



Developing communication tools on rotavirus vaccination to support family paediatricians in Italy



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ABSTRACT

Background: Universal rotavirus (RV) vaccination for newborns was introduced in Italy in 2018, but national vaccination coverage is still suboptimal. Effective communication between the family paediatrician (FP) and parents/caregivers is essential to promote vaccination acceptance. This project aimed to support FPs in communicating RV vaccination to parents/caregivers through the development and implementation of demonstrative videos and training modules.

Methods: A working group composed of two FPs, two communication professionals, a medical expert from GSK and a clinical psychologist, was formed to establish the key scientific information to be communicated to parents/caregivers and develop the demonstrative videos. Four videos depicting four communication styles (I to IV) were developed based on the Social Styles Theory. Thirty FPs were then asked to pilot test the videos and provide feedback. In addition, two training modules with scientific information were developed to learn how to respond to parents'/caregivers' objections.

Results: A total of 23 FPs provided feedback after using one or more videos at least five times. Twenty FPs (87.0 %) used mostly-one style, and most (60.0 %) used Style IV. Overall, the feedback was positive, as the majority of FPs (82.6 %, $n = 19/23$) indicated that the proposed videos were 'useful' or 'extremely useful' for introducing the RV vaccination to parents/caregivers in their actual practice. Based on this feedback, shorter versions of each video were also produced, and two training modules were developed to support FPs in responding to parental objections. Most FPs 75 % ($n = 9/12$) found Module 1 'very useful', and all found Module 2 'very useful' (100 %, $n = 12/12$).

Conclusions: The communication tools developed were well appreciated by the FPs and are expected to support FPs in communicating RV vaccination thereby increasing its coverage. Practicing RV communication may also prove beneficial for FPs to communicate other critical topics to parents/caregivers.

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1. Introduction

Rotavirus (RV) infection is the leading cause of acute gastroenteritis in children under 5 years of age, with a particularly high frequency in the first 2 years of life. In infants, the infection is often asymptomatic or mild due to the presence of maternal antibodies, while diarrhoea, malaise, fever and vomiting may occur between 3

and 24 months of age. In general, the disease is manageable at home when mild, but severe diarrhoea can result in rapid dehydration with shock, electrolyte imbalance and death [1]. In the pre-vaccination era, an estimated 14,550 RV hospitalisations per year were reported in children 0–5 years old, in Italy [2].

Two effective and safe oral RV vaccines have been available in Europe since 2006 [3,4]. Universal RV vaccination was included in the 2017–2019 Italian National Vaccine Prevention Plan (PNPV) for all newborns, starting with the 2018 cohort [5]. Vaccination against RV is offered free of charge and is strongly recommended but not mandatory. Based on the PNPV vaccination calendar, two or three doses (depending on the vaccine) are scheduled between the third and seventh months of life. The RV vaccines are co-administered with the hexavalent vaccine (combination of diphtheria, tetanus,

Abbreviations: AREA, Ascolto, Riconoscimento, Empatia, Argomentazione [Listening, Recognition, Empathy, Discussion]; FIMP, Italian Federation of Family Paediatricians; FP, family paediatrician; GSK, GlaxoSmithKline; PNPV, National Vaccine Prevention Plan; RV, rotavirus; WG, working group.

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acellular pertussis, poliovirus, *Haemophilus influenzae* type B and hepatitis B) and the pneumococcal conjugate vaccine. The RV vaccination course must be completed by 24 or 32 weeks of age (depending on the vaccine) and missed RV vaccinations cannot be administered at a later date [3,4]. According to their respective Summary of Product Characteristics [3,4], the most frequent adverse events of the two-dose vaccine are diarrhoea and irritability [3], and of the three-dose vaccine are diarrhoea, vomiting and fever [4]. According to the 2019 Italian Medicines Agency vaccine report, the most serious adverse event, namely intussusception (intestinal invagination), was reported with a frequency of 0.6 cases per 100,000 doses of vaccine administered [6]. By 2020, over 1.2 million newborns were vaccinated in Italy with the two-dose RV vaccine [7].

