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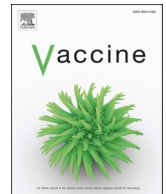
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Applying the COM-B behaviour model to understand factors which impact school immunisation nurses' attitudes towards designing and delivering a HPV educational intervention in post-primary schools for 15–17 year old students in Northern Ireland, UK

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ABSTRACT

Introduction: Human Papilloma Virus (HPV) is responsible for the development of cervical, vaginal, vulvar, penile, oropharyngeal and anal cancers. Throughout the UK, Immunisation nurses (IMNs) deliver school-based HPV vaccinations to students 12–13 years old. Providing HPV education to 15–17 year old students may promote decision-making regarding their sexual health and award opportunity for unvaccinated students to self-consent to the vaccination. This study aims to explore the perceptions of IMNs regarding the value of providing HPV education to 15–17 year old students and to explore whether IMNs feel that the design/delivery of this education should form part of their professional role.

Methods: Six focus groups were conducted online with IMNs from all five Health and Social Care Trusts in Northern Ireland, UK, between January–June 2021. Data were analysed using the COM-B model to identify factors that might influence IMNs' behaviour towards designing/delivering this education for 15–17 year old students.

Results: IMNs were highly motivated to design and deliver this HPV education. Facilitators promoting this behaviour included their specialist training, their previous sexual health teaching experience and their desire to educate young people. Barriers negatively influencing this behaviour included lack of time/resources, parental influences, lack of school support and lack of teaching/presentation skills training.

Conclusion: IMNs feel that they are the most appropriate professionals to design/deliver HPV education for 15–17 year old students. National policy change, based on collaboration between the Public Health Agency and Education Authority, is a key factor in facilitating IMNs to implement this school-based HPV education intervention.

1. Introduction

Human Papilloma Virus (HPV) is a sexually transmitted infection which can be spread through oral sex, anal sex or vaginal sex and high risk strains can cause cancers including cervical, vulvar, penile, anal and oropharyngeal [1]. In 2008, the first prophylactic HPV vaccine was offered to girls, 12–13 years old in their 1st year of post-primary school

throughout the UK, as part of the universal NHS immunisation programme [2]. Since its introduction, the incidence of cervical cancer has decreased by 87% [3] and it is likely to significantly reduce the incidence of all HPV-associated cancers [4]. The HPV vaccine has also been offered to boys in 1st year since September 2019 [5]. In 2018/2019, pre-COVID, HPV vaccination rates fell to a historical low in Northern Ireland, with fewer than 77% of girls completing the two vaccinations by

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the end of their 1st year in post-primary school [6]. Declining vaccination rates have been strongly linked to misinformation regarding vaccine safety and targeted campaigns by anti-vaccination groups through social media platforms [7,8]. Since the pandemic, 1st year completion rates in Northern Ireland have dropped dramatically to 11% in 2019/2020 and only 3% in the 2020/2021 school year due to school closures and restrictions [6,9]. Declines in HPV vaccination uptake has been observed in all other areas of the UK since the pandemic [10–12].

Due to their young age at the time of vaccination, parents/guardians are usually the primary decision-makers in this process [13]. Unsurprisingly, numerous studies have demonstrated that adolescents' knowledge of HPV is poor, even when they have received the vaccine [14,15]. At 15–17 years old, information regarding HPV is likely to be much more relevant to adolescents, who may be considering or are already engaged in sexual relationships. Numerous developed countries report the average age of first sexual intercourse to be between 15 and 17 years old including the UK, France and Sweden [16–18]. Additionally, research has also indicated that a significant number of adolescents engage in oral sex prior to vaginal sex [19] and use of condoms during oral sex is low [20]. Consequently, providing additional education at this later age could provide an opportunity for these adolescents to understand their vaccination status and the HPV strains they are protected against. For example, around a third of cervical cancer cases are caused by HPV strains which are not targeted by Gardasil 4 [2], the currently approved HPV vaccine, so education would help adolescents to understand their risk and protect themselves accordingly. This education would provide an opportunity for professionals to engage with young people regarding the benefits of HPV screening in the future. This would also be an opportunity for students who are 16 years old or above and students deemed Gillick competent to self-consent to the vaccine without the need for parental consent [13]. A person under 16 years old can be considered Gillick competent if they demonstrate a clear understanding of the HPV vaccine and potential consequences of HPV vaccination [21]. In Northern Ireland, if deemed Gillick competent, a young person can legally consent to the HPV vaccine without parental consent [13].

Since the introduction of HPV vaccinations into post-primary schools, specialist public health trust nurses called Immunisation Nurses (IMNs), have provided the vaccine [22] and provided education in the form of letters and standardised NHS information leaflets [23–26]. However, IMNs' opinions regarding HPV education in post-primary schools are relatively unknown. This study aims to explore the attitude of IMNs regarding the current HPV education provision in post-primary schools and whether they feel that there is a need for a HPV educational intervention for 15–17 year old adolescents. The study also aims to explore nurses' perceptions regarding barriers and facilitators to being involved with the design and delivery of this proposed HPV educational intervention.

