the students. The next step

could be a role-play involving the teacher and someone of the participants, simulating situations that could happen in daily practice, with the goal to demonstrate how to put in practice the teaching given in the section. In alternative there could be a group work activity were a case was proposed to the components of each group that had to analyze the situation and propose the most appropriate approach in light of what they had learnt. The course provider was a physician and counsellor (RA) who had previously taught hundreds of similar courses since 2003 to over 15.000 healthcare operators in Italy (www.italianmr.com, for more details about the provider and the methodology of the courses)

Questionnaire

The CARE Measure, developed in the UK and validated in several countries and fields of medicine, includes 10 items on empathic relationship with response options based on a 5-point scale with scores from poor to excellent and a “not applicable” option.^{26,30,31,36–40}

The translation to Italian from the English CARE Measure was performed according to the international standards for the translation and cultural adaptation of patient-reported outcomes measurements.⁴¹ A professional translator and native English speaker reviewed the final back translation to English.

The Italian version of the CARE Measure adapted to a vaccination setting was validated with data obtained from the pre-intervention survey.

Data analysis

Internal reliability of the CARE Measure was assessed using Cronbach’s alpha, and whether removal any of the 10 items weakened the Cronbach’s alpha was determined. Homogeneity was examined by corrected item–total correlations.⁴²

A descriptive analysis of parents’ and children’s characteristics was performed to assess the homogeneity of two samples (pre- and post-course).

Nonparametric tests (Wilcoxon test for paired samples and Mann Whitney U test for independent samples) were used to evaluate whether there were significant differences in the level of empathy between pre- and post-course and between doctors and nurses.

The total CARE Measure score for each questionnaire was calculated by summing each item’s score (questions 1 to 10, Table 1), obtaining a range from 10 to 50. T -tests were performed to compare the average CARE Measure scores of groups with different demographic and socioeconomic characteristics.

Multivariate analysis was performed to evaluate the relation between total CARE measure score and items selected by results obtained in univariate analysis ($p < 0.2$).

Statistical analysis was performed using SPSS v. 22.0, and the P -value was set at 0.05 for all tests.

The Ethical Committee of the Local Health Unit of Brindisi, Italy, approved this study.

Informed written consent was obtained from participating parents. Participating health professionals provided verbal consent to take part to the study and were free to decide not to continue data collection throughout the study.

Acknowledgments

The authors would like to thank Dr. Stewart Mercer, who authorized the use of the Italian version of the CARE Measure adapted to the vaccination setting.

Disclosure of potential conflicts of interest

No potential conflict of interest was reported by the authors.

ORCID

Massimo Maurici  <http://orcid.org/0000-0001-5884-161X>

Michele Arigliani  <http://orcid.org/0000-0002-5366-4594>

Elisabetta Franco  <http://orcid.org/0000-0002-1179-4411>

References

- MacDonald NE. the SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: definition, scope and determinants. *Vaccine*. 2015;33(34):4161–4164. doi:10.1016/j.vaccine.2015.04.036.
- Dubé E, Gagnon D, MacDonald NE. SAGE Working Group on Vaccine Hesitancy. Strategies intended to address vaccine hesitancy: review of published reviews. *Vaccine*. 2015;33(34):4191–4203. doi:10.1016/j.vaccine.2015.04.041.
- Marti M, de Cola M, MacDonald NE, Dumolard L, Duclos P. Assessments of global drivers of vaccine hesitancy in 2014–Looking beyond safety concerns. *PLoS One*. 2017;12(3):e0172310. doi:10.1371/journal.pone.0172310.
- Curry DW, Perry HB, Tirmizi SN, Goldstein AL, Lynch MC. Assessing the effectiveness of house-to-house visits on routine oral polio immunization completion and tracking of defaulters. *J Health Popul Nutr*. 2014;32(2):356–366.
- Berhane Y, Pickering J. Are reminder stickers effective in reducing immunization dropout rates in Addis Ababa, Ethiopia?. *J Trop Med Hyg*. 1993;96(3):139–145.
- Haji A, Lowther S, Ngan’ga Z, Gura Z, Tabu C, Sandhu H, Arvelo W. Reducing routine vaccination dropout rates: evaluating two interventions in three Kenyan districts, 2014. *BMC Public Health*. 2016;16:152. doi:10.1186/s12889-016-2823-5.
- Leask J, Kinnersley P, Jackson C, Cheater F, Bedford H, Rowles G. Communicating with parents about vaccination: a framework for health professionals. *BMC Pediatr*. 2012;12:154. doi:10.1186/1471-2431-12-34.
- Ames HM, Glenton C, Lewin S. Parents’ and informal caregivers’ views and experiences of communication about routine childhood vaccination: a synthesis of qualitative evidence. *Cochrane Database Syst Rev*. 2017;2:CD011787.
- Smith PJ, Humiston SG, Marcuse EK, Zhao Z, Dorell CG, Howes C, Hibbs B. Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the health belief model. *Public Health Rep*. 2011;126(Suppl 2):135–146. doi:10.1177/003335491112605215.
- Gust DA, Darling N, Kennedy A, Schwartz B. Parents with doubts about vaccines: which vaccines and reasons why. *Pediatrics*. 2008;122(4):718–725. doi:10.1542/peds.2007-0538.
- Kennedy A, Lavail K, Nowak G, Basket M, Landry S. Confidence about vaccines in the United States: understanding parents’ perceptions. *Health Aff Proj Hope*. 2011;30(6):1151–1159. doi:10.1377/hlthaff.2011.0396.
- Miller LS, Kourbatova EV, Goodman S, Ray SM. BRIEF REPORT: risk factors for pneumococcal vaccine refusal in adults. *J Gen Intern Med*. 2005;20(7):650–652. doi:10.1111/j.1525-1497.2005.0118.x.