National data on vaccination coverage showed RV vaccination coverage rose from 26.2 % (ranging from 1.0 % to 72.4 % between regions) for the 2017 cohort [8], to 70.3 % for the 2019 cohort [9]; nevertheless, it was substantially lower than the objectives set by the Ministry of Health of ≥ 60 % in 2018 and ≥ 95 % in 2020 [10]. A 2015 survey among 500 parents of children hospitalised with RV gastroenteritis in Italy found that 91.8 % of the hospitalised children were not vaccinated against RV [11]. After the hospitalisation, 79.8 % of the parents would strongly recommend RV vaccination to other parents. They indicated that they considered their family paediatrician (FP) the most relevant source of information when deciding to vaccinate their child, closely followed by the internet and other parents [11]. Also, a large survey in 2016 among 3,130 parents of children 16 to 36 months old found that the FP is the most frequently (87.2 %) consulted source of information about vaccinations and is also considered by the majority of parents (94.4 %) as a reliable source [12]. In another survey of 307 parents of 3 months to 3 year old children, parents who quoted their physician as their source of information were 21 times more likely to have knowledge of RV vaccination [13]. The results of these surveys, and a study in 2020 of online sources and opinions on social media about RV vaccination [14], confirmed that the FP plays a major role in guiding families' vaccination choices, particularly for RV vaccination. The main reason for vaccine-hesitant or anti-vaccine behaviour was the concern about adverse events that may occur in the short term (80.0 %) or long term (73.4 %) [12]. Thus, FP skills in communicating to parents/caregivers the value of RV vaccination and the real extent of adverse events were then deemed critical to improve the suboptimal RV vaccination coverage in Italy.

The main objective of this project was to develop dedicated communication tools for FPs in Italy on the value of RV vaccination, to support the FPs in their task of informing families about RV vaccination.

2. Methods

This project consisted of six phases (Fig. 1). In Phase 1, a working group (WG) was established. In Phase 2, the WG determined the scientific content. In Phase 3, four videos with the same content but different communication styles were designed and shot. In Phase 4, a pilot test was carried out where FPs followed the style represented in the chosen video to inform their communication about RV vaccination in their clinical practice. In Phase 5, feedback from FPs was obtained and implemented. In Phase 6, two digital training modules were developed and tested, followed by another feedback round, and then the videos were released on the Italian Federation of Family Paediatricians (FIMP) website.

2.1. Phases 1 and 2: WG and scientific content

A WG was formed based on the expertise required by the project objectives and which included: two FPs belonging to the FIMP,

selected on the basis of their past experience developed in more than 30 years of clinical activity, encompassing vaccination communication with parents and scientific community; two communication professionals from Choralia; one senior medical advisor from GSK's medical department; and one clinical psychologist from the University of Milan. All authors of this article were WG members.

The scientific content to be included in the videos was based both on literature search and personal experience of the WG members and focussed on the information the WG considered key to inform parents/caregivers about RV vaccination. This included publicly available information on RV vaccination and vaccine safety and efficacy.

2.2. Phase 3: Video design

After the key scientific content was established, the WG designed four videos, each 4 to 6 min in duration. The four videos shared the same scientific content but used different communication styles. For the design of the videos, four communication styles from the Social Styles Theory [15] were used, with the purpose of offering each FP a video that they would be comfortable with, which fits with their personal communication style. The Social Styles Theory divides the modes of communication along two axes: assertiveness and responsiveness. The four communication styles (summarised in Fig. 2) were determined on the extent FPs were perceived to be assertive and responsive. The four communication styles were:

- Style I, 'analytical' (low assertiveness and low responsiveness);
- Style II, 'expressive' (high assertiveness and high responsiveness);
- Style III, 'driver' (high assertiveness and low responsiveness);
- and
- Style IV, 'amiable' (low assertiveness and high responsiveness) [15].

