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Predicting and understanding seasonal influenza vaccination behaviour among forensic mental health inpatients

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ABSTRACT

Objectives: This study aimed to identify demographic and psychological predictors of seasonal influenza vaccination intentions and behaviour among a sample of inpatients in a secure forensic mental health service. It also sought to explore patient experiences about being offered the vaccine.

Design: This study used a mixed-methods design. The quantitative element employed a prospective design using a questionnaire; both cross-sectional and prospective findings are reported. For the qualitative part of the study, semi-structured interviews were conducted and analysed using Interpretative Phenomenological Analysis (IPA).

Main outcome measures: Seasonal influenza vaccination intentions and behaviour

Results: Past behaviour, vaccine knowledge and cues to action were predictors of vaccination intention (N = 57). Cues to action remained as the only statistical predictor of vaccination behaviour (N = 55). Nine interviews were conducted with four vaccinated and five unvaccinated participants. Three main themes were formed in the IPA analysis; these were 'Managing Decisional Conflict', 'Interaction with Immune Function' and 'The Role of Others'.

Conclusions: The results highlighted the integral role of health professionals in shaping patient's vaccination behaviour within a secure mental health setting. Recommendations for vaccination promotion strategies were offered.

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Introduction

Influenza can pose a serious health threat among high-risk groups. Under UK guidelines an influenza vaccine is offered to older adults and those with specific chronic illnesses to minimise the severity of its consequences. Healthcare workers and service users in long-term health facilities are also recommended to receive a vaccination as they are in settings where there is an increased risk of contracting influenza and

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infecting others (NHS, 2019). Vaccination uptake statistics from the 2017/18 season indicated that 68.7% of healthcare workers, 72.6% of older adults (age 65+ years) and 44.9% of individuals with an underlying health condition received the vaccine (Public Health England, 2018). Specific uptake figures for service users in long-stay settings were not available. Individuals detained in prison should receive the same level of healthcare as people living in the community. In 2016, the flu vaccination coverage rate was 57% among eligible prisoners, below the target of 75% uptake (PHE, 2017). Understanding determinants of vaccination behaviour in high-risk groups is essential to reduce the burden of influenza which currently causes approximately 8,000 deaths per year in the UK.

Social cognition models including the Health Belief Model (HBM) and Theory of Planned Behaviour (TPB) have been applied as frameworks to understand determinants of vaccination behaviour. According to the HBM, vaccination behaviour is predicted by the following constructs; perceived susceptibility and severity of influenza, personal benefits and barriers associated with the vaccine and environmental cues such as health provider recommendations (Becker & Rosenstock, 1987; Rosenstock, 1966). Previous studies have reported different outcomes in terms of identifying the most pertinent HBM constructs in determining uptake. In a sample of at-risk participants, perceived threat of influenza (a combination of beliefs about susceptibility and severity), vaccine benefits and cues to action (including access to the vaccine) were predictive of uptake (Cheney & John, 2013).

According to the TPB, a proximal predictor of behaviour is one's behavioural intentions. Such intentions are said to be formed by the following three constructs; perceived behavioural control (belief in one's ability to carry out a behaviour), subjective norms (perceptions about whether the behaviour is socially accepted) and attitudes towards the behaviour (Ajzen, 1985). The TPB has been applied to a wide range of health behaviours, including vaccination uptake (Schmid et al., 2017). For example, Myers and Goodwin (2011) found that having a positive attitude towards the vaccine, scoring high on measures of subjective norm and perceived behavioural control predicted healthy adults' intention to get vaccinated during a swine flu pandemic in 2009. The researchers reported that the TPB dimensions predicted 60% of variance in vaccination intentions. Expanded versions of the TPB that include knowledge, risk perception and past behaviour are able to improve predictive power and better explain behavioural patterns in vaccination uptake (Schmid et al., 2017).

Most of our current understanding about predictors of vaccination behaviour is derived from studies in the general population, elderly adults or healthcare workers. Studies in other vulnerable adult populations are limited (Schmid et al., 2017). Research has demonstrated poorer health outcomes and lower uptake of preventative behaviours, including vaccination, among individuals with severe mental illness (Naylor et al., 2016). One study reported the uptake of the seasonal flu vaccine was 28.4% in a sample of individuals with a mental illness (Lorenz et al., 2013). It is therefore important to understand vaccination decision making in this population to allow targeted health promotion interventions to be developed.

Objectives

The overarching aim of the present study was to gain an understanding of the demographic factors and psychological constructs that predicted vaccination behaviour among a sample of inpatients in a secure psychiatric hospital. Uptake of the flu vaccine is important in this group as reduced immune function and poorer physical health can be a consequence of mental illness (Naylor et al., 2016). There would also be high-risk of virus transmission due to the contained nature of this setting. Specifically, the study sought to address the following research questions:

1. What are the statistical predictors of participants' intentions to receive the seasonal influenza vaccine?
2. What are the statistical predictors of participants' seasonal influenza vaccination behaviour?
3. How do patient experiences of being offered the seasonal influenza vaccination in a secure inpatient-setting influence vaccination decision-making?

Design

This research followed a mixed methods design. The first two research questions were addressed quantitatively, and the third question was addressed using qualitative methods. Ethical approval for this study was granted from the service's internal Research Committee and external permissions were given by the London - South East Research Ethics Committee (REC reference: 17/LO/1285, IRAS ID:228056).

Participants and recruitment

Participants were recruited from a high secure forensic mental health service in the UK between September-October 2017. Permission to approach patients was sought from Responsible Medical Officers, who also determined which patients in their case-load had the capacity to give informed consent. Individuals who provided written informed consent to participate completed the study questionnaire and agreed for their medical notes to be accessed for relevant information.

Quantitative methodology

A questionnaire was distributed to participants measuring past vaccination behaviour, experience of flu, influenza and vaccine knowledge, HBM and TPB domains, health motivation and self-efficacy (see Table 1). Items measuring HBM and TPB variables were developed based on established measures (Champion & Skinner, 2008; Fishbein & Ajzen, 2010). All participants completed the questionnaire ahead of the vaccination period as a prospective design minimised the risk of responses being affected by dissonance. At the end of the vaccination period, participant's records were checked for their age, length of hospitalisation, physical and mental health diagnoses and to measure vaccination behaviour.

Table 1. Self-report questionnaire items measuring selected psychological constructs. All items except those measuring past behaviour, flu experience and TPB attitudes were assessed using a 4-point Likert Scale ranging from 'strongly disagree' to 'strongly agree'.

