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Recipient of a total of 45 awards / honours

Research Activities:

- Publications in Medline / Scopus Indexed journals: 67
- In press: 2
- Completed Research (yet to be published): 10
- Ongoing Research: 16

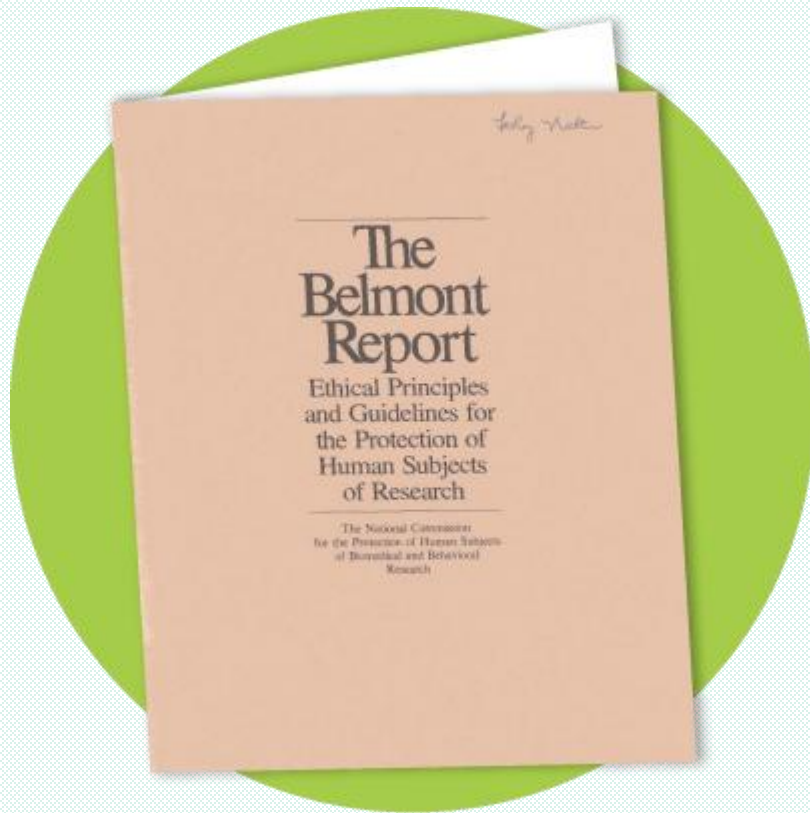
Funding Received: India - 3.75 crores INR
(approx.); Foreign - 8.16 crores INR equivalent
(approx.)

Peer Reviewer:

- Journals: BMJ Open, BMC Central, PloS One, J Phys Act Health, Polish psychological bulletin
- Funding agencies: DBT – India & Medical Research Council - UK

The Belmont Report (1979)

The three basic ethical principles



Respect for persons (Autonomy)

Beneficence

Justice

Do pandemics impact ethical principles?



Vaccine - a key prevention strategy of any contagion

People often mandated to take a vaccine for the 'greater good' of humanity

Can impact autonomy

Vaccine Hesitancy – The Silent Killer?

Pneumococcal Vaccine – part of Universal Immunisation program → children

Dec 2021 → 169 million doses → ↓ mortality due to Pneumococci by 60%

Elderly → No UIP

National Technical Advisory Group on Immunization (NTAGI) → recommends for all elderly

Hesitant to take a vaccine – concerns regarding safety, effectiveness, costs *etc.*

24th FERCAP Annual Conference 2024

24-27 Nov 2024

Parallel Session 3C – 3.6: Ethical Issues in Public Health Research (25 Nov 2024)

Can a Discrete Choice Experiment (DCE) help understand Pneumococcal vaccine hesitancy among elderly? A study from India

Speaker: Dr. Jeffrey Pradeep Raj, Associate Professor, Division of Clinical Pharmacology, Kasturba Medical College Manipal, Manipal Academy of Higher Education, Manipal, India

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Can a Discrete Choice Experiment (DCE) help understand Pneumococcal vaccine hesitancy among elderly? A study from India

Jeffrey Pradeep Raj, Inesh Vij, Likhith Prasanna
Department of Pharmacology, KMC Manipal, India



SIDCER
Globalizing Ethics for Health Research

Presentation Overview



- What is a DCE?
- Study Objectives
- Methods and Study procedures
- Results
- Discussion
- Conclusions

What is a DCE?