In the four videos, actors played the roles of the FP and parent/caregiver. When acting as the FP the four communication styles were used. When acting as the parent/caregiver a 'neutral' style was always used. The same actors played the FP and parent/caregiver in all videos. To avoid bias in the FP's video choice (i.e., aspirational instead of actual personal style), the social styles of the videos were not disclosed and the videos were referred to as videos I to IV. The videos were also available through the FIMP website [16].

2.3. Phases 4 and 5: Pilot test and feedback solicitation

For the pilot test, 30 FPs were purposefully recruited by FIMP as a convenience sample based on their expertise and experience in the role and availability to take part in the project, representing 16 Regions out of 20. After a presentation of the project by the WG in a dedicated online meeting, the FPs were asked to choose one video style they felt most comfortable with, and then use that video in their outpatient practices (test) at least five times (but up to seven times was allowed) in a time frame of approximately 8 weeks (September 2020–November 2020). FPs were asked to complete a diary (see **Supplementary Material: Diary**) reporting the number of tests (i.e., number of times FPs recommended RV vaccination to parents/caregivers), the video style used and the expected outcome (i.e., whether the parents/caregivers accepted or refused RV vaccination for their child). Once the tests were completed, the FPs sent the diary to the FIMP office, after which they received a link to self-assess their personal social style. The FPs could provide their full feedback through a 15-item questionnaire

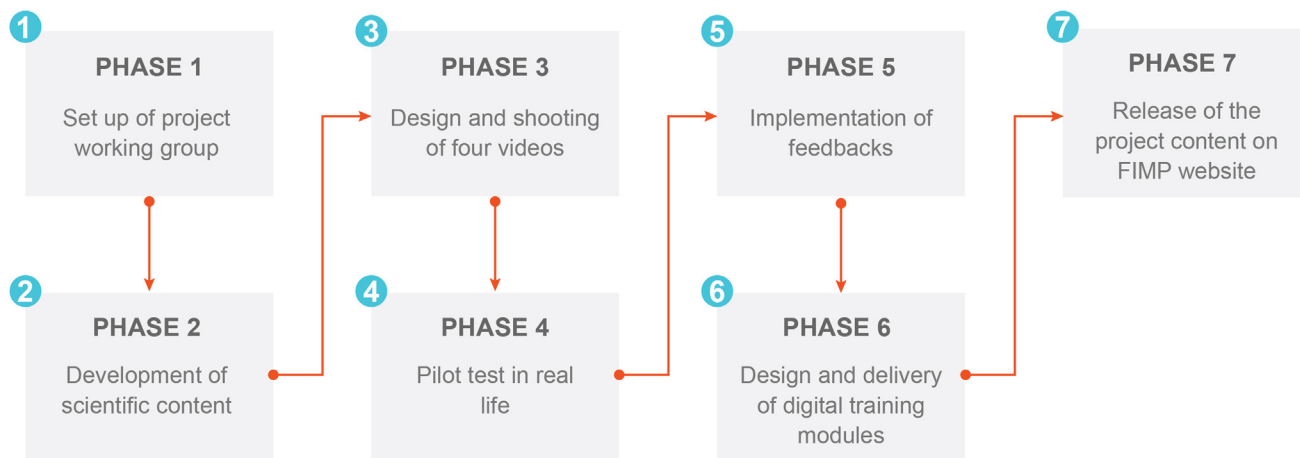


Fig. 1. Study phases. FIMP, Italian Federation of Family Paediatricians.