Psychological Construct	Questionnaire items
Past Behaviour	Did you have the seasonal flu vaccination last year? (Yes/No)
Experience of Flu	Have you ever had the flu? (Yes/No)
Knowledge about Flu	Only people over the age of 65 get the flu People get the flu from breathing the same air as people who have the flu The flu lasts three to five days
Knowledge about Flu Vaccine	If I get the flu vaccine, this could prevent other people in my ward getting the flu The flu vaccination is not effective for protecting against the flu People often get sick from the flu vaccine
Perceived Susceptibility to Flu (HBM)	Spending time each day in communal areas increases my chances of getting the flu My chances of getting the flu are high I am at greater risk of getting the flu than other people my age Even if I feel healthy now, I could still get the flu Even if others in my ward had the flu, I wouldn't catch it
Perceived Severity of Flu (HBM)	Having the flu would disrupt my daily activities Too much fuss is made about the flu If I got the flu, it's not a big deal because I would feel better after a few days Flu can be a serious disease If I got flu, it would be more serious than other diseases
Benefits of Vaccination (HBM)	I believe that the flu vaccination is safe Getting the flu vaccination will prevent me from getting the flu Having a chronic illness (e.g. diabetes or asthma) is a good reason for getting the flu vaccine The flu vaccine is free of charge. This is a good reason to get the vaccine. I think the flu vaccine is effective
Costs of Vaccination (HBM)	Getting the flu vaccine is not convenient for me Getting the flu vaccine is quite painful Getting the flu vaccine interferes with my daily activities I am afraid of needles I am concerned about there being bad side effects of the flu vaccine
Cues to Action (HBM)	I will get the flu vaccine if my doctor recommends it I will get the flu vaccine if the nurses on my ward recommend it I will get the flu vaccination if I am given information that tells me about the benefits of the vaccine I will get the flu vaccine if I am on the ward when the practice nurse comes around with the vaccine
Attitudes Towards Vaccination (TPB)	News of a bad flu season would influence me to get the flu vaccine Responses to the statements below measured on a five-point Likert Scale: Getting the flu vaccination is ... (Harmful to my health/ Not harmful to my health) (Will benefit me/ Will not benefit me) (A good idea/ A bad idea) (Worthless/ Useful) (A hassle for me/ Not a hassle for me) (Pleasant for me/ Not pleasant for me) (Important/ Not important)
Perceived Subjective Norm (TPB)	Most people who are important to me think the flu vaccination is a good idea My health care providers think that the vaccination is a good idea It is expected that I should get the flu vaccine I feel under social pressure to get the flu vaccine
Perceived Behavioural Control (TPB)	The decision to get the flu vaccination is beyond my control Whether I get the vaccination is not entirely up to me It is easy for me to get the flu vaccination
Self-Efficacy	I am confident that I could get the flu vaccination if I wanted to Even if I faced barriers, I am confident that I could get the vaccine if I wanted to
Health Motivation	In general, I follow advice from my care team as I believe this will benefit my health I look for new information related to my health In general, I attend health checks and screening appointments with the GP I exercise regularly (at least three times per week) I eat a well balanced diet

Main outcome measures

The primary outcome variables for the quantitative part of the study were self-reported vaccination intention (measured on a 5-point Likert-type scale in the study questionnaire) and vaccination behaviour (ascertained objectively using patient medical records). Multiple linear regression analysis was used to establish which variables predicted vaccination intention, and binomial logistic regression was used to predict vaccination behaviour as this was a dichotomous variable. G* Power software indicated a sample size of at least 46 participants would be required to detect a large effect size at 80% power level in a model with six statistical predictors. To account for multiple comparisons, statistical significance was accepted at the $p < .01$ for correlations and univariate regression analyses. In multivariate regression models, statistical significance was determined at the $p < .05$ level.

Qualitative methods

Participant's experiences of being offered the vaccine in the context of a secure mental health service were explored in interviews. After the vaccination had been offered, a purposive sample of vaccinated and unvaccinated individuals were selected to participate in semi-structured interviews. In order to select participants for interview, those who had consented to the possibility of being invited back to interview after the vaccination period were allocated a rank. Computer randomisation software was used to generate two random sequences, outlining the order in which patients from vaccinated and unvaccinated groups should be approached for interview. Sequences were generated by an individual from an external health service, who was neither involved in the care of patients nor in the research. If a participant declined to be interviewed, the next participant in the sequence was approached.

Interviews were analysed using Interpretative Phenomenological Analysis (Smith et al., 2009). This is a suitable methodological approach for understanding patient's lived experiences of a particular situation and how this fits in with their wider personal and social world (Smith & Osborn, 2003). Since interviews generally generate a rich dataset, and IPA is idiographic in the sense that the researcher aims to understand a particular person's lived experience, small and homogenous samples are required (Smith et al., 2009). The semi-structured interview schedule was developed following the guidelines of Smith et al. (2009). Participants were asked to recall their experience of being offered the seasonal influenza vaccine and about their views towards vaccination and preventative health behaviours more generally. The interview schedule (see [supplementary materials](#)), was used as a flexible topic guide rather than a script with the researcher making use of reflections and active listening. Interviews were audio recorded and transcribed verbatim by the primary researcher. Transcripts were then transferred on to a three-column template (available in the [supplementary materials](#)) which facilitated the IPA analysis process. Techniques outlined by Smith et al. (2009) for IPA in a larger sample ($N > 6$) were used (Stuart et al., 2017). Transcripts were firstly read and re-read to ensure familiarity, and then analysed paragraph by paragraph, including detailed observations of language use, recurring ideas and emotive content. The primary researcher captured observations and impressions as field notes during

each interview and these also informed the analysis process. The researcher developed emerging themes for one participant, before moving on to the next in order to ensure that each transcript was reviewed in its own right. When all transcripts had been coded, the researcher searched for recurrent themes across interviews. It was important to acknowledge the inherent subjectivity of qualitative research, particularly given the interactional nature of IPA. Samples of transcripts were discussed in supervision to clarify the plausibility of the themes being constructed. This helped the lead researcher to consider other perspectives on the analysis. The complete analysis of one transcript was also checked by an independent reviewer. They looked at a fully analysed transcript and confirmed the suitability of the themes that had been identified. Any differences in views were resolved by discussion. Quality can be demonstrated in IPA research through sufficient use of participant quotations. It is recommended that extracts be individuated, ensuring participant voices are represented within the analysis and allowing readers to assess the interpretations being made by the researcher (Smith, 2011; Stuart et al., 2017). These recommendations were followed in the current study, and the prevalence of themes across transcripts was also documented to demonstrate analytic rigour and transparency (Yardley, 2000).

Quantitative results

Participants

A total of 113 patients were resident in the hospital over the recruitment period. Eight individuals had a learning disability and were not eligible to take part. Of the 105 remaining patients, 89 had the capacity to give informed consent. A total of 58 patients (65% of the eligible sample) agreed to participate in part or all of the research activities and met with the lead researcher to complete the research questionnaire. One questionnaire had to be excluded due to partial completion; therefore, final analyses included data from 57 participants (see Figure 1). Participants in the research study ranged from 19 years to 67 years of age (mean 42 years; SD = 11.51), and average length of stay in the high-secure service was 6.26 years (SD = 7.82), ranging from 3 months to over 36 years. Of those who participated in the research, 44 individuals (77.2%) accepted vaccination, 11 (19.3%) declined, and 2 patients (3.5%) were transferred from the hospital before the vaccine could be offered. The vaccination acceptance rate was higher among patients who participated in the research than across the hospital as a whole, where the uptake rate was 69.3%. Uptake across the hospital increased slightly from the previous year, where it was reported as 66%. A total of 43.9% of participants presented with an additional risk factor warranting annual seasonal flu vaccination (e.g. high-risk condition or aged over 65 years). Primary mental health diagnosis was available for 82.5% of the sample, and the most common diagnosis was schizophrenia. Table 2 provides further health-related information about the participants.