It is widely accepted that interventions are much more likely to result in behaviour change if grounded on a theoretical behaviour change framework [27]. One such framework is the Behaviour Change Wheel (BCW), which incorporates The Capability, Opportunity, Motivation, Behaviour (COM-B) model [27]. The BCW has been central to the design of numerous interventions related to sexual health including sexual counselling [28], condom use [29] and the use of sexual health services by university students [27]. Consequently, the COM-B model was chosen to provide further insight into identified barriers and to help determine how these barriers could be overcome leading to direct behaviour change. The COM-B model suggests that for any behaviour to occur there must be a change in one or more of the following: capability, opportunity or motivation [27,30]. This behaviour (being involved in the design/delivery of HPV education) will only occur if IMNs perceive themselves as being capable of designing and/or delivering this education, having the opportunity to be involved and are motivated to be involved in this education. Through this model, determinants, which confine IMNs' behaviour, can be explored enabling implementation of

practical measures to lead to behaviour and ultimately organizational change.

2. Methodology

Ethical approval for this project was granted through the NHS Research Ethics Committee in September 2020 (ID: 287358) and subsequently each of the five Health and Social Care (HSC) Trusts within Northern Ireland individually approved the project. Purposive sampling was utilised to recruit participants. The research team liaised with the IMN team managers from the five HSC Trusts and provided them with full details of the project including an information video. Each team manager then distributed the video along with a Qualtrics link, including the consent form and demographic information form, to each of the team members. Contact information for the researchers was provided to enable nurses to ask questions to the researchers prior to consenting to the study. Nurses were eligible to participate in online video-assisted focus groups if they were a band 5 nurse or above and involved in the school immunisation programme within their trust. Consent was confirmed prior to each of the focus groups for participation in and recording of the focus group.

One of the researchers (Flood T.), who held a post-graduate Qualitative Practical Skills Workshop Certificate through Ulster University, facilitated all focus groups while a second postdoctoral researcher in the team, observed and took notes. All four researchers involved in this study identified as female. To optimize the dynamics in each focus group, the researchers aimed to include 4–8 participants per group [31]. Guest et al. (2017) [32] suggest that 4–6 focus groups are likely to yield 90% of all potentially arising themes and therefore the researchers aimed to conduct one focus group with IMNs from each of the five HSC Trusts throughout Northern Ireland.

3. Data analysis

Directed Qualitative Content Analysis was chosen to analyse the data. This type of analysis is guided by a more structured process compared to conventional content analysis [33]. Coding of the data involves using pre-determined codes based on existing models or theories [32]; in this case the COM-B model. The researchers began by using existing concepts within the COM-B model to establish pre-determined codes, categories and themes.

Each of the COM-B domains were input as pre-determined themes within NVivo™. Within these three domains, 6 pre-determined sub-domains [34] were added as categories. Within these 6 sub-domains, The Theoretical Domains Framework (TDF) further sub-divides these sub-domains into 14 distinctive TDF domains [27]. The TDF framework expands on the COM-B components and provides more detailed indicators regarding potential mediators of behaviour change [27]. The TDF domains were then incorporated into NVivo as codes within each predetermined category. Fig. 1 demonstrates the TDF domains and how they can be incorporated within the COM-B model.

Data that cannot be coded within the TDF domains can be placed within a new category or within a subcategory of an existing code [33]. The main strength of a directed approach to content analysis is that 'existing theory can be supported and extended' (page 1283) [33].

Participants were asked to determine who is best placed to deliver this HPV educational intervention and to discuss the ideal format and content of the intervention. While the focus group was semi-structured, the researchers ensured that they included questions, which addressed each of the TDF domains within the model though questions were not necessarily asked in the order as outlined in Appendix 1. This approach is consistent with Timlin et al.'s (2021) study where they asked participants questions in accordance with the TDF framework and COM-B model [35]. Probes were added where answers were ambiguous or more in-depth and/or specific information was required. Once the transcription was complete, two of the researchers independently coded