13. McKee C, Bohannon K. Exploring the reasons behind parental refusal of vaccines. *J Pediatr Pharmacol Ther.* 2016;21(2):104–109.
14. Simone B, Carrillo-Santistevé P, Lopalco PL. Healthcare workers role in keeping MMR vaccination uptake high in Europe: a review of evidence. *Euro Surveill.* 2012;17:26.
15. Healy CM, Pickering LK. How to communicate with vaccine-hesitant parents. *Pediatrics.* 2011;127(Suppl 1):S127–33. doi:10.1542/peds.2010-1722S.
16. Berry NJ, Henry A, Danchin M, Trevena LJ, Willaby HW, Leask J. When parents won't vaccinate their children: a qualitative investigation of Australian primary care providers' experiences. *BMC Pediatr.* 2017;17(1):19. doi:10.1186/s12887-017-0969-7.
17. Diekema DS. Improving Childhood Vaccination Rates. *N Engl J Med.* 2012;366(5):391–393. doi:10.1056/NEJMoa1114705.
18. Maurici M, Dugo V, Zaratti L, Paulon L, Pellegrini MG, Baiocco E, Rizzo G, Franco E. Knowledge and attitude of pregnant women toward flu vaccination: a cross-sectional survey. *The Journal of Maternal Fetal Neonatal Med.* 2016;29(19):3147–3150.
19. Fields SK, Hojat M, Gonnella JS, Mangione S, Kane G, Magee M. Comparisons of nurses and physicians on an operational measure of empathy. *Eval Health Prof.* 2004;27(1):80–94. doi:10.1177/0163278703261206.
20. Kelm Z, Womer J, Walter JK, Feudtner C. Interventions to cultivate physician empathy: a systematic review. *BMC Med Educ.* 2014;14:219. doi:10.1186/1472-6920-14-219.
21. Howells RJ, Davies HA, Silverman JD. Teaching and learning consultation skills for paediatric practice. *Arch Dis Child.* 2006;91(4):367–370. doi:10.1136/adc.2005.072314.
22. Levettown M. American Academy of Pediatrics Committee on Bioethics. Communicating with children and families: from everyday interactions to skill in conveying distressing information. *Pediatrics.* 2008;121(5):e1441–60. doi:10.1542/peds.2008-0565.
23. Brown JB, Boles M, Muloooly JP, Levinson W. Effect of clinician communication skills training on patient satisfaction. A randomized, controlled trial. *Ann Intern Med.* 1999;131(11):822–829. doi:10.7326/0003-4819-131-11-199912070-00004.
24. Fellowes D, Wilkinson S, Moore P. Communication skills training for health care professionals working with cancer patients, their families and/or carers'. *Cochrane Database Syst Rev.* 2004;2:CD003751.
25. Dudley N, Ackerman A, Brown KMSnow SK, American Academy of Pediatrics Committee on Pediatric Emergency Medicine, American College of Emergency Physicians Pediatric Emergency Medicine Committee. Patient- and family-centered care of children in the emergency department. *Pediatrics.* 2015;135(1):e255–72. doi:10.1542/peds.2014-3424
26. Mercer SW, Maxwell M, Heaney D, Watt GC. The consultation and relational empathy (CARE) measure: development and preliminary validation and reliability of an empathy-based consultation process measure. *Fam Pract.* 2004;21(6):699–705. doi:10.1093/fampra/cmh621.
27. Susan Goldstein S, MacDonald NE, Guirguis S. the SAGE Working Group on Vaccine Hesitancy. Health communication and vaccine hesitancy. *Vaccine.* 2015;33(34):4212–4214. doi:10.1016/j.vaccine.2015.04.042.