Vaccination intention

Relationships between predictor variables and outcome variables were explored using correlation analyses (see Table 3). Strong associations were observed between past behaviour and both vaccination intentions and behaviour ($r=.652$, $p<.001$ and $r=.543$,

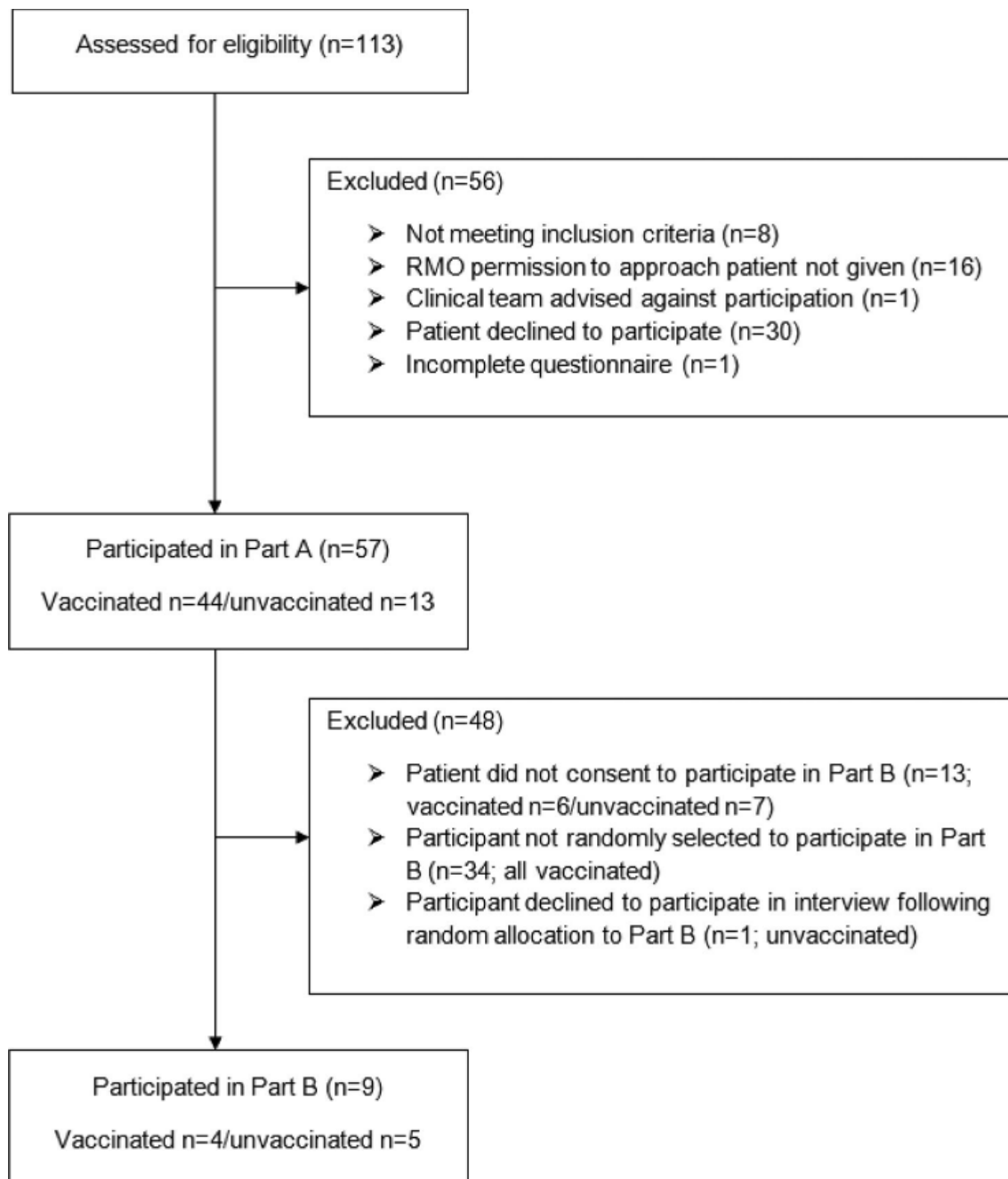


Figure 1. Participant flow diagram outlining the number of individuals at each stage of the study.

$p < .001$, respectively.) The outcome variables, vaccination intention and vaccination behaviour were also highly correlated with one another ($r = .734$, $p < .001$).

Linear multiple regression analyses were conducted to explore the relationship between vaccination intention and demographic, clinical and theoretical variables. Univariate analyses were firstly conducted with each predictor and the outcome variable, and factors that were significant at the $p < .01$ level were included in a multivariate analysis.

The following variables reached statistical significance in univariate analyses predicting vaccination intention; past behaviour, vaccine knowledge, HBM benefits, HBM cues to action, TPB attitude and TPB norm (see Table 4).

These variables were subsequently included in a multivariate linear regression model using a forced entry method; and the final model was statistically significant $F(6,56) =$

Table 2. Primary mental health diagnoses and information on additional at-risk factors for sample of participants (N = 57).

Health-Related Information	Number of participants with selected condition (percentage of total sample)
Primary Mental Health Diagnosis	47 (82.5%)
Schizophrenia	28 (49.1%)
Schizoaffective disorder	8 (14.0%)
Delusional disorder	2 (3.5%)
Psychotic disorder	1 (1.8%)
Personality disorder	4 (7%)
Bipolar disorder	3 (5.3%)
Generalised anxiety disorder	1 (1.8%)
Additional High-Risk Factors*	25 (43.9%)
Age >65 years	1 (1.8%)
Asthma	5 (8.8%)
Diabetes	13 (22.8%)
Hepatitis C	3 (5.23%)
Chronic respiratory disease	1 (1.8%)
Chronic liver disease	3 (5.3%)
COPD	2 (3.5%)
Chronic Hepatitis B	1 (1.8%)
Coronary Heart Disease	2 (3.5%)
Morbid Obesity	3 (5.3%)

*Note: Some participants presented with more than one additional risk-factor for which seasonal influenza vaccination was recommended. Five participants belonged to two additional at-risk categories, and two participants belonged to three at-risk groups.

30.023, $p < .001$. The model predicted approximately 75.7% of the variance in vaccination intention as determined by the adjusted R^2 statistic. Three variables (past behaviour, HBM cues to action and vaccine knowledge) were independent significant predictors of vaccination intention in the multivariate liner regression model, as shown in Table 5.

A binomial logistic regression was conducted to determine the relationship between predictor variables and vaccination uptake. Past behaviour, vaccine knowledge, HBM benefits and HBM cues to action were significant predictors of vaccination behaviour in univariate analyses (see Table 6).

A binomial logistic regression analysis was subsequently carried out with four significant predictors of vaccination behaviour added into a multivariate model using a forced-entry technique. The model was significant $X^2(4) = 30.829$, $p < .001$, although cues to action remained the only significant predictor of vaccination behaviour (see Table 7). The model explained approximately 67.9% (Nagelkerke R^2) of the variance in vaccination uptake behaviour.

Qualitative results

A total of nine interviews were conducted with five unvaccinated and four vaccinated participants. Interviews ranged from 19 minutes to 59 minutes in duration, lasting 35 minutes on average. Typed transcripts varied in length from 1691 to 5425 words (3646 on average). The central focus of interview was participants' lived experience of being offered the seasonal influenza vaccination in the context of residing in a secure psychiatric hospital. Three superordinate themes were formed in relation to this; Managing Decisional Conflict, Interactions with Immune Function, and The Role of

Table 3. Correlation table containing predictor and outcome variables. Pearson's correlations (r) denoted with associated significance levels. Associations significant at $p < .01$ marked in **bold**.