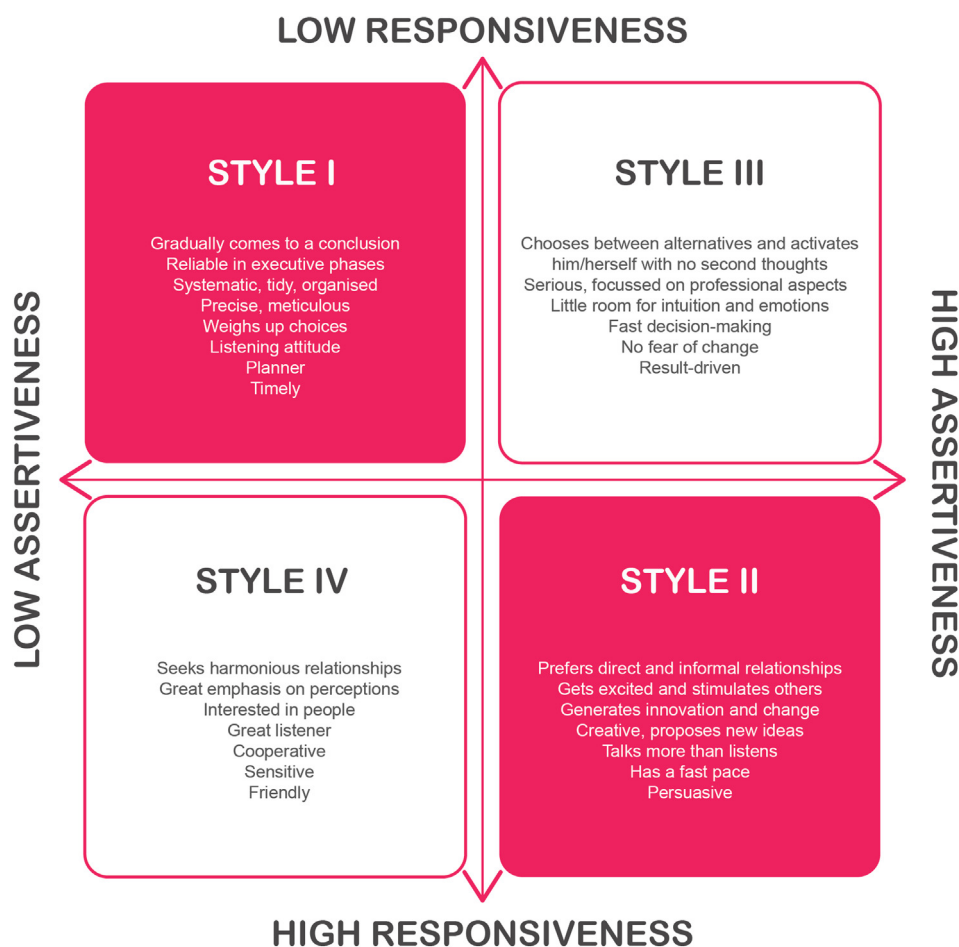


Fig. 2. Four communication styles of the Social Styles Theory. Reference for the four communication styles: Bolton R, Bolton DG. People styles at work. Making bad relationships good and good relationships better. New York, NY: AMACON; 1996.

that contained nine closed and six open questions, including questions about their primary and secondary social style (see [Supplementary Material: Questionnaire 1](#)).

2.4. Phase 6: Training modules and feedback solicitation

Based on the feedback received, two training modules were developed using a literature-derived method [17,18] named AREA (Ascolto, Riconoscimento, Empatia, Argomentazione [Listening,

Recognition, Empathy, Discussion]) to prepare the FP for managing objections. The AREA technique is based on the concept that the FP should not respond in haste but keep a high degree of control over the situation and avoid discussion until the FP understands the reason for the objection. The AREA method includes four steps that entail: a) active listening, with paraphrases and in-depth questions to verify that the content of the objection has been understood; b) recognising the parent’s/caregiver’s right to express their confusion and uncertainties and the validity of their feelings; c) empathising

with the parent/caregiver, through emotional sharing and understanding of the other's experience; and d) providing data and information, suggesting a different vision and proposing solutions.

Training Module 1 included a general overview of AREA objection handling techniques, while training Module 2 illustrated how to discuss, as an example/exercise, three widespread objections regarding RV vaccination: a) the child is too young to be vaccinated; b) too many vaccines are administered in a short time; and c) the RV vaccine is not safe. The training modules were delivered through a highly interactive e-learning platform [19,20] that could be accessed via the web page dedicated to the on the national FIMP website. The same 30 FPs who watched the videos were then asked to complete the training and provide feedback on the training modules through an 8-item questionnaire containing six open and two closed questions (see **Supplementary Material: Questionnaire 2**).