An experiment commonly used by companies (FMCG or white goods) for marketing purpose

A quantitative/ Statistical technique that elicits individual preferences regarding any goods or services. E.g., Whether vaccine A or Vaccine B

Preferences can be broken down into separate characteristics – called “attributes” [E.g., safety, effectiveness, etc.,] which vary across different levels (E.g., effectiveness - 50%, 70% or 90%).

Helps in identifying which attribute primarily influence the decision to take one vaccine over the other

Objectives

Primary:

To identify the key attributes of Pneumococcal vaccine for its acceptability and their willingness to pay (WTP) for the same by the general elderly population of India

Secondary:

To estimate the burden and predictors of pneumococcal vaccine hesitancy among the Indian elderly

Methods - overview

Ethics	IEC Reference Number: 365/2024 CTRI Reference Number: CTRI/2024/10/075561. Written informed consent was obtained digitally Conducted in accordance with ICH-GCP, and ICMR ethics guidelines 2017
Study Design	Cross sectional survey at single time point
Sample size	Total of 2000 participants. No formal sample size estimation as it is a DCE

KASTURBA HOSPITAL
MANIPAL
(An associate Hospital of M.D.U., Manipal)

Kasturba Medical College and Kasturba Hospital
Institutional Ethics Committee
(Registration No. ECR/146/InstKA/2013/RR-19)
(DHR Registration No. EC-NEWINST/2022KA/0042)

Communication of the decision of the Institutional Ethics Committee

Wednesday 14th August 2024 **IEC1 : 365/2024**

Project title	Prediction of factors influencing the elderly population of India in accepting any Pneumococcal vaccination and their willingness to pay – an online discrete choice experiment study.
Principal Investigator	Dr. Jeffrey Pradeep Raj
Co Investigators	Dr. Likhith P
Name & Address of Institution	Division of Clinical Pharmacology, Department of Pharmacology, Kasturba Medical College Manipal, Department of Pharmacology, Kasturba Medical College, Manipal.
Status of review	New
Date of review	13.08.2024
Decision of the IEC	Approved with modifications till 31.10.2025.
IEC Approval Date	16 OCT 2024

Additional Recommendations:

- CTRI Registration

Dr. Muralidhar M Kulkarni
MEMBER SECRETARY – KMC & KH IEC

ISOP: The chairperson endorses the comments before communicating to the investigator. The Member Secretary signs on behalf of the Chairperson on the IEC certificate.

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Kasturba Medical College, Manipal - 576104, Karnataka, India. Phone : +91 - 0820 - 2933522. Fax : +91 - 0820 - 2571927. Email : iec.kmc@manipal.edu



Study Setting

The survey link has been live from 21 October 2024

Interim analysis with data until 08 Nov 2024

Pneumococcal vaccine → not yet mandated by GoI

Administered only in high-risk individuals

Phases of the Study

I. Designing of the DCE

- Decide on the attributes and levels under each attribute
- Generate multiple vaccines pairs using various permutations and combinations of these levels
- Each of the vaccine (Vaccine A or Vaccine B) will have all the attributes mentioned but will have just one of the many levels

II. Conduct of the Survey

- Respondents assessed for eligibility to participate
- Survey containing the DCE was answered by the respondents and data analyzed

DCE Designing: Attributes and Levels for a hypothetical Pneumococcal vaccine

Attributes	Levels
Effectiveness	50% protection/ 70% protection/ 90% protection
Duration of protection	1 year/ 5 years/ 10 years/ Lifelong
Number of Injections	One/ Two
Common Side effects anticipated	No side effects/ Injection site pain, redness and swelling for 1-2 days/ Fever or body pain for 1-2 days
Where the vaccination will be administered to you	At Home/ At Hospital or Clinic /At place of work
Cost per Injection	Free/ Rs.1000/ Rs. 2000/ Rs. 3000/ Rs. 4000 (1USD = 86 INR)

DCE Designing: An example DCE question

Attributes	Vaccine A	Vaccine B
Effectiveness	50% protection	70% protection
Duration of Protection	Lifelong	10 years
Number of Injections	2	1
Common side effects anticipated	No common side effects	Injection site pain redness and swelling for 1-2 days
Vaccine administration	At Home	At place of work
Cost Per Injection	Rs.3000	Free

Which among the above vaccines would you prefer?