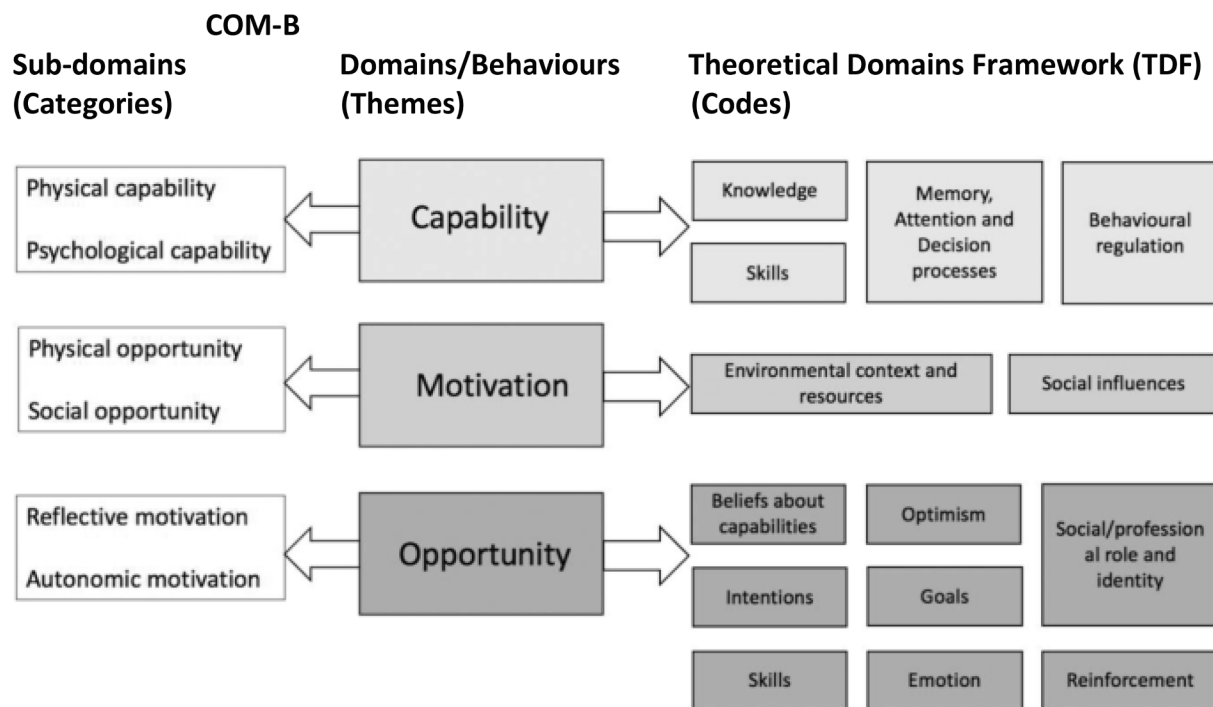


Fig. 1. Sub-domains within the 3 main COM-B domains and associated TDF domains [34].

the data. Where there was disagreement between the researchers, all four researchers met and agreed on the coding.

4. Results

IMNs were recruited from all five of the HSC Trusts between January and June 2021, resulting in six focus groups with 26 participants. While data saturation was reached after five focus groups, the inclusion of nurses’ perspectives from all HSC Trusts was deemed a priority, and thus, the sixth focus group was conducted to confirm data saturation and ensure full representation across the region. The length of the focus groups ranged from 30 to 70 min. See Table 1 for full demographic details of IMNs.

All emerging themes from the focus groups aligned with the pre-determined categories and sub-domains. See Table 2 for frequency of coding in each TDF domain to highlight the most important TDF domains as recommended by Hsieh & Shannon (2005) [33].

It is common and acceptable practice to report on only the most important TDF domains and therefore nine of the fourteen most frequently occurring TDF domains are discussed in detail [33,36]. In alignment with analysis of other health research using the TDF domains, ‘goals’, ‘intentions’ and ‘optimism’ were infrequently coded [36].

For each of the nine important TDF domains, analysis of the data identified facilitators and barriers. Facilitators include aspects which facilitate implementation of the school-based HPV education by IMNs and barriers include aspects which impede implementation of the school-based HPV education by IMNs [37].

4.1. Capability (Psychological and Physical)

Capability captured whether nurses perceived themselves or others as being psychologically and physically capable of being involved in the design and/or delivery of a HPV educational intervention for 15–17 year old students. Psychological capability was also interpreted by the researchers based on whether nurses demonstrated psychological capability when discussing this topic. The three aspects of the Theoretical Domains Framework (TDF) with the highest coding frequencies were 1)

Table 1

Demographic information of Focus Group IMNs.

Variable	n	(%)
Band/Grade		
Band 5	18	69.2
Band 6	3	11.5
Band 7	5	19.2
Age range		
20–34 years old	1	3.8
35–49 years old	11	42.3
50–69 years old	14	53.8
≥70 years old	0	0
Time in IMN role		
<1 year	2	7.7
1–5 years	6	23.1
>5 years	18	69.2
Race/Ethnicity		
White Northern-Ireland	24	92.3
White Non-Northern-Ireland	2	7.7
Mixed/multiple ethnic groups	0	0
Asian or Asian British	0	0
Black/African/Caribbean Black British	0	0
Gender		
Female	26	100.0
Male	0	0
Non-binary	0	0
Other	0	0
Not specified	0	0
Religion		
Catholic	8	30.8
Protestant	14	53.8
Christian (*not Catholic or Protestant)	2	7.7
Other	0	0
No religion	1	3.8
Prefer not to answer	1	3.8

Knowledge 2) Memory, Attention and Decision Processes and 3) Skills.

4.1.1. Knowledge

4.1.1.1. Facilitators. Nurses from all HSC Trusts perceived themselves to have strong knowledge of all aspects of HPV. Four of the five nurse

Table 2
Frequency of coding into each TDF domain.

		Coding frequency
Capability		
Psychological capability	Psychological skills	69
Psychological capability	Knowledge	58
Psychological capability	Memory, attention and decision processes	16
Physical capability	Physical skills	8
Psychological capability	Behaviour regulation	3
Opportunity		
Social & Physical opportunity*	Social influences and Environment/Resources	144
Motivation		
Reflective motivation	Social/Professional Role and Identity	74
Reflective Motivation	Belief about consequences	42
Reflective Motivation	Belief about capabilities	17
Reflective Motivation	Goals	9
Reflective Motivation	Optimism	9
Reflective Motivation	Intention	3
Automatic Motivation	Reinforcement	58
Automatic Motivation	Emotion	19

* Social & Physical Opportunities were often highly intertwined so are reported together despite being two TDF domains.

groups felt that they would have the best knowledge to deliver this material in schools, given their specialist training in public health. Nurses felt that teachers would not have the required specialist knowledge in this area of healthcare and should not be expected to teach topics outside of their scope of knowledge.

4.1.1.2. Barriers. Nurses' knowledge regarding the rights of students to self-consent to HPV vaccinations was inconsistent. Some nurses felt that it was always the parent's right to consent their child for the HPV vaccination, even where the young person was 16 years old, while others indicated that an adolescent could legally self-consent at 16 years old. Knowledge of Gillick consent was also inconsistent with some nurses demonstrating strong knowledge of Gillick consent while others did not understand the concept. Nurses were often not sure if students 15–17 years old could attend their GP on their own to receive the vaccine.

See Table 3 for comments from nurses regarding their perception of their knowledge.