3. Results

3.1. Diary outcomes

Of the 30 FPs selected that participated in the pilot test of the videos, 23 completed the diary. A total of 134 tests were reported, as 8 FPs carried out five tests each and 13 FPs carried out seven tests each. Overall, after the tests, the FPs expected 94.0 % of the parents/caregivers ($n = 126/134$) to accept RV vaccination, but it was not possible to confirm this with the medical records.

The most often used video was video IV (73.8 %, $n = 99/134$), followed by video III (19.4 %, $n = 26/134$), video I (6.0 %, $n = 8/134$), and video II (0.7 %, $n = 1/134$). In the occasions when FPs expected the parents/caregivers to refuse the RV vaccination after watching a video, the videos shown were video IV (6.1 %, $n = 6/99$) and video I (25.0 %, $n = 2/8$).

3.2. Video feedback: Post pilot test

Of the 30 FPs selected that participated in the pilot test of the videos, 23 provided insights and suggestions through Questionnaire 1. The majority of FPs (82.6 %, $n = 19/23$) thought the proposed videos were useful for the presentation of vaccination against RV as they answered they were 'useful' ($n = 14$) or 'extremely useful' ($n = 5$) (Fig. 3A). The majority of FPs (95.7 %, $n = 22/23$) also thought the proposed mode of communication was feasible in daily practice (Fig. 3B).

Twenty-three of these FPs had tested one or more styles at least five times: 87.0 % ($n = 20/23$) used mostly-one style (Fig. 3C): more than half of those FPs (60.0 %, $n = 12/20$) chose Style IV, two FPs chose Style III, and one FP chose Style I. Three FPs used more than one video; they twice mentioned using Style IV, and Styles I and III once each. Most of the FPs (81.8 %, $n = 18/22$) thought the videos were of adequate length, while some (18.2 %, $n = 4/22$) thought they were too long. Nobody thought that the videos were too short. The information in the videos was deemed to be sufficient for the presentation of RV vaccination by 95.7 % ($n = 22/23$).

Based on the answers to the open questions (see **Supplementary Material: Questionnaire 1**), the three main positive aspects of the use of the videos were:

1. Clear, comprehensive, and understandable content.
2. Correctness and scientific nature of the information provided.
3. Effective structure of the communication.

Based on the answers to the open questions, the three main aspects that could be improved in the use of the videos:

1. Length of the videos.
2. Interaction with the caregiver: 'the parent, in daily practice, tends to interrupt the discourse, makes objections, and leads the conversation in other directions. It is necessary to be more flexible, depending on the interlocutor. There is a need to address the possible objections of the parent/caregiver'.
3. Risk of loss of naturalness in the conversation: 'following the flow I could lose sight of the interlocutor or "perform" the dialogue'.

3.3. Assessment of social styles of the FPs

The FPs were also asked to complete an online questionnaire (which has since been transformed into the smartphone application Sintonia [21,22]) with 24 short questions to determine their primary and secondary social styles. As primary communication style, 30.4 % ($n = 7/23$) of the FPs turned out to be Style IV, 'amiable', 26.1 % turned out to be Style II, 'expressive' ($n = 6/23$), 13.0 % turned out to be Style I, 'analytical' ($n = 3/23$), and 8.7 % ($n = 2/23$) turned out to be Style III, 'driver' (Table 1). As secondary communication style, 34.8 % ($n = 8/23$) turned out to be Style IV, 'amiable', 17.4 % turned out to be Style II, 'expressive' ($n = 4/23$), 17.4 % ($n = 4/23$) turned out to be Style III, 'driver', and 8.7 % ($n = 2/23$) turned out to be Style I, 'analytical' (Table 1). A lack of agreement was evident between the type of video used in the pilot test and the primary and secondary social styles that emerged from the self-assessments.