- Vaccine A
- Vaccine B
- Neither vaccine/No vaccine

DCE Designing: The final construct

Using permutations & combinations of levels, no. of unique vaccine pairs (choice sets) obtainable = 582,660

Of which 24 pair wise choice sets were constructed using a D-optimality algorithm using STATA software V 16.0

All choice sets checked for logical plausibility and no manual alterations were done

24 choice sets were randomly assigned to four blocks, each of which had 6 choice sets; Each participant received one block randomly

Validity of the DCE

I. Internal validity

- Trap Question
- Hypothetical vaccine pair with one of the vaccine pair unambiguously better than the other pair
- It was fixed for all participant and was the 6th DCE question

II. External Validity

- Opt-out option of neither vaccine
- Respondents not forced to fit their responses as per the given DCE → Generalizability issues

DCE Designing: The Trap Question

Attributes	Vaccine A	Vaccine B
Effectiveness	50% protection	90% protection
Duration of Protection	1 year	Lifelong
Number of Injections	2	1
Common side effects anticipated	Fever, body pain for 1-2 days	No common side effects
Vaccine administration	At Home	At Home
Cost Per Injection	Rs.4000	Free

Which among the above vaccines would you prefer?

- Vaccine A
- Vaccine B
- Neither vaccine/No vaccine

Conduct of Survey: Inclusion Criteria

All consenting elderly of any sex, age 60 years and above

A citizen of India who has NOT been residing >3months outside India in the past 6 months (self-reported).

Survey forms that are filled 100 percent

Conduct of Survey: Exclusion Criteria

Non-resident Indians (NRIs) and overseas citizen of India (OCIs)
[despite having a Passport or dual citizenship]

Those who do not answer the trap question correctly

Incompletely filled survey forms [anything less than 100 percent]

Conduct of Survey: Study Procedures

➤ Online link circulated in various digital platforms
Hybrid Mode – Self administered / volunteer administered

↷ On clicking the link → access to PIS & ICD document in 6 language choices

After consent, access to survey

↷ Survey had 3 sections (a) Socio-demographic (b) past medical, flu and COVID- 19 related history (c) DCE with 6 hypothetical vaccine pairs + 1 trap question

Conduct of Survey: Statistical Analysis Plan



Socio-demographic characteristics summarized using descriptive statistics



Mixed logit regression (MXL) - to identify the key attributes of COVID-19 vaccine for acceptability



Burden of vaccine hesitancy expressed as proportion of participants choosing the opt-out option