4.1.2. Memory, attention and decision processes

4.1.2.1. Facilitators. Nurses recognised the importance of student

Table 3
Nurses discuss their knowledge of HPV and associated vaccination consent.

<i>'Our knowledge for HPV is sound... we are actually doing it four times... so it's four times a year we are constantly going over the same stuff with people.'</i> (Western Trust Nurse)
<i>'In an ideal world, I do feel that a school [immunization] nurse would probably have the best knowledge, without a teacher having to go and look it all up and educate themselves first. We all have done training and we all understand...'</i> (South Eastern Trust Nurse)
<i>'I think fifteen or sixteen, we wouldn't be able to accept a consent under sixteen, for definite. Over sixteen I think is a different story. But certainly fifteen would be too young for consenting, in my opinion. And the law as well, really, isn't it?'</i> (Northern Trust Group 2 Nurse)
<i>'We run under the Gillick competency, I'm sure you know about that anyway. So although we ultimately get consent from a parent or a guardian, if we have a child sitting before us and they are Gillick competent, they understand completely, we can take their consent.'</i> (Western Trust Nurse)
<i>'I'm not sure. They can possibly go on their own. I really don't know.'</i> (Northern Trust Group 2 Nurse)

engagement and interactive learning to retain students' attention. They felt that health professionals external to the school, like themselves, would make the experience more memorable for students. They indicated that education should be provided via fully immersive, relaxed and supportive interactive face-to-face teaching alongside information provided in alternative ways such as closed group social media platforms, video media and practical demonstrations.

Many nurses throughout the various focus groups talked about the power of personal stories of young people who have had a HPV-acquired cancer. They recognised that part of retaining students' attention was using language that students can identify with socially alongside appropriate medical terminology. An ability to contact the nurses after the education was deemed extremely important along with keeping resources up-to-date See Table 4.

4.1.3. Skills

4.1.3.1. Facilitators. Nurses felt that they had the most appropriate and adaptable cognitive and interpersonal skills to deliver this education. They felt confident and skilled in talking to students about sexual health, noting that teachers reluctantly facilitate sexual education in schools and are often embarrassed by these conversations. Nurses felt that students would prefer to have this education delivered by nurses who would create a more open environment.

Nurses demonstrated a strong insight into the emotional needs and cognitive abilities of students concerning HPV information, often referring to their fear of needles, capacity at different ages and need to consider students with special needs. They felt that information about HPV would be more readily received by 15–17 year olds, compared to younger students who may not yet be sexually active. They explained that, while younger students would not be ready to discuss various topics, all topics of relevance should be discussed with groups of 15–17 year old students. Nurses did not want to 'sugar coat' the information being delivered and emphasised the importance of comprehensive and transparent information when speaking to students of this age See Table 5.

4.2. Opportunity (Social and Physical)

Opportunity captures whether nurses perceive there to be influencing social and/or physical factors that may aid or hinder the design/delivery of an educational intervention for 15–17 year old students. This includes discussion of environmental factors, access to resources and societal influences.

Table 4
Nurses talk about the need for varied, interactive and up-to-date education.

<i>'I think people remember face to face more...they remember the personalities...you need a variety of approaches. Maybe introductory quizzes at the start to break the ice and get them thinking. A time for questions. A time for talking. Something visual. But at the same time, maybe social media, maybe an app that they can download or whatever. They are very into their apps and social media...you have to be seen to be current as well.'</i> (Northern Trust Group 2 Nurse)
<i>'Tik Tok, social media, Snapchat... that's where they are getting their information from. So I suppose it's a no brainer, really. That's where you would do some of the education... definitely doing the social media end of it, but then going into a school as well, to reinforce it.'</i> (Western Trust Nurse)
<i>'you know the young lady in the Republic that had passed away a couple of years ago? She had made a wee video. And we actually showed that at one of our schools. And that had a massive impact. They were silent.'</i> (Western Trust Nurse)
<i>'they come out with words. I've got children ranging in age from twenty five down to twelve. And there are words that even the twelve year old is using, and I'm saying, well what does that mean? So yeah, I think whoever is talking to them, it's definitely effective if they are current with their terminology.'</i> (Northern Trust Group 2 Nurse)

Table 5

Nurses describe their ability to communicate effectively with 15–17 year old students.

'There's an increasing amount of children in schools now with learning difficulties, including ASD, ADHD, who are... I suppose some of them are more likely to be impulsive and act impulsively and I don't know if there's any... Not to single them out, but I suppose, whatever intervention is going to have to target them and keep them interested as well.' (South Eastern Trust Nurse)

'You need to be honest and truthful with them. And they will respect that...so many adolescents now, they have the increasing gay community, lesbian community, all sorts of different communities. And sexual education is very poor for all those individual communities. So I just think that yeah, you just need to be honest with them and truthful.' (Belfast Trust Nurse)

'...we were trying to get round this conversation of anal cancer in boys having same sex relationships. And we couldn't get away from it, because that's part and parcel of part of the component of HPV... it was well received but the shock, the shock of the word anal was like... but there's no easy way of hitting that in a different direction, because it's anal cancer...it is all important. You need to give them all information, every bit.' (Western Trust Nurse)

'... the teachers will tell you they are not comfortable talking about sex with their students. You'll get the odd young person, young teacher that's really good at it. Because they are just young themselves. But the majority of teachers that we've come across will tell us that they are not comfortable.' (Southern Trust Nurse)

'You can imagine we've heard everything, seen everything. The children would nearly try to shock us. We are kind of unshockable at this stage.' (Western Trust Nurse)

4.2.1. Barriers

Nurses described the extent of their involvement in current education for 12–13 year olds as providing reading materials, mainly for parents/guardians, alongside brief information of side-effects to students on the day of vaccination. They felt dissatisfied with the time provided to them to educate these students. They expressed that they often have difficulty accessing schools to vaccinate without the addition of providing education, and felt that sexual health education in certain schools often depended on the principal's ethos. Nurses described how there are inconsistencies in terms of the nurses employed within schools. They explained how some schools have permanent school nurses while others do not, and the school nurses' role can vary considerably with some nurses not being involved in sexual health education. Trust nurses valued the school-based nurses and felt that, with an appropriate public health qualification, they could have the skill-set to provide HPV education to 15–17 years old students.