		Length stay	High risk	Past behaviour	Flu experience	Flu symptoms	Flu know	Vaccine know	Susceptibility	HBM Severity	HBM Benefit	HBM Cost	HBM Cues	HBM	TPB attitude	TPB norm	TPB PBC	Self- efficacy	Health motivation	Vaccine Intent	Vaccine behaviour
Length of stay	r	1	.204	.340	.021	.042	-.089	.091	-.099	.034	.138	-.282	.180	.300	.185	.099	.112	.011	.243	.125	
	p		.128	.010	.875	.754	.508	.502	.466	.803	.305	.034	.179	.023	.169	.462	.406	.933	.069	.364	
High risk condition	r		1	.235	.094	.156	.124	.197	.184	.176	.234	.016	.072	.281	.313	-.167	.007	.189	.094	.055	
	p			.078	.488	.247	.358	.142	.171	.190	.080	.905	.595	.034	.018	.213	.956	.159	.485	.688	
Past behaviour	r			1	.156	.072	-.071	.309	.267	.162	.365	-.227	.472	.408	.141	.117	-.055	.354	.652	.543	
	p				.248	.592	.601	.019	.045	.229	.005	.089	.000	.002	.294	.387	.686	.007	.000	.000	
Flu experience	r				1	-.006	-.088	.145	.107	.065	.155	.030	.490	.163	.338	.031	.335	.189	.254	.230	
	p					.963	.516	.281	.427	.631	.248	.827	.000	.226	.010	.819	.011	.159	.057	.092	
Flu symptoms	r					1	.036	-.096	.184	-.046	-.092	-.016	-.025	-.159	.032	.012	-.058	.134	.060	-.102	
	p						.790	.475	.172	.733	.497	.906	.856	.237	.812	.931	.668	.319	.659	.458	
Flu knowledge	r						1	.162	.065	.199	.162	-.172	-.107	-.042	-.199	.176	-.046	.035	-.071	.075	
	p							.229	.633	.139	.230	.202	.428	.757	.138	.189	.732	.798	.601	.587	
Vaccine knowledge	r							1	.196	.217	.556	-.308	.525	.360	.275	.091	.050	.002	.614	.447	
	p								.144	.105	.000	.020	.000	.006	.039	.500	.711	.988	.000	.001	
HBM Susceptibility	r							1		.436	.179	-.133	.319	.179	.129	-.085	-.179	.054	.272	.329	
	p									.001	.184	.324	.016	.183	.339	.531	.182	.688	.041	.014	
HBM Severity	r									1	.077	-.217	.190	.206	.076	.003	.067	.000	.204	.240	
	p										.570	.104	.157	.124	.572	.980	.621	.998	.128	.078	
HBM Benefits	r										1	-.209	.514	.306	.381	.162	.154	.211	.474	.416	
	p											.118	.000	.021	.003	.228	.253	.116	.000	.002	
HBM Cost	r										1	-.238		-.485	.074	-.339	-.136	-.048	-.330	-.110	
	p											.074		.000	.583	.010	.313	.724	.012	.423	
HBM Cues	r											1		.495	.483	.064	.003	.212	.790	.660	
	p													.000	.000	.637	.983	.113	.000	.000	
TPB attitude	r													1	.174	.174	-.090	.055	.552	.380	
	p														.195	.195	.507	.685	.000	.004	
TPB norm	r														1	-.140	.230	.232	.297	.287	
	p															.299	.085	.082	.025	.034	
TPB PBC	r															1	.158	.163	.070	.168	
	p																.241	.219	.605	.219	
Vaccine self-efficacy	r																1	.034	-.044	-.100	
	p																	.800	.747	.470	
Health motivation	r																	1	.077	.122	
	p																		.569	.373	
Vaccine Intention	r																		1	.734	
	p																			.000	

Table 4. Univariate multiple regression analyses assessing the relationship between each predictor variable and vaccination intention (N = 57 for all analyses). Standardised coefficients (β), t values and significance levels reported with associations significant at the $p < .01$ level highlighted in **bold**.

Predictor	β	t	p
Age	.161	1.209	.232
Length of stay in TSH	.243	1.856	.069
At-risk group	.094	.703	.485
Past behaviour	.052	6.380	<.001
Health motivation	.077	.077	.573
Flu experience	.254	1.944	.057
Flu symptoms	.060	.444	.659
Flu knowledge	-.071	-.071	.601
Vaccine knowledge	.614	5.764	<.001
HBM susceptibility	.272	2.094	.041
HBM severity	.204	1.544	.128
HBM benefits	.474	3.997	<.001
HBM costs	-.330	-2.597	.012
HBM cues	.790	9.568	<.001
TPB attitude	.552	4.913	<.001
TPB norm	.297	2.310	.005
TPB PBC	.070	.520	.605
Vaccine self-efficacy	-.044	.325	.747

Table 5. Standardised coefficients (β), t-values, and significance levels for predictors in forced-entry multiple regression model predicting vaccination intention (N = 57). Adjusted R^2 , F change and associated significance levels reported as each variable was added to the model with significant predictors highlighted in **bold**.

Predictor	β	t	p	Adjusted R^2	F Change	Sig F Change
(1) Past Behaviour	.317	4.049	<.001	.415	40.701	<.001
(2) Vaccine Knowledge	-.056	3.037	.004	.599	26.234	<.001
(3) HBM Cues to Action	.258	5.243	<.001	.755	35.503	<.001
(4) HBM Benefits	.513	-.653	.517	.754	.714	.402
(5) TPB Attitude	.105	1.134	.188	.758	1.943	.169
(6) TPB Norm	-.063	-.809	.422	.757	.655	.422

Others. Table 8 outlines superordinate themes, sub-themes and the recurrence of each sub-theme across participant interviews.

Superordinate theme 1: Managing decisional conflict

Most participants seemed to experience a degree of ambivalence towards decision making, recognising that there were often both advantages and disadvantages to vaccination uptake. In order to simplify the decision-making process, participants took active steps to reduce decisional conflict and post-decision regret. The subordinate themes emerging under this theme were: confirmation bias, rational vs. emotional decision making, and attitudes towards health.

Confirmation bias

Decisions about whether to receive the influenza vaccination seemed to be grounded in past experience. Among individuals with prior experience of receiving the seasonal influenza vaccine, those that described positive experiences generally repeated this

Table 6. Univariate binomial logistic regression analyses assessing the relationship between each predictor variable and vaccination behaviour (N = 55 for all analyses). Unstandardised coefficients (B), associated Standard Errors, Wald statistic and significant levels reported with associations significant at the $p < .01$ level highlighted in **bold**.

Predictor	B	SE	Wald	P
Age	.024	.030	.632	.427
Length of stay in TSH	.055	.062	.793	.373
At-risk group	.285	.697	.168	.682
Past behaviour	3.401	1.105	9.473	.002
Health motivation	.506	.562	.809	.368
Flu experience	1.176	.712	2.730	.098
Flu symptoms	-.539	.717	.452	.583
Flu knowledge	.386	.698	.306	.580
Vaccine knowledge	2.370	.859	7.610	.006
HBM susceptibility	1.632	.712	5.252	.022
HBM severity	1.162	.677	2.946	.086
HBM benefits	1.621	.588	7.597	.006
HBM costs	-.495	.608	.661	.416
HBM cues	2.854	.860	11.004	.001
TPB attitude	1.018	.412	6.102	.014
TPB norm	1.754	.864	4.118	.042
TPB PBC	.535	.437	1.504	.220
Vaccine self-efficacy	-.533	.731	.531	.466

Table 7. Unstandardised coefficients with associated standard errors, Wald statistic and significance levels for predictors in forced-entry binomial logistic regression model predicting vaccination behaviour (N = 55). HBM cues to action was the only significant predictor as defined by $p < .05$ (highlighted in **bold**); HBM benefits, vaccine knowledge and past behaviour were all non-significant in the multivariate model.

Predictor	B	SE	Wald	p	Exp (B)	95% CI's for Exp (B)	
						Lower	Upper
(1) HBM Cues to Action	2.055	1.000	4.223	.040	7.809	1.100	55.443
(2) Past Behaviour	2.220	1.239	3.210	.073	9.203	.812	104.353
(3) Vaccine Knowledge	.670	1.227	.298	.585	1.954	.176	21.654
(4) HBM Benefits	.472	1.164	.165	.685	1.604	.164	15.708

Table 8. Recurrence table showing whether subordinate themes were present or not within each participant's transcript. Participants 1–5 were unvaccinated and 6–9 were vaccinated.