3.4. Implementing the video feedback

Based on feedback from the FPs, some improvements were made to the original videos. One of these improvements involved the duration, as the videos were perceived as too long by some. Therefore, additional to the standard duration videos of 4 to 6 min, shorter duration videos of 2 to 3 min were also made. Both the standard and shorter videos were made available on the FIMP website [16].

Based on the feedback on the interaction of the FPs with the parents/caregivers, especially regarding objections against vaccination, two digital training modules were also developed for the FPs. These training modules provided the FPs with a structured way to manage objections of parents/caregivers and scientific content to convey to the parents/caregivers.

3.5. Training modules feedback: Post pilot test

Of the 12 FPs who participated in training Modules 1 and 2, all 12 FPs gave feedback. Overall, 75 % ($n = 9/12$) of the FPs found training Module 1 'very useful', and 25 % found it 'useful' ($n = 3/12$). The three main positive aspects of training Module 1 were reported as:

1. The module presents an effective communication method.
2. The concepts are clearly explained.
3. The module teaches how to deal with objections in an interactive way.

The main negative aspect of training Module 1 was reported as:

1. The method requires time, patience and self-discipline.

Most of the FPs (58 %, $n = 7/12$) did not suggest any change or addition to training Module 1. One FP suggested adding a summary sheet with the key points at the end, and another FP suggested adding more examples.

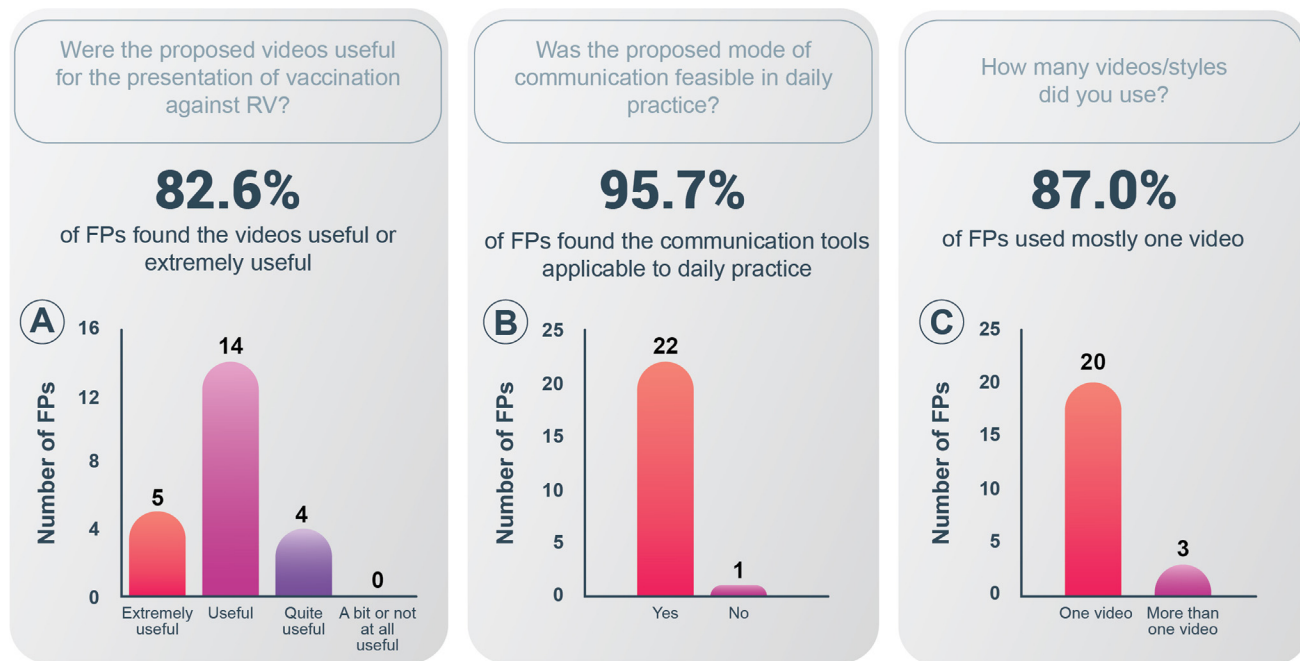


Fig. 3. Video feedback. FPs, family paediatricians; RV, rotavirus.