Nurses' opinions were divided regarding whether they felt that this HPV education should be compulsory in post-primary schools. Some nurses felt that the only way to overcome inequality in sexual health education in post-primary schools, was to mandate important components of sexual health. Other nurses felt that parents should always have a say in the sexual health education that their teenagers are receiving and therefore it should not be mandated. All nurses felt that this HPV education should be part of a larger sexual health school curriculum for this age group.

Nurses felt that it may be difficult to obtain consent from all parents for this education. They felt that some parents are unaware of their child's sexual relationships and parents may feel that the information is either not applicable to their child or could encourage initiation of sexual relationships. Many nurses commented that religion is often a factor which can influence parents' acceptance of HPV education but noted that this influence is not specific to any one religious affiliation. Nurses felt that some parents lacked the education themselves to make informed choices for their children. One group of trust nurses described how they organised information evenings for parents in schools with low HPV vaccination uptake, to help them to understand the importance of the vaccination, despite the lack of time and resources allocated for this

Table 6

Nurses talk about the barriers influencing their opportunity to provide HPV education.

'We send out a pack with the consent form of all the information that's required. A lot of those packs, go in the bin... or a lot of them stay on the floor before they leave, or they are left on their seats. So these packs are not even being read...they are not even reading it.' (Western Trust Nurse)

'I think school nurses really do have a lot to contribute to sexual health education. I don't think they were ever used as well as they could have been.' (Northern Trust Group 1 Nurse)

'I think it would be useful for it to be part of the curriculum, but I think you also have to give the parents the choice of opting out. Because some parents would just find this very difficult to deal with certain aspects of that holistic approach. So they do need to know that, next week is when they are covering STDs or whatever. And they have the option of opting out. And something alternative being provided for those children who aren't going to be included in that.' (Northern Trust Group 2 Nurse)

'I think all students have the right to have that kind of education. To feel that they are well informed with regard to making good choices. And to understand what is happening and what may happen and I think at the minute there is a wide variation in terms of how that relationship and sex education is provided in schools.' (South Eastern Trust Nurse)

work. Nurses felt that it would be important to have the support of the school and teachers to promote this education to parents.

While four out of five trust nurse groups clearly felt that specialist nurses would be the ideal healthcare professionals to deliver this education to students, most nurses were open to the idea of young healthcare professional trainees delivering this education as part of their healthcare degree, who may have less time pressures than the school IMNs See [Table 6](#).

4.3. Motivation

Motivation is defined as 'the internal processes which influence our decision making and behaviours.'(p3) [38]. Michie et al. (2011) [39] describe two components; reflective motivation and autonomic motivation. Reflective motivation involves motivation due to reflection on past events while autonomic motivation involves 'our desires, impulses and inhibitions' (p3) [37].

4.3.1. Reflective motivation

The three aspects of the TDF which were most commonly discussed by nurses within reflective motivation were 1) Professional or Social Role and Identity; 2) Beliefs about Capabilities; and 3) Beliefs about Consequences.

4.3.1.1. Professional or social role and Identity

4.3.1.1.1. *Facilitators*. Nurses from four out of five trust nurse groups felt that educating students about HPV should be part of their professional role and were very motivated to be involved. Many nurses talked about being involved in the sexual health education programme in schools in the early 2000s before it was discontinued and instead taught in schools by teachers/external speakers. These nurses felt that their previous teaching experience was a strong motivator to wanting to deliver HPV education. Nurses felt that teachers do not see HPV education as part of their teaching role and did not value health education in the same way as those with health professional backgrounds. Consequently, they felt that HPV education is provided in an ad hoc manner, depending on individual teachers' interest in this topic See [Table 7](#).

Table 7

Nurses describe their thoughts about teachers' motivation regarding delivering HPV education.

'...pressure is put on the teachers and the teachers probably don't even want to deliver education like that, really. Not to the depth that it needs to be delivered. And then they would be a bit more resentful delivering it, so therefore maybe it's not done adequately enough.' (Belfast Trust Nurse)

'teachers are not...they are not as open minded to the medical field or health interests of children. And I say that with great respect. But they aren't. And some teachers would tell you that that's not their focus. Their focus is education.' (Western Trust Nurse)

4.3.2. Beliefs about capabilities

4.3.2.1. Facilitators. Overall, nurses felt very capable of being able to deliver this education to students as a team, if the correct support and resources were implemented. While they expressed feeling confident in their HPV knowledge, they felt that a standardised approach to teaching would be essential to ensure consistency in content delivery. They indicated that a teaching plan should be developed and shared with school team nurses across all trusts. They indicated that, to integrate this fully, some standard presentation skills training regarding designing teaching plans, would be necessary. Nurses felt that Band 6 nurses with a post-graduate public health qualification would have the most appropriate skills to prepare and deliver this education.