	1	2	3	4	5	6	7	8	9
Superordinate Theme 1: Managing Decisional Conflict									
Confirmation Bias	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rational vs. Emotional Decision Making	✓	✓	✓	✓	✓	✓	✓	✓	✓
Attitudes towards Health	✓	✓	✓	✓	✓	✓	✓	✓	✓
Superordinate Theme 2: Interaction with Immune Function									
Perceived Vulnerability vs. Invincibility	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vaccine Effectiveness	✗	✓	✓	✓	✓	✓	✓	✓	✓
Strengthening vs. Weakening of Immune System	✓	✗	✓	✓	✓	✓	✓	✓	✓
Superordinate Theme 3: The Role of Others									
Information Gathering	✓	✓	✓	✓	✓	✓	✓	✗	✓
Influence of Professionals in Decision Making	✓	✓	✓	✓	✓	✓	✓	✓	✓

behaviour in subsequent years, whereas those who reported an unpleasant experience were more likely to abandon the behaviour.

Well fortunately the experience I've got is that flu vaccine, the flu vaccine doesn't cause me any pain, I'll probably be in absolute agony next year now right enough (laughs) but it

hasn't caused me any pain in the past, it's been over very very quickly, just a little nick on the arm and bob's your uncle that' it sorted (participant 9, vaccinated)

The participant in the above extract seemed to minimise the personal burden associated with vaccination receipt in order to justify their repeated uptake of the vaccine. This is demonstrated through the use of phrases 'very very quickly', 'hasn't caused any pain'. The use of informal language such as 'just a little nick' and 'bob's your uncle' sought to make the experience seem simple, relaxed and unobtrusive. Participants seemed to seek out information and evidence in support of the decision they made, with the below extract indicating how this was achieved for an unvaccinated participant:

Vaccination decisions were relatively stable in this sample. For participants who were offered the vaccine for the first time, future behaviour patterns appeared to be established.

I: So what kind of things will you think about in the future if it's offered again?

I know I'll just no take it, and I'll just no fill in no forms because I just don't want side effects from it to be honest with you (participant 2, unvaccinated)

Participant 2's repeated use of the word 'just' shows a level of resistance towards considering the vaccine in future seasons. Establishing this pattern of vaccination refusal seemed to serve as a way of reducing the cognitive load associated with the decision-making process.

Across accounts, it seemed as though participants reflected on their past experience in a way which justified their current vaccination status. Since participant's actively sought out information in support of their decision, it is likely that vaccination behaviours will be reinforced and repeated in future seasons.

Rational vs. emotional decision making

Some participants seemed to go through a process of deliberation; whereas others arrived at a choice almost instantaneously. The below extracts highlight the decision-making process for two participants:

I was saying on the back burner in my subconscious 'I'm taking this' because I'm no getting any younger or that but I don't feel it, I'm fit and all that, but I just as I say I've never had the flu so I didn't bother, I was listening to both sides of the decision making and I just went that way (participant 3, unvaccinated)

I just took a chance because I thought I was better off without and it was all about trying it for the first time, do we want to try, don't we want to try, will we, won't we? So I ended up doing, it was much more than that (participant 7, vaccinated)

There was a sense that participants used internal dialogue to resolve ambivalence, although the success of this was limited as both participants seemed to make their decision somewhat impulsively, as indicated by the phrases 'just went that way' and 'just took a chance'. Other participants explicitly drew on gambling metaphors, further indicating that their decision was not the outcome of rational processing:

I just gambled and said naw, I just took a chance really, I took a risk (participant 3, unvaccinated)

I think that it's just that I'd rather take my chances and let my immune system fight these things off (participant 4, unvaccinated)

The use of the words 'gambled', 'chance' and 'risk' across these accounts suggests that some participants may have derived a sense of excitement from being unprotected from the virus. If they feel they 'got away' with being unvaccinated, this behaviour is likely to be reinforced and they will be discouraged from receiving the vaccine in future.

The emotion fear seemed to play a role in decision making for most participants; with some individuals appearing concerned about the consequences of contracting influenza while others seemed more fearful about the vaccination itself.

I regard myself quite a busy person in this hospital and I'm not keen to be spending days or even weeks off if I can avoid it so one little jab on the arm for 30 seconds or even less than that is well worth the effort I think (participant 9, vaccinated)

Participant 9 discussed how contracting the influenza virus would interfere with his ability to attend placements, a direct conflict with his self-identity of being 'quite a busy person'. There was a sense that receiving the influenza vaccine allowed this participant to feel in control of minimising his risk of influenza. Other participants were more fearful of potential adverse consequences of vaccination and this relevant to both vaccinated and unvaccinated individuals:

Well I was a bit scared of it at first and wasn't sure whether to take it or not because I had my own thoughts about it once you take it you're gonnae get the flu and I hadn't had the flu and I don't normally get the flu (participant 7, vaccinated)

I get quite paranoid about taking things obviously I get anxiety on things thinking that if I take something that it'll no agree wi us, but I did follow through and get it done (participant 6, vaccinated)

Fear of consequences contributed to a degree of hesitancy before receiving the vaccination. Through highlighting that he would not 'normally' experience influenza symptoms, it seemed as though worries about self-inducing an illness weighed on participant 7's decision. Participant 6 seemed to experience more intense fear about possible side effects as illustrated by his choice of words; 'paranoid' and 'anxiety'. His reference to 'following-through' suggests that he may have made a prior commitment either with himself or to someone else to take vaccine, and this bore influence on his decision.

Fear of needles was common in the sample. The extent to which this fear influenced decisions varied between participants as highlighted in the extracts below:

I don't like taking jags either, paranoid that the needle is gonna snap my vein, so I'm paranoid about that, I know it's not gonna snap, the things are solid, but I take paranoid when the thing goes into my vein, I don't like it (participant 5, unvaccinated)

Aww I just hate needles, absolutely hate needles

I: So how did you manage that then?

Emm, I just put it to one side and told myself it would be over in a minute and sure enough it was, it was a lot quicker. (Participant 7, vaccinated)

Participant 5 also used the word 'paranoid' to describe his emotional state. Although he attempted to mitigate his fears by stating 'the things are solid', he seemed unable to overcome this, leading to non-uptake of the vaccine. Participant's

repetition of 'hate' and use of the word 'absolutely' highlights strength of his dislike towards injections. However, he was able to use cognitive strategies to put his fear to one side, allowing him to receive the vaccination. There was an overall sense that participants feared adverse reactions and potential harm, however if they were motivated to receive the flu vaccine then they were able to overcome such fears.

Attitudes towards health

Decisions about whether to receive the seasonal influenza vaccine seemed to be influenced by individuals' general attitudes towards health protection.

There's also the fact that when you're offered the flu jag, you're healthy so you're no really affected by it as much. If say you could get jag when you actually had the flu that made you feel better, then you would probably take it, but when you're well you're no motivated to the same extent are you? (participant 4, unvaccinated)

If you've got something at the time then it's a good thing for the vaccination to cut off but (pause) I don't know

I: What do you mean?

Like if you've got a disease or something like the cold and you could get the flu jab or whatever (participant 2, unvaccinated)

The unvaccinated participants above described a lack of motivation to engage in preventative behaviours in the absence of illness. Participant 4's apathy is demonstrated through use of the phrases 'no really affected' and 'not motivated'. Participant 2 similarly described how he would be more open to receiving a vaccine at a time when he felt his health was under direct threat. There was a sense that these participants had short-term attitudes towards health, focussed on immediate symptom reduction as opposed to future health protection.