Table 1
Communication styles of the videos and primary personal communication styles of the FPs.

| | Style of videos used* n = 23 | Primary personal style n = 23 | Secondary personal style n = 23 |
|------------------------|---------------------------------|----------------------------------|------------------------------------|
| Style I, 'analytical' | 8.7 % (2/23) | 13.0 % (3/23) | 8.7 % (2/23) |
| Style II, 'expressive' | 0 % (0/23) | 26.1 % (6/23) | 17.4 % (4/23) |
| Style III, 'driver' | 13.0 % (3/23) | 8.7 % (2/23) | 17.4 % (4/23) |
| Style IV, 'amiable' | 60.9 % (14/23) | 30.4 % (7/23) | 34.8 % (8/23) |
| Not specified | 34.8 % (8/23) | 21.7 % (5/23) | 21.7 % (5/23) |

FP, family paediatrician; n, number.

* Twenty FPs used one video at least five times; three FPs used more than one video at least five times.

All FPs (100 %, n = 12/12) found training Module 2 'very useful'. The three main positive aspects of training Module 2 were reported as:

1. The module presents the most frequent objections as well as the appropriate answers to these objections.
2. The training is simple and effective.
3. The module further enhances the communication techniques from Module 1.

The main negative aspect of training Module 2 was reported as:

1. The method requires time.

Most of the FPs (58 %, n = 7/12) did not suggest any changes or additions to training Module 2. One FP suggested adding a third training module to answer additional objections. One FP suggested adding information about the difference between compulsory and optional vaccines. One FP asked to include references to study the AREA technique further.

4. Discussion

Dedicated communication tools (videos and training modules) were developed to support FPs in their communication about RV vaccination with parents/caregivers of newborns. Four videos with

four different communication styles were generated to suit most of the FP's individual social styles. The videos were considered to be useful by the majority of the FPs. In addition, based on the FP feedback, two training modules were developed to support the FPs in managing objections of parents/caregivers against RV vaccination. The participating FPs found these training modules 'very useful'.

Many parents of newborns are hesitant to accept vaccinations. A survey conducted by the FIMP among 1,034 Italian FPs showed that the most effective argument for parents to accept vaccinations is safety (84.3 %), followed by efficacy in preventing disease (62.7 %) and the risk of disease for a child of this age (66.7 %) [23]. Among the reasons for hesitancy, the FPs indicated that 80.4 % of parents were concerned about giving their children too many vaccines simultaneously, 61.5 % were concerned about safety and 54.4 % were afraid that the vaccines might harm the child [23]. For parents/caregivers, the FP is the most trusted information source on vaccinations [11–13]; therefore, it is crucial that FPs are able to communicate effectively and share information about vaccinations with parents/caregivers. The FP must be in tune with parents/caregivers and provide them with the key information within the limited time available in busy outpatient clinics. The videos and training modules developed can support the FPs in this task, as the participating FPs thought both these tools were useful.

The quality of communication between paediatricians and parents/caregivers is known to affect outcomes of care such as adherence to paediatricians' recommendations [24]. When two people,

such as an FP and a parent/caregiver, communicate using different communication styles, they share information and thoughts in a way that the other person finds hard to process. Communication, especially to convey important information, can drastically improve if the communication style is adapted to suit the interlocutor's communication style. According to the Social Style Theory, which is based on years of behavioural research, there are four communication styles [15]. An individual may use each of the four communication styles depending on the context; however, every-one has a dominant primary and secondary communication style [15]. The four videos that were developed each reflected one of the four communication styles. During the pilot test, the FPs most often chose video Style IV to support their communication with parents/caregivers about RV vaccination, followed by video Style III and video Style I.