4.3.2.2. Barriers. Some nurses indicated that they felt like 'dinosaurs' in terms of their ability to teach with social media platforms so would need additional support in order to utilize these tools as part of a teaching plan.

See [Table 8](#) for IMNs' comments regarding this aspect.

4.3.3. Beliefs about consequences

4.3.3.1. Barriers. Nurses felt strongly that the current education at the time of vaccination is insufficient and strongly believed that a follow-up HPV educational intervention for 15–17 year old students is needed to address the poor knowledge that students currently have regarding this subject.

Nurses felt that reinforcing information at this age was important as students could fully understand the rationale and benefits of the HPV vaccine, informing future decisions about their health. Many nurses felt that this HPV educational intervention was an important opportunity for students to self-consent to the HPV vaccination if they missed their vaccinations in the first or second year of post-primary school.

While nurses felt that this education could potentially increase HPV vaccination uptake, they felt that this would only occur if there was a change in the service infrastructure. Currently, the vaccine is offered to 12–13 year olds and the IMNs are not permitted to provide HPV vaccinations to students 15 years and above [40]. Instead these students are referred to their GP for the vaccine. Nurses felt that if students had to attend their GP to receive the vaccination, they would be much less likely to do so. Subsequently, they felt strongly that it would be vital that

Table 8

Nurses describe the resources needed to increase their capability to design/deliver this education.

'I think on a practical level the team would want, if they were involved, you'd want presentation skills. You'd want set lesson plans as structure to the information that is to be imparted, so that everyone, while we can talk in different ways, we are saying the same thing.' (Belfast Trust Nurse)

'If anything, there would be maybe some people would like the benefit of getting the confidence to stand up and speak. Because you know the way that comes with doing. And so because some of the girls haven't been doing that a lot, they probably would like that... so if anything it might be that sort of training we would need' (Wendy: Western Trust Nurses)

Table 9

Nurses discuss the importance of reinforcing information regarding HPV and associated screening.

'We talked about intercourse... about healthy choices and developing healthy choices...and would go through different STIs and how that impacts on your body. And it was building confidence, and the confidence to say no. And what is a healthy relationship and what isn't a healthy relationship. And making good, personal choices.' (Belfast Trust Nurse)

'A lot of parents do not consent for the HPV vaccine in particular...maybe perhaps if the pupils were able to consent that would increase the uptake of it.' (Northern Trust Group 2)

'I was concerned that people would feel that they were protected against all viruses and all chance of getting cervical cancer. They maybe don't understand percentages that cause cervical cancer and how many this vaccine protects against. And I would be concerned, then, that they would feel they maybe don't need to go to cervical screening, because they feel protected' (South East Trust Nurse)

they would be able to offer the vaccination to students after this education in order for the intervention to be successful See [Table 9](#).

4.3.4. Automatic motivation

The two aspects of the Theoretical Domains Framework (TDF) within the automatic motivation domain include reinforcement (e.g. personal incentives) and emotion.

4.3.4.1. Barriers. Nurses felt that their skills and knowledge were underutilised and were frustrated by the lack of encouragement for role development in the education of students alongside the vaccination programme. They expressed their dissatisfaction at how their role has changed since the early 2000s when the responsibility of teaching sexual education in post-primary schools was taken away from them.

Some nurses also expressed strong feelings regarding parental attitudes towards vaccinating and educating their children about HPV. Nurses described the 'bond' that they form with these students and even though they visit the schools quite infrequently, they indicated that they enjoyed that aspect of educating and guiding students. They felt that this 'relationship building' was important to both them and the students. Nurses described enjoying the time to speak to students when time permitted. See [Table 10](#).

5. Discussion

School IMNs were very supportive of a HPV educational intervention for 15–17 year old students, expressing dissatisfaction with the current education provided to students. They identified barriers and facilitators which influence their attitudes and behaviours regarding the design and delivery of such an intervention, which are captured within the

Table 10

Nurses express their frustration at the current education provision.

'We'd love to be going in and giving those health promotion into each school. That's the ideal. That's what we want to do. That's what we were trained to do and it's a lovely thing to do...every year you get asked could you come and do a wee P7 transition talk...they want that service...for things like sexual health where it is much more delicate, why would the children not want somebody that they don't see every day? Definitely I think we are the best placed.' (Western Trust Nurse)

'...this is our bread and butter. This is what we are really keen to do. And this is why we undertake the degree that we do. And we've been taught in all these wonderful ways. And it's very frustrating for us, for those of us that have done the course, that we cannot get out and do what we were taught to do. We love it.' (Western Trust Nurse)

'they don't understand what they are being vaccinated for. I would say there's numerous parents who wouldn't even discuss, maybe, with their children, sexual education, things like that. So I think it's appalling. It's terrible.' (Belfast Trust Nurse)

'... you are building that rapport with the students. And long term all that's beneficial with regards their health and what's important to them. So definitely I think there's more scope for nurses... there should be more scope for nurses to educate on it.' (Belfast Trust Nurses)

categories of the COM-B model; Capability, Opportunity and Motivation [27,30].

5.1. Capability

Four of the five nurse groups recognised that their unique specialist skills would be ideal to guide and deliver this education to 15–17 year old students based on their experience and post-graduate public health qualification. These nurses felt that they had the knowledge and psychological skills to provide HPV education to students throughout the various stages of post-primary school. In the UK (including Northern Ireland), National Minimum Standards and Core Curriculum for Immunisation Training exist which prepare IMNs for their role, providing them with the knowledge and skills to educate and deliver the HPV vaccination [41].