Some unvaccinated participants also made reference to how their personality influenced their attitudes towards vaccination and preventative health behaviours more generally:

I think it's in my nature to decline when it's no something that's going to have an immediate impact on my life and because it's an inconvenience or just because I see it as being unnecessary or whatever I see the reasons (participant 4, unvaccinated)

But I still probably wouldn't have taken it anyway to be honest with you, I'm too, I'm too stubborn, I've always been too independent and done things on my own instead of using people to help me, because I've always been like that (participant 3, unvaccinated)

Participant 4 seemed resistant to change as he set a high threshold; 'immediate impact on my life', for determining whether a health behaviour seemed worthwhile. Since he accepts this as part of his identity, or 'nature' it is likely that these beliefs and associated behaviours would be difficult to change. Similarly, participant 3 draws on personality characteristics that influenced his uptake of preventative healthcare, including traits of being 'stubborn' and 'independent'. His use of the word 'too' in relation to these qualities suggests that this participant is aware that his behaviour can become too extreme and therefore problematic; however, these behaviour patterns seem embedded and therefore difficult to shift.

Theme 2: Interactions with immune function

Participants held different views about whether they required a flu vaccination, grounded in subjective risk perceptions about their likelihood of contracting influenza. Within this superordinate theme, participants explored their perceived need for vaccination based on beliefs about their current health status. The subordinate themes were: perceived vulnerability vs. invincibility, vaccine effectiveness and strengthening vs. weakening of the immune system.

Perceived vulnerability vs. perceived invincibility

This sub-theme was relevant to all participants. Those who received the vaccine seemed to report greater perceived vulnerability to the influenza virus, whereas unvaccinated individuals described a sense of resistance, or invincibility to the illness.

You know about it, you get to hear about it and I just thought well I'm no at that stage yet, no for a while but when I got in here I thought maybe I am at that stage, so what the hell, I think I'll take it (participant 7, vaccinated)

Participant 7 described a shift in his perceived level of vulnerability, and this appeared to be related to his age as suggested by the phrases: 'at that stage', 'no for a while'. Something about being admitted to hospital seems to have prompted a shift in this participant's appraisal of his personal risk, and this may be related to his increased exposure to discussions about vaccination as he suggests he has gotten to 'hear about it' and 'know about it'. His enhanced perceptions of vulnerability to influenza seem to have prompted a spontaneous change in his vaccination decision making, as suggested by the phrase 'what the hell'. In the extract below from participant 9, the decision to receive the vaccine seemed to be more planned and rationalised by his high level of perceived vulnerability to influenza.

I mean I have asthma for example, so asthma is one of the groups that's advised, that's encouraged to take the flu vaccine ehh so I want to take it for that reason amongst others, also being in the hospital here we all live on top of each other so if somebody were to get a true flu virus that would go through the place like wildfire (participant 9, vaccinated)

This participant reported several factors that increased his perceptions of vulnerability to influenza. This individual seemed receptive to advice from professionals and motivated to protect his health, as he reported receiving the vaccine because it was 'advised' and 'encouraged'. Residing in an inpatient facility also impacted this participant's risk perceptions, with use of the phrases 'live on top of each other' and 'spread like wildfire'. In contrast to these views, unvaccinated participants reported a sense of resistance or invincibility to the flu virus.

Well I've never had any diseases or things like that, never had a disease of any kind, touch wood so I'm lucky, and I heal pretty quick. I always heal pretty quick if I've been cut or hit (participant 3, unvaccinated)

This individual suggests that he is resilient to contracting influenza based on his general lack of experience with illness. He uses absolutes in his language, 'never had a disease' and 'I always heal' to demonstrate confidence in his immune system being able to fight off illness. This individual may perceive vaccine acceptance as a sign of weakness, in direct contrast to the view he holds of himself as strong and lucky.

Perceived vaccine effectiveness

Across the accounts of both vaccinated and unvaccinated participants there was uncertainty about vaccine effectiveness. There was a sense that most participants felt it was partially effective, reducing the severity of symptoms without completely preventing flu.

I expect that I would still get the flu anyway, maybe a little less severe but not enough to make a difference (participant 4, unvaccinated)

It saves you in case end up getting the flu and if you end up getting the flu you can end up extremely well you know what I mean? So it helps in different ways and there's obviously a lot of people who end up getting the flu inside the hospital and if you end up catching it off them then you'll no get it as bad if you've get the flu vaccine so it's good that way (participant 6, vaccinated)

Participant 4 acknowledged that he may experience less severe symptoms from influenza if he were to take the vaccination, however, this in itself did not drive him to receive the vaccine. In a previous extract, this participant described how he was not motivated to utilise healthcare in the absence of illness symptoms. This idea appeared to be recurring, with participant 4 suggesting that a reduction in suffering was 'not enough' to encourage him to adopt the behaviour. Participant 6 on the other hand, also believed that the vaccine can reduce influenza severity; 'you'll no get it as bad'; however, he seemed to appraise this as a beneficial enough outcome to prompt receipt of the vaccine. His use of the phrases 'saves you' and 'good that way' indicate positive views held towards the vaccine. There was a sense that both participant's 4 and 6 felt that contracting influenza was unavoidable, as suggested by the phrases 'get the flu anyway', 'end up getting the flu' and 'end up catching it'. It was recognised across transcripts that there was an increased risk of contracting influenza due to the environment, however, vaccinated and unvaccinated individuals held different minimum thresholds for the expected benefits they would need to see before they were motivated to receive the vaccine.

Some of the uncertainty about the vaccination seemed to be related to difficulty in determining whether it was effective at an individual level. The following vaccinated participants reflected on how they were unable to tell whether they would have contracted the illness if they had remained unvaccinated:

I: How do you know it helps you?

Hmm, well because I've taken it now and I haven't had the flu yet, just a wee touch of a throat infection and then that was it so through trial and error I suppose, just try it and if it works out okay then you just trust don't you? You don't really know but you trust (participant 7, vaccinated)

I: So this time around when you were offered the vaccine, what did you think?

I did wonder is it as good as they say it is, does it work or no? You know I've never had the flu and I do wonder whether there is any truth behind them saying that the flu jab actually prevents the flu (participant 8, vaccinated)

Participant 7 was asked how he knows the vaccine helped him and he acknowledged that it was difficult to know for sure, as shown by his use of language in 'trial and error' and 'just try it'. For this participant, it seemed he was happy to 'trust' that

the vaccine was providing sufficient protection so long as he was not affected by severe side effects. Participant 8 also received the vaccine; however, there was a sense that he was less trusting of the vaccine's benefit and on the advice he had received about this. His use of the phrases 'I did wonder', 'any truth' and 'actually prevents' indicate these suspicions. His uncertainty also seems to be grounded in the belief that he had low susceptibility to influenza regardless of his vaccination status; 'I've never had the flu'. Although both participants queried the effectiveness of the vaccine due to the intangible and immeasurable outcome, they chose to receive the vaccine when offered, which indicates that absence of a visible outcome does not necessarily limit vaccine uptake.

Strengthening vs. weakening of immune system

Participants seemed to hold different ideas about whether the flu vaccine supported or weakened their immune system. Most vaccinated participants believed that the vaccine was helpful for their immune function while some (but not all) unvaccinated participants suggested that it can be beneficial to allow the body to naturally overcome illness.