28. Stein RA. The golden age of anti-vaccine conspiracies. *Germs.* 2017;7(4):168–170. doi:10.18683/germs.2017.1122.
29. Kelm Z, Womer J, Walter JK, Feudtner C. Interventions to cultivate physician empathy: a systematic review. *BMC Med Educ.* 2014;14:219.
30. Giambi C, Fabiani M, D'Ancona F, Ferrara L, Fiacchini D, Gallo T, Martinelli D, Pascucci MG, Prato R, Filia A, et al. Parental vaccine hesitancy in Italy – results from a national survey. *Vaccine.* 2018;36(6):779–787. doi:10.1016/j.vaccine.2018.05.076.
31. Mercer SW, Murphy DJ. Validity and reliability of the CARE Measure in secondary care. *Clin Gov Int J.* 2008;13:269–283.
32. Mercer SW, Hatch DJ, Murray A, Murphy DJ, Eva KW. Capturing patients' views on communication with anaesthetists: the CARE Measure. *Clin Gov Int J.* 2008;13(2):128–137.
33. Arigliani M, Castriotta L, Pusiol A, Titolo A, Petoello E, Brun Peressut A, Miorin E, Elkina I, Marzona F, Cucchiario D, et al. Measuring empathy in pediatrics: validation of the Visual CARE measure. *BMC Pediatr.* 2018;18(1):57. doi:10.1186/s12887-018-0993-2.
34. Parrish-Sprowl J. 2018. Vaccine hesitancy communication: what counts as evidence. *Vaccine.* 36(44):6529–6530.
35. Rogers CR. A way of being. Boston (Ma): Houghton Mifflin Company; 1980.
36. Dugo V, Caredda E, Zorzi M, Carlino C, Giliberti C, Scappaticci L, Pettinicchio V, Zorzoli E, Zaratti L, Arigliani R, et al. Communicating the benefits and risks of vaccination: a focus on the PFCC (Patient and Family Centered Care) approach. *Ig Sanita Pubbl.* 2014;70(5):527–535.
37. Neumann M, Wirtz M, Bollschweiler E, Mercer SW, Warm M, Wolf J, Pfaff H. Determinants and patient-reported long-term outcomes of physician empathy in oncology: a structural equation modelling approach. *Patient Educ Couns.* 2007;69(1–3):63–75. doi:10.1016/j.pec.2007.07.003.
38. Fung CS, Hua A, Tam L, Mercer SW. Reliability and validity of the Chinese version of the CARE Measure in a primary care setting in Hong Kong. *Fam Pract.* 2009;26(5):398–406. doi:10.1093/fampra/cmp044.
39. Aomatsu M, Abe H, Abe K, Yasui H, Suzuki T, Sato J, Ban N, Mercer SW. Validity and reliability of the Japanese version of the CARE Measure in a general medicine outpatient setting. *Family Pract.* 2014;31(1):118–126. doi:10.1093/fampra/cmt053.
40. Mercer SW, McConnachie A, Maxwell M, Heaney D, Watt GCM. Relevance and practical use of the Consultation and Relational Empathy (CARE) Measure in general practice. *Fam Pract.* 2005;22(3):328–334. doi:10.1093/fampra/cmi025.
41. Bikker AP, Fitzpatrick B, Murphy D, Mercer SW. Measuring empathic, person-centred communication in primary care nurses: validity and reliability of the Consultation and Relational Empathy (CARE) Measure. *BMC Fam Pract.* 2015;16(1):149. doi:10.1186/s12875-015-0374-y.
42. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, Erikson P. ISPOR Task Force for Translation and Cultural Adaptation. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health J Int Soc Pharmacoeconomics Outcomes Res.* 2005;8(2):94–104. doi:10.1111/j.1524-4733.2005.04054.x.
43. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika.* 1951;16(3):297–334. doi:10.1007/BF02310555.