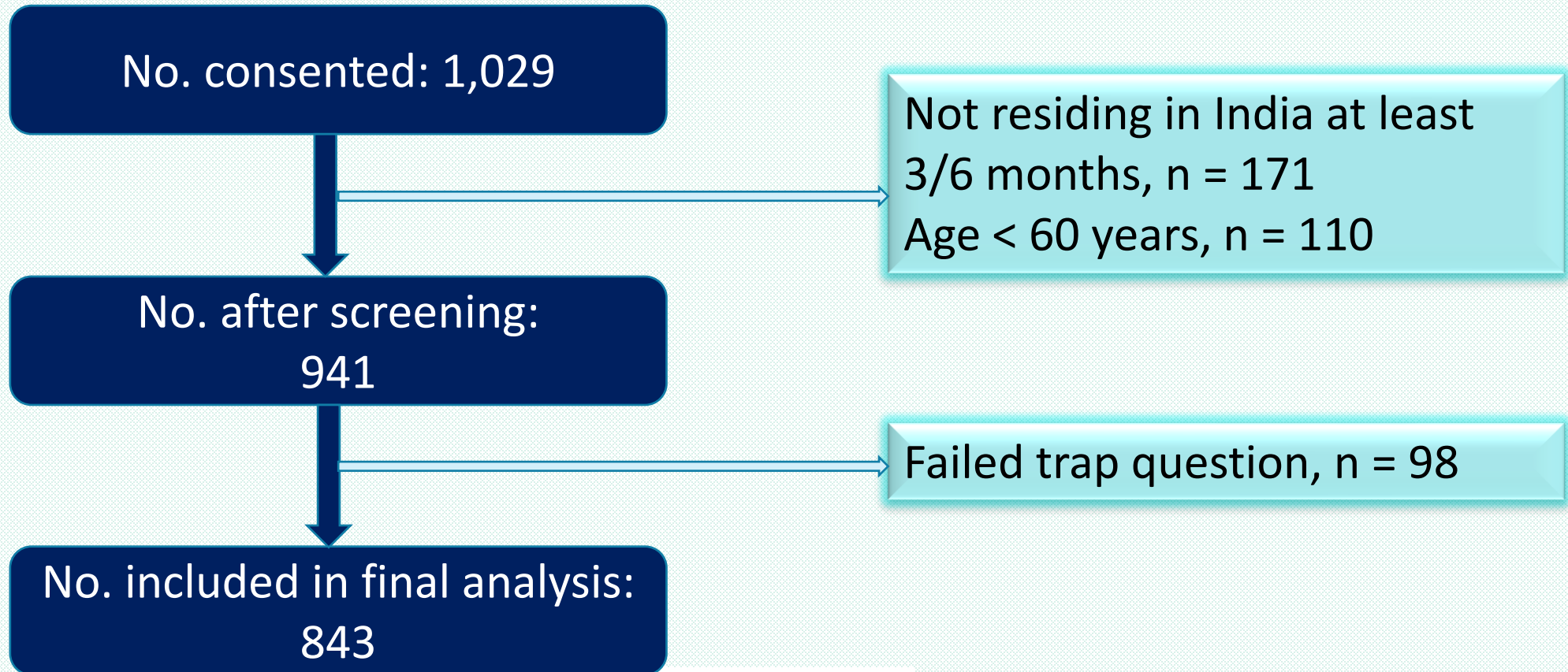


Predictors - univariate and multivariate binary logistic regression



Statistical significance $P < 0.05$

Results: Study Flow Diagram

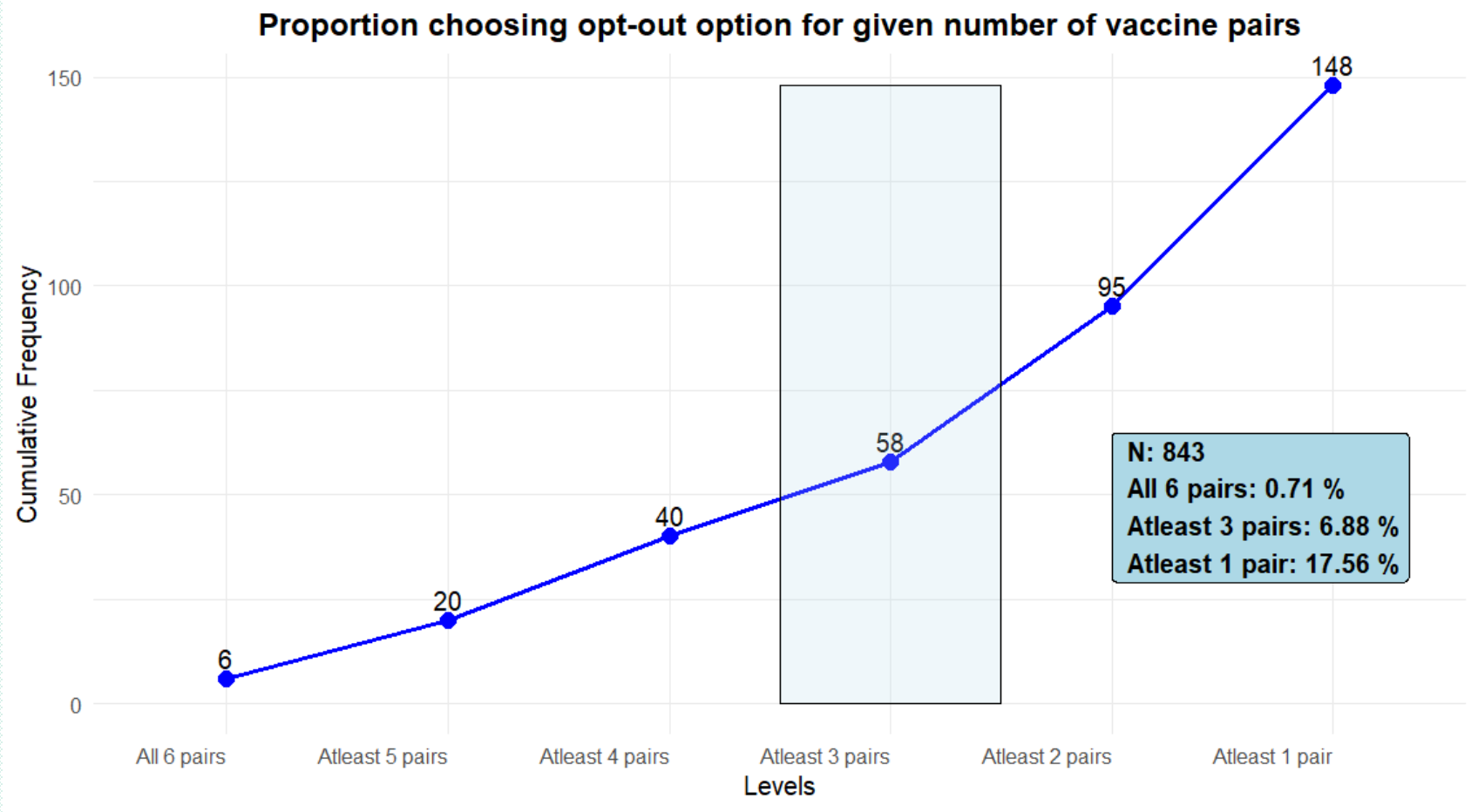


	Number	Percentage
▪ Age (Mean ± SD)	67.85 ± 7.28	
▪ Sex		
▪ Male	427	50.5
▪ Female	414	49.1
▪ Others	2	0.23
▪ Marital status	28	3.32
▪ Unmarried	54	6.40
▪ Separated	54	6.40
▪ Widow/ Widower	126	14.94
▪ Married and living with spouse	586	69.51
▪ Locality of living		
▪ City	483	57.29
▪ Town	173	20.52
▪ Village or Hamlet	187	22.18
▪ Education		
▪ Illiterate	85	10.08
▪ Primary School (Up to class 5th Pass)	75	8.89
▪ Middle School (Class 6th, 7th & 8th Pass)	57	6.76
▪ High School (Class 9th & 10th Pass)	66	7.82
▪ Higher Secondary (PUC or Class11th & 12th Pass)	90	10.67
▪ Diploma / Certificate course	40	4.74
▪ Degree (UG / PG)	239	28.35
▪ Professional Degree, Lawyer, Chartered accountant, Engineer, PhD degree holder)	191	22.65

<ul style="list-style-type: none"> ▪ Health care worker <ul style="list-style-type: none"> ▪ Yes ▪ No 	711	84.34
	132	15.65
<ul style="list-style-type: none"> ▪ If health care worker, role (n=1296) <ul style="list-style-type: none"> ▪ Doctor ▪ Nurse ▪ Office /any other role that does NOT involve interaction with patient/patient samples/ contact of potentially infective articles. ▪ Pharmacist ▪ Ward boy/ sanitary worker/ Ward Clerk ▪ Other role involving patient interaction/ patient samples/ other potentially infective articles like clothes, bed sheet, equipment's etc. ▪ Monthly total income of all family members <ul style="list-style-type: none"> ▪ Lower class ▪ Lower middle class ▪ Middle class ▪ Upper middle class ▪ Upper class 	96	11.38
	12	1.42
	8	0.94
	5	0.59
	5	0.59
	6	0.70
	41	4.86
	39	4.63
	110	13.05
	138	16.37
	515	61.09