I don't think that you necessarily need to take a vaccine, I think that it can be beneficial just to get the virus and let your system overcome it, I think that your immune system benefits from having to overcome virus like that (participant 4, unvaccinated)

In the extract above, participant 4 conveys the idea that the immune system could be strengthened through fighting infections, as shown by his choice of words; 'beneficial' and 'benefits'. It also seemed as though this individual was confident in his body's ability to successfully fight infection with the use of phrases 'let your system overcome' and 'having to overcome'. In contrast to this, some participants were more concerned about how their immune system would respond to the virus:

I just thought emm, obviously if you were to have that bug and you've got injected wi the bug, I just thought it would cause like a superbug in me (participant 6, vaccinated)

In the above extract, the participant 6 discussed concerns about taking the flu vaccine if he were to have an undetectable virus already in his system. There was a sense that he was anxious about possible interactions between virus strains; and his repeated use of 'I just thought' indicates that he may have created these ideas to fill gaps in his understanding about how the vaccine works. In the extract below, another participant hypothesised about how his immune system may respond to annual vaccination:

It wouldny really matter I suppose if it wasny different, if it was the same then I guess your immune system would get stronger and stronger and I guess there would be no chance of you getting the flu (participant 7, vaccinated)

The participant was asked how his vaccination decision would be impacted if the composition was different in following years. He seemed uncertain in his response as indicated by his use of the phrases 'I suppose' and 'I guess'; however, he concludes that there would be a sense of progressive protection associated with taking the same vaccine each year. This is indicated through his use of the phrases 'stronger and stronger', up until the stage where he felt complete protection against the virus would be

achieved. Misconceptions about gaining eventual immunity from influenza would likely cause this individual to continue receiving the vaccine. Across all extracts, there was a sense that participants were uncertain about how vaccines affected their immune system, leading them to generate their own ideas. This was indicated by language such as 'I think', 'I just thought', and 'I guess'. Further examples of individuals drawing on their existing knowledge are demonstrated in the extracts below, where flu vaccination is compared to antibiotic resistance:

You're taking the flu injection to boost your immune system right and you take antibiotics to boost your immune system, and when antibiotics were developing and first developing and penicillin first come out, they didn't know that in years to come it would start having a lesser effect on people and they wouldn't work quite so often (participant 1, unvaccinated)

Obviously antibiotics, they can end up like becoming resistant to some infections so you end up taking, I dunno (pause) I don't know if it's vica versa with the flu vaccination (participant 6, vaccinated)

In both extracts, participants directly compared influenza vaccination to antibiotic resistance, highlighting concerns about diminishing effectiveness. Participant 1 seemed to harbour some mistrust in the offering of vaccines, and there was a sense that he felt the long-term implications remained unclear. His use of the phrase 'they didn't know' suggests that trust in health professional recommendations has been hindered by the belief that they advocated for antibiotic use without an understanding of the long-term consequences. Participant 6 also seemed to hold similar concerns; however, there was a sense of uncertainty and hesitancy in his speech as shown through pausing and use of 'I dunno' and 'I don't know', with this lack of confidence seeming to prevent him from changing his vaccination decision.

Across extracts within this superordinate theme, participants tried to make sense of their perceived need for vaccination. There was an overall feeling of uncertainty amongst participants about the physiological effects of the vaccine. Individuals seemed to create theories based on anecdotal evidence and their existing understanding of other medical treatments, highlighting the need for further information to address misconceptions.

Theme 3: The role of others

Vaccination uptake seemed to be influenced by social processes, and this concept was explored within the final superordinate theme. Two sub-themes were formed; information gathering and the influence of health professionals.

Information gathering

Individuals drew on personal experience to inform their vaccination decision; however, most participants also relied, at least in part, on information gathered from additional sources.

I: How did you come to thinking that you might get unwell with it?

Just stories I heard in here, just stories I've heard outside as well. I was gonna take it and then I decided against it (participant 2, unvaccinated)

I was just swayed by the guys and the lassies that said they are injecting you with actual germs and that (participant 3, unvaccinated)

These participants lacked personal experience of receiving the influenza vaccine, and therefore placed value on information from informal sources (the grapevine). Both participants used the word 'just' in describing how their decision was swayed by those around them. Participant 2 refers to the information he gathered as 'stories', implying a level of awareness that these could be dramatised and not necessarily factual. Participant 3 explicitly described how information about vaccine composition deterred him. His use of the phrase 'actual germs' suggests a level of disgust which may have driven his decision to decline vaccination.

In contrast to individuals who relied on informal sources of information, others placed emphasis on information obtained from official channels such as news coverage. These participants tended to have established patterns of vaccination behaviour gained over years of being offered the vaccine.

The flu vaccine, they tell you it only works for one in five people anyway, it's in the paper (participant 5, unvaccinated)

I'm always looking for it because there's usually a good advertising campaign on the television about the advert for the flu vaccine for the season, there's usually news programmes on (participant 8, vaccinated)

In the above extracts, participants 5 and 8 shared information they had gained from the media about influenza vaccination. There was a sense that participants selectively attended to messages that fitted with their prior opinions and vaccination intentions.

The influence of health professionals in decision making

Health professionals appeared to have influence upon the decision-making process for most participants. Individuals accepting the vaccination generally reported receiving encouragement from health professionals and trusted guidance they received.

I: What kind of people do you tend to listen to?

Nurses mainly, nurses mostly erm older nurses just older nurses really, I ask them what it's been like for them, I ask them if they've stayed immune or if they've ended up getting the bloody flu because they've taken the injection (participant 7, vaccinated)

In the above extract, participant 7 described how he sought guidance from staff who he felt he could relate to, valuing input in particular from 'older' nurses. His repetition of 'I ask them' suggests that he was proactively approaching staff to ask questions and valued hearing about their experiences to inform his decision. A further two vaccinated participants described an apparent knowledge imbalance between themselves and staff.

If they say to get the vaccine and say it's going to be better in the long run then I tend to think of that as true

I: Why do you think they know better?

Because they've done millions of studying and they know better (participant 8, vaccinated)

I think it's important because well they are the experts in the field, I'm sure they don't go out saying these things without good reason and facts (participant 9, vaccinated)

In both extracts, participants assumed that their own knowledge about influenza vaccination was inferior to that held by health professionals. Participant 8 described accepting messages from staff about the benefits of vaccination as 'true', indicating a high degree of trust in those professionals. For both participant 8 and 9, the apparent expertise of staff gained through academic study helped to determine their level of trust, with participant 5 stating that professionals have done 'millions of studying' and participant 9 considering them 'experts'.

The degree to which health professionals were perceived by participants as being caring vs. controlling also seemed to impact how messages promoting vaccination uptake were received.

It's just that you are caring about us you know, getting us the jab tae stop us catching the flu (participant 3, unvaccinated)

There was a sense of a power imbalance suggested through Participant 3's use of defining roles 'yous' vs. 'us'. Although he didn't receive the vaccine, this individual perceived the offering of the flu vaccine as professionals relating to patients in a caring way. Contrastingly, in the extracts below, participants seemed to interpret the actions of health professional and the organisation as whole in more authoritative way:

Although they're geeing us the choice to get the flu jab or not (long pause) I don't know (long pause). I like to play ball with the authorities and if they ask me to do stuff like that and I take nothing to do with it, well I might need them one day and they might say 'I'm no bothered with you' so I like to be part of something (participant 8, vaccinated)

I was like 'I don't want the flu jag' and they were like 'if you just take it' and I was like 'I don't want it' and tried to get oot the room quick, cos if I don't see the point, if you're saying naw once what do they no understand about it? As I say I think they are trying to force you into getting it (participant 5, unvaccinated)

Both participants 8 and 5 seemed to feel they were being coerced into receiving the vaccination. These participants differed in vaccination status, which suggests they responded differently to perceptions of being controlled, with participant 8 willingly adopting the recommended behaviour, or 'playing ball', while participant 5 actively resisted. Use of phrases such as 'the authorities' and 'trying to force' is suggestive of a power imbalance between patients and providers. Participant 8 explicitly shared concerns about his future needs not being met as consequence of him not engaging in the recommended behaviour. It is difficult to ascertain whether his feeling of being controlled stems from the inherent nature of residing in a secure facility, or whether it has arisen from specific interactions with professionals. There was a sense that participant 5 was more sensitive to the actions taken by professionals recommending the influenza vaccine. He seemed to view their follow-up questions as a direct attack on his sense of autonomy and there was a sense of hostility and rebellion in his response.