IMNs demonstrated strong awareness of the emotional needs and cognitive development of students of various ages. While they indicated that their knowledge of most aspects of HPV was strong, they expressed uncertainty regarding the legal rights of students in this age range to self-consent to the HPV vaccination. Many nurses did not have a strong understanding of the notion of Gillick consent and expressed reluctance to consent young people under the age of sixteen without parental consent. This finding is consistent with a number of previous studies [22,42–43] who found that school nurses were reluctant or refused to vaccinate young people under sixteen years old if parents had refused permission. In this study, as indicated by Stretch et al. (2009) [43], nurses reported feeling confused about the legal guidelines governing consent. The authors agree with Stretch et al.'s [43] conclusion that to 'facilitate the legal right' of students under the age of sixteen, nurses need to be comprehensively educated on this issue in order for any educational intervention with this age group to be effective. To ensure that nurses feel completely capable of designing and delivering this education, nurses would need to receive training regarding legislation related to adolescent consent in Northern Ireland. This training should include how to facilitate and resolve scenarios where differing opinions arise between parents and students regarding the HPV vaccine.

5.2. Opportunity

IMNs indicated that workload pressures and restructuring within the NHS, have resulted in HPV education being almost completely removed from their role despite HPV vaccinations being almost exclusively delivered by IMNs [44]. Currently no time or resources are allocated to them for this role development. With schools now having responsibility for the delivery of HPV education within their curriculum, IMNs describe inconsistent and often non-existent HPV education in post-primary schools. Publication of a recent systematic review [45] supports these findings, demonstrating that IMNs throughout the UK feel overwhelmed by the volume of work associated with school vaccination programmes. Additionally, COVID-19 has increased workload pressure on school IMNs and a shortage of IMNs is continuing to contribute to this effect [46].

In order for school IMNs to have the opportunity to design/deliver a HPV educational intervention, national policy change supported by the Public Health Agency (PHA) and the Education Authority (EA) is required. This would involve allocation of time and resources to the dedicated delivery of HPV education in post-primary schools. Without this restructuring and support, nurses will not be provided with the opportunity to be involved in the design and delivery of HPV education.

Nurses believe that this HPV education should be incorporated into a wider sexual health programme although they expressed mixed opinions regarding whether this should be a mandated component of the post primary school curriculum. Parental influences were perceived as a major barrier to implementation of HPV education. The theme of parents as a barrier to HPV vaccination opportunity has arisen in several publications, which describe the challenges of managing parental

concerns and gaining parental consent [44–45]. One systematic review reported that in 83% of the reviewed studies, parents had only modest or limited knowledge regarding HPV infection and vaccination [47]. One of the IMN teams explained how they have tried to address parental concerns and knowledge through the organisation of an evening event, where vaccination rates were particularly low. However, time and resource pressures do not easily facilitate this type of community intervention [45].

Nurses also discussed religious beliefs as a potential barrier to the implementation of standardised HPV education in post-primary schools. However, a rapid evidence assessment and interviews with IMNs across the UK [48] reported only a small effect of religion and ethnicity on HPV acceptance in schools. However, nurses interviewed within this study indicated that they sometimes struggled to deliver their programme in schools, which had a large religious population or where the principal did not agree with the HPV vaccine due to their own religious beliefs. Rockcliffe et al. (2020) [49] cite a number of studies, which also agree that 'commitment to the vaccination program from schools and school staff has the potential to affect uptake' (p136). Given that recent data suggests that over 90% of the adult population in Northern Ireland self-identify with a religious affiliation [50], this effect may be more pronounced in this region of the UK compared to others.

In order to enable nurses to have the opportunity to design and deliver this education, it is important to remove these potential barriers. This would involve educating parents, teachers and principals about the importance of the HPV vaccine and protection against transmission of HPV. By promoting this education as a part of a wider health awareness programme, those with religious reservations may be less likely to perceive this as promoting sexual intercourse but rather as promoting healthy lifestyle choices for their children.

Given the resource and time pressures placed on school IMNs, nurses felt that there may be opportunities for school-based nurses to provide this HPV education if appropriately trained in public health. The IMNs were also receptive to healthcare professional students being trained to deliver this HPV education if a consistent approach was taken to ensure a quality and sustainable service. While publications evaluating peer-led interventions are sparse, there is some evidence to suggest that this teaching has a positive impact on sexual health knowledge but limited or no impact on behaviour [51–53]. Nurses often expressed concerns that young people view them as being too old and outdated to relate to, and felt that adolescents would respond positively to people closer to their own age delivering HPV and other sexual health education. However, research conducted regarding students' view on the effectiveness of teachers of different ages, did not find any evidence to support the notion that students relate teaching effectiveness to age [54]. Students tend to rate ability to motivate, sense of humour and helpfulness as being of higher importance [55].

5.3. Motivation

Nurses felt that adolescents had poor knowledge regarding the HPV vaccine and HPV transmission. They were motivated to improve student knowledge and empower them to make their own future health decisions consistent with previous findings [22]. Nurses who had previous experience of teaching in the sexual health education programme, expressed strong satisfaction and enjoyment of this previous teaching opportunity. They felt that this was what 'they were trained to do' and that education should be a central component of their professional role. They expressed frustration at their lack of opportunity for role development in educational settings. While over 69% (n = 18) of the focus group nurses had over 5 years of experience within the school immunisation team, only a small number of nurses (<31%; n = 8) had been promoted beyond the level of band 5. While there is undoubtedly a variety of reasons of this lack of progression, the integration of role expansion to include further educational responsibilities, would likely motivate and promote teams who already view themselves as opinion

Table 11
Summary of recommended interventions aligned to the COM-B model.