ATTRIBUTES (n = 843)		MAIN EFFECTS MODEL					WILLINGNESS TO PAY ANALYSIS		
		Coefficients (SE)	Odds ratio	95% CI LL	95% CI UL	P-Value	Coefficients	95% CI LL	95% CI UL
Effectiveness	50% protection	-	-	-	-	-	-	-	-
	70% protection	0.71(0.05)	2.04	1.87	2.23	<0.001	2276.81	1858.96	2694.65
	90% protection	0.64(0.06)	1.90	1.68	2.15	<0.001	2041.55	1527.57	2555.54
Duration of protection	1 year	-	-	-	-	-	-	-	-
	5 years	1.02(0.07)	2.78	2.44	3.16	<0.001	3253.99	2663.95	3844.04
	10 years	0.91(0.05)	2.48	2.25	2.75	<0.001	2898.20	2434.09	3362.31
	Lifelong	1.28(0.07)	3.60	3.15	4.12	<0.001	4084.25	3328.49	4840.01
Dosage	1 dose	-	-	-	-	-	-	-	-
	2 doses	-0.54(0.05)	0.58	0.53	0.64	<0.001	-1721.74	-2161.59	-1281.88
Side effects anticipated	No common side effects	0.07(0.06)	1.07	0.95	1.20	0.293	207.22	-170.40	584.83
	Infection site redness and swelling for 2 days	-0.003(0.1)	1.00	0.86	1.16	0.969	-9.30	-481.64	463.04
	High fever and severe body ache for 2 days	-	-	-	-	-	-	-	-
Location of injection	Injection at home	-	-	-	-	-	-	-	-
	Injection at workplace	0.002(0.06)	1.00	0.89	1.12	0.964	8.31	-355.66	372.27
	Injection at hospital	0.12(0.06)	1.13	1.00	1.28	0.047	391.64	18.06	765.22
Cost per injection		-0.0003139	1.00	1.00	1.00	<0.001			

Results: Burden of Vaccine Hesitancy



Proportions
All 6 pairs: 0.71%
≥ 3 pairs: 6.88%
≥ 1 pair: 17.56%



Results: Predictors of Vaccine Hesitancy

Variables (N = 843)	Multivariate Analysis	
	aOR (95% CI)	P value
Marital Status Separated (vs Married & Living with spouse)	26.21 (3.07, 223.81)	0.003
Residing in Village (Vs city)	6.57 (1.36, 31.84)	0.019
Illiterate	794.36 (1.42, 445448.10)	0.039

Discussion (1/2)

Our DCE suggested, longer duration of protection and more effective vaccine → most preferred. Cost least important attribute

Over usual characteristics like efficacy and safety, duration of protection stood out → long-lasting immunity as a way to enhance overall quality of life

Higher value, potentially reducing the need for repeat vaccinations → financial & logistical impact

Discussion (2/2)

Cost of the vaccine was a significant but least important attribute →
Similar to the report by Dong *et al.* from China

Burden of vaccine hesitancy (chose opt-out option for $\geq 3 / 6$ pairs) =
6.88% → approximately ↓ by half than a decade ago during H1N1
pandemic (2009)

Significant proportion still is hesitant → Balance respecting personal
autonomy with promoting public health

Strengths

Large Sample size (Final analyzed n = 843)

Representative of entire nation (28 states and 8 union territories)

India is a nation of diverse cultures/ traditions and geographical topography → generalizable to other LMICs

Limitations

Non-probability sampling → potential sampling bias; mitigated by a large sample size

Although vaccine pairs were hypothetical → respondents could have linked one or more of the given attributes to the existing commercially available vaccines → ?Decision influenced based on other attributes not listed in this study

Conclusions

Most important attributes that influence decisions were duration of protection and effectiveness

The significant predictors of vaccine hesitancy were male sex, upper and middle socio-economic class, and presence of comorbidities such as diabetes, heart problems or asthma.

Before making it mandatory - Balance respecting personal autonomy with promoting public health



Acknowledgements



- Md. Hamza – Independent statistician