Across these extracts, interpretations of health professional actions varied between participants, and this was not necessarily related to vaccination status. Individuals responded differently to feelings of being coerced by the organisation. Some participants seemed to accept this while others adopted a defiant response, fuelled by anger and a sense of injustice.

Discussion

This study aimed to identify predictors of seasonal influenza vaccination intention and behaviour among inpatients in a secure mental health service. It also sought to explore participant experiences of being offered the vaccine in this context. Findings from regression analyses indicated that past behaviour, vaccination knowledge and cues to action were significant statistical predictors of vaccination intention. These variables predicted approximately 75.7% of the variance in vaccination intentions. Further support was found for the existence of the intention-behaviour gap, as cues to action remained the only significant predictor of vaccination behaviour, explaining approximately 67.9% of the variance. Quantitative results were supported and expanded upon by qualitative analyses where three main themes were formed; Managing Decisional Conflict, Interaction with Immune Function, and The Role of Others. Within 'The Role of Others' theme, some participants discussed how health professional recommendations influenced their vaccination choices, supporting the finding that cues to action were important among this patient population; however, the impact of other social processes, including the opinion of peers were explored. Similarly, vaccine knowledge was identified as a significant predictor of vaccination intentions in the statistical analyses, while specific misconceptions about how the vaccine is absorbed by the body emerged in the theme 'Interaction with Immune Function'.

Previous studies have linked misconceptions, particularly about whether the vaccine can cause influenza, to reductions in uptake (Brewer et al., 2017; Lewandowsky et al., 2012; Schmid et al., 2017). The current study found support for the influential role of vaccine knowledge in shaping intentions, but not for predicting vaccination behaviour. It is nevertheless important to continue trying to improve understanding of the influenza vaccine, as findings from the IPA analysis showed how potential gaps in participants' knowledge influenced vaccination decision making. In the absence of factual knowledge, participants made assumptions about how the vaccine would impact their body, drawing on anecdotal beliefs, and in some cases making comparisons with antibiotics.

Lorenz et al. (2013) reported that beliefs about effectiveness were associated with vaccine uptake among a sample of patients with mental illness. The present study did not identify a significant relationship between vaccine confidence (as measured by HBM costs, HBM benefits and TPB attitude), and either intentions or behaviour. Analysis of interviews showed that while most participants actively weighed up personal pros and cons associated with vaccination uptake, their views were often not polarised and there was a high level of uncertainty surrounding the personal benefits of vaccination. For example, both vaccinated and unvaccinated individuals questioned whether the vaccine was effective, with most participants concluding that it was 'partially' effective.

Fear and worry seemed to be influential in determining vaccination uptake. Eliciting fear has been explored as a potential strategy for increasing vaccination uptake (Brewer et al., 2017; Leventhal et al., 1965). However, recent reviews have found limited support for the use of fear-appeal interventions in improving vaccination coverage (Tannenbaum et al., 2015). There are also ethical considerations about the use of such techniques, particularly in services treating patients with severe mental illness.

Messages eliciting fear would likely increase levels of distress, anger, or resistance among this population. Findings from the IPA analysis highlighted how some individuals already harboured mistrust towards health professionals, feeling controlled by the inherent nature of their detainment in a secure service. Therefore, the use of such interventions would likely be counterproductive both in terms of effectiveness and in developing positive relationships between health professionals and patients. An alternative approach could be to make use of decision aids. These tools prompt individuals to consider the potential benefits and harms associated with the behaviours, often including numerical estimates of their likelihood. Such tools support rational thinking and encourage patients to make an informed choice about vaccination receipt. The evidence for the effectiveness of decision aids in increasing vaccination coverage remains unclear; however, studies employing these tools report improved vaccine knowledge and reduced decisional conflict (Stacey et al., 2017, Brewer et al., 2017).

The present study did not find that either perceived behavioural control (PBC) or self-efficacy predicted vaccination uptake. Other studies have reported similar findings, and it is argued that PBC and self-efficacy may be less important in the context of vaccination decision making as it is a single action that does not involve the same degree of planning and self-regulation as other behaviours (Chapman & Coups, 1999; Cheney & John, 2013; Myers & Goodwin, 2011).

In terms of variables drawn from social cognition models, 'cues to action' remained the only statistically significant predictor of seasonal influenza vaccination intentions and behaviour. This highlights the integral role that health professionals play in determining vaccination uptake among inpatients in a secure forensic mental health service. Within the 'The Role of Others' superordinate theme, the ways that health professionals influenced patient vaccination decision making were further explored. Some participants perceived the offering of the vaccine as a caring action by health professionals. They trusted the advice offered by staff and felt that the qualifications held by health professionals entitled them to provide guidance about vaccination uptake. Conversely, some participants felt controlled by staff in the organisation. One participant explicitly described feeling pressured into taking the vaccine, and another more implicitly shared concerns about his care and treatment being affected if he were to decline the vaccination. It is important to acknowledge the inherent power imbalance between patients and staff in secure mental health services, and to recognise the importance of balancing health recommendations with respect for patient autonomy. Motivational Interviewing may be an appropriate communication style for addressing vaccination hesitancy, with the patient-centred nature of this approach minimising the likelihood that patients feel coerced (Leask et al., 2012). Communication skills that are part of this approach focus on working with resistance, identifying motivation to be vaccinated, and evoking and reinforcing change talk (Miller & Rollnick, 2013). In terms of resource effectiveness, such an intensive intervention may be most appropriately used with individuals who resist other forms of medical care and treatment, or for those where the need for vaccination is especially great (e.g. those belonging to an additional at-risk group).

Strengths, limitations and recommendations

There were several strengths to this study, including the use of a mixed-methods design which allowed theoretical models to be tested and patient experiences explored. The adoption of a prospective design for the quantitative part of the project was also strength, as this minimised the likelihood that questionnaire responses were affected by participants' motivation to avoid decisional regret. This was particularly relevant since conformation bias emerged as a subordinate theme within the interviews. Use of an objective measure of vaccination behaviour was advantageous as this helped to minimise the risk of recall bias.

Overall, the findings of this study have helped to clarify factors that influence seasonal influenza vaccination behaviour among inpatients in a secure mental health service. It is important to note as a limitation that the vaccination rate in the research sample was higher than across the hospital as a whole, which may have introduced bias into the analyses. Although all eligible patients were approached about the study, those holding favourable vaccination views were more willing to take part.

Multi-site studies should be considered in future to increase sample size as it was not possible to detect smaller effects in the current study. While it is possible that the limited sample size meant that effects were not detected, the finding that cues to action was the only theoretical construct to predict vaccination behaviour raises questions about the appropriateness of using the HBM or TPB models to understand vaccination behaviour among inpatients in secure mental health services. Going forward, it may be useful to apply broader frameworks such as the COM-B model (Michie et al., 2014) or Social Ecological Model (Bronfenbrenner, 1986) to aid our understanding of the individual, social and environmental predictors of vaccination in this population. The importance of health professionals' input into vaccination decision making was highlighted in the current study and this could be explored further in future research. It may also be beneficial for the role of emotions, risk perceptions and decisional conflict to be investigated, as these emerged as influential factors in the qualitative analysis. In terms of the IPA process, one researcher was primarily responsible for coding data and generating themes. The reliability of results would be improved if a second coder had checked the complete analysis.

Conclusions

This study explored seasonal influenza vaccination behaviour in an under-researched high-risk group. Health professionals were found to play an integral role in shaping the vaccination behaviour of patients in secure mental health services. Structured conversations, use of decision aids and motivational interviewing were recommended as potential strategies for promoting uptake.

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Disclosure statement

There were no potential conflicts of interest to declare.

Data availability

Participants did not consent for their data to be shared publicly, therefore supporting data is not available.

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