	Recommended Interventions
Capability	
Knowledge	IMNs need to receive comprehensive training regarding the legal rights of students, assessment of Gillick competence and conflict resolution strategies.
Psychological capability	
Memory, attention and decision processes	
Opportunity	
Social influences and Environment/Resources	Support by the Public Health Agency (PHA) and the Education Authority (EA) is required to; <ul style="list-style-type: none"> - provide time and resources to enable IMNs to consistently educate students. - integrate HPV education into the sexual health curriculum in post-primary schools. - educate parents and teachers on the importance of HPV education and vaccination.
Motivation	
Social/Professional Role and Identity	IMNs need to receive some level of teacher training to increase their confidence to deliver HPV education.
Belief about consequences	
Belief about capabilities	IMNs need to understand social media platforms including optimising information posted and understanding the impact of social media on students' emotional wellbeing.
Reinforcement	
Emotion	Vaccination opportunity needs to be added alongside any HPV education offered to students.

leaders in HPV education. It is especially important to encourage the role development of experienced IMNs who have been shown to achieve higher vaccination rates than their less experienced colleagues [56]. In order to increase IMNs' desire to be involved in school education, trust leadership teams need to promote and support role development opportunities in alignment with support from the PHA and EA.

IMNs suggested that interactive face-to-face education with possible use of social media platforms may be optimal in the design of an intervention for this age group. While powerpoint presentations often form part of HPV interventions [57–58], researchers have increasingly explored the use of more interactive HPV education. For example, Davis et al. (2017) produced a high quality study where magazines and DVDs alongside interactive activities were used yielding positive knowledge outcomes [14]. Lai et al. (2015) successfully designed their HPV intervention using facebook-assisted teaching [59]. While there is no proven optimal HPV educational intervention for this age group [60], given that the majority of young adults use Instagram, Snapchat and/or TikTok [61], social media platforms may logically provide ideal teaching opportunities. Many IMNs expressed that they would like to increase confidence in their presentation, teaching and social media platform skills.

Nurses felt that to increase their confidence in delivering high quality education, they would need further teacher and technical training to enable them to develop and deliver teaching plans. Fear of presentation was noted and is a common phenomena experienced by healthcare professionals [62–64]; implementation of presentation skills training would likely help to improve motivation in this group of nurses. Additionally, when social media is utilised as a virtual communication platform, nurses need to gain the ability to recognise and respond to emotions in a manner which promotes a trusting relationship between the nurses and adolescents [65]. Therefore, it is imperative that nurses have appropriate training in not only the practical aspects of communicating via social media platforms, but also an additional level of training to enable them to develop a professional, caring and trusting relationship with students using this platform.

Many nurses were motivated by this unique and important opportunity for students to self-consent to the HPV vaccination if they had not previously received the vaccine. However, nurses felt that the education would only result in an increased uptake in HPV vaccination rates in this age group, if the IMNs were able to offer another opportunity for vaccination alongside this HPV education. Currently students are only offered the vaccine in the first two years of post-primary school and must attend their GP if they wish to receive the vaccine after this time period [40]. In order to positively influence nurses' motivation and increase

uptake of the vaccine, it is essential that this vaccination opportunity is added as an integral component of an education intervention for this age group see Table 11.

6. Study strengths and limitations

Strengths of this study include representation from highly experienced IMNs within each of the five HSC trusts throughout Northern Ireland. However, due to confinement of the project to Northern Ireland school IMNs, findings may not be generalisable to all of the UK. While the majority of IMNs in Northern Ireland participated in the study, those who did participate may be more likely to be motivated to deliver this type of HPV education. Additionally, there was little diversity within the study population with none of the participants describing themselves as belonging to a race or ethnic group other than white. 92% of participants (n = 24) indicated that they were Northern Irish with the remaining two participants being from the UK and EU. In face-to-face public health interviews/focus groups, it is possible that interviewer characteristics can result in some bias in the data collected [66].

While barriers and facilitators to IMNs participating in the development and delivery of HPV education are captured, provision of education alone to increase knowledge and awareness to the 15–17 year old demographic may not be sufficient to increase self-consent or vaccination uptake. To explore this topic further, the next phase of this study will involve conducting focus groups/interviews with 15–17 year old students, teachers and school-based nurses.

7. Conclusion

School IMNs are highly motivated to be involved in the design and delivery of HPV education to 15–17 year old students in post-primary education. However, existing barriers severely impact their capability, motivation and opportunity to be involved in this education. The PHA and EA need to recognise the potential value of school HPV IMNs and utilise their knowledge and skills to ensure appropriate HPV education is being delivered in a consistent and high quality manner to adolescents throughout the UK. It is essential that students understand which strains of HPV they are protected against following vaccination, to inform their future sexual health decisions. National policy changes are particularly important in schools where the vaccination uptake is sub-optimal and this additional educational intervention could provide an opportunity for self-consent and increased uptake of the vaccine at this time. Without infrastructure in place to support the delivery of this education in conjunction with vaccination opportunity, adolescents will continue to

lack the basic sexual health knowledge to protect themselves against a virus which has the potential to cause a number of cancers and health conditions.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: This work was supported by the College of Radiographers, UK, through the CoRIPs Research Grant fund. All authors declare that they have no conflict of interest to disclose.

Data availability

The data that has been used is confidential.

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Appendix A. Supplementary data

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