Interestingly, the communication styles of the videos used often differed from the personal communication styles of the FPs. The two most notable differences were that although 26.1 % turned out to be Style II, nobody chose this style video to communicate with the parents/caregivers about vaccinations, and although 60.9 % used video Style IV, only 30.4 % of the FPs turned out to have Style IV, 'amiable' as their primary personal communication style. The FP sample size was too small to conduct statistical analyses or sociodemographic reporting. However, we speculate that FPs may have preferred video Style IV driven by an aspiration to, on the one hand, behave in a gentle and interactive manner and, on the other hand, be concretely directive in the time-constrained environment of their office.

The videos were perceived to be very effective in the pilot test, as FPs expected 94 % of the parents/caregivers they communicated with, to accept RV vaccination, with a considerable number of FPs even attaining 100 % acceptance. However, the number of tests was limited, and the outcomes were not objectively measured but were based on the FPs' perceptions.

Although paediatricians have indicated in surveys that they have a need and desire for training and resources to increase vaccine knowledge and communication skills [25] or for training to improve communication skills about health subjects in general [26], few studies have focussed on supporting paediatricians in their communication with parents. One study, about antibiotic prescription, developed booklets for parents and paediatricians that each described four communication principles. The paediatricians that followed the booklet's training were more likely to spend time addressing positive treatment options [27]. In another study, a smartphone application was developed for paediatricians to enhance their knowledge of human papillomavirus vaccination and improve their counselling skills regarding the vaccine. The application was perceived as interactive, informative and engaging, but its efficacy was not assessed as it was a usability study [28]. The last study was similar to our current study in that it contained both evidence-based vaccine information and training to improve communication skills. The tools developed by us appear very promising; however, future trials focusing on outcomes of these interventions will need to determine their effectivity in informing parents/caregivers and increasing vaccination rates.

The present project has a number of limitations. The number of FPs invited to participate in this study was small (30 in the pilot test and 12 in the learning modules out of a total of an estimate of 6.500 FPs nationwide) and may not adequately represent the diversity of FPs in Italy; however, FPs with a wide range of expertise and experience were selected. Furthermore, a selection bias generated by the willingness to participate in the project among FPs who were already more motivated to fight vaccine hesitancy cannot be ruled out. Another limitation may be the lack of analysis on the knowledge and opinions of parents/caregivers on RV vaccination before and after their visit to the FP. This analysis could have determined which video styles were most effective at convey-

ing the information and persuading parents/caregivers to vaccinate their children against RV. One additional test that might be missing in this study would be to expose a number of caregivers to the videos and collect their impressions and suggestions. Nevertheless, this test would have been impacted by the level of matching between the caregivers' social styles and the video styles.

With regard to the strength of this project, the communication tools (videos and training modules) were developed by an interdisciplinary WG that included FPs. It was considered important by the WG to include the end-users – the FPs – in the development as the tools needed to meet their needs. Moreover, the video feedback from the FPs resulted in developing the two digital training modules.

5. Conclusions

This project developed communication tools (videos and training modules) to support FPs in communicating RV vaccination to increase coverage. The FPs reported that the videos were 'very useful' for the presentation of RV vaccination. The videos produced for this project were specifically designed to improve communication about RV vaccination, while the training modules were specifically designed to counter the parents'/caregivers' objections. These communication tools are accessible to FPs in Italy on the FIMP website. The communication skills acquired through the videos will not only be helpful to communicate RV vaccination but also to convey important information about other medical topics to parents/caregivers.

Disclosures

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Data availability

No data was used for the research described in the article.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: 'Federico Marchetti is employed by GSK and holds shares in GSK. Giulia Lamiani reports personal fees from GSK. Federico Marchetti and Giulia Lamiani declare no other financial and non-financial relationships and activities. Marco Bona, Chiara Amerighi, Bruno Ruffato and Giorgio Conforti declare no financial and non-financial relationships and activities and no conflicts of interest.'

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2022.10.036>.

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