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Brief Original Report

Disparities in pneumococcal and influenza immunization among older adults in Israel: A cross-sectional analysis of socio-demographic barriers to vaccination ☆

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ABSTRACT

Objective. Vaccinations against influenza and pneumonia reduce morbidity and mortality among older adults. We examined vaccination rates among Israel's diverse geriatric population to determine socio-demographic barriers to vaccination.

Methods. This study is a quantitative data analysis with a cross-sectional design, comprising 136,944 patients aged 65 and older enrolled during 2008–2009 in the Maccabi Healthcare Services, one of Israel's four sick funds (preferred provider organizations). We conducted multivariable logistic regression analyses to determine the association between vaccination status and socio-demographic characteristics, including age, gender, rural residency, socio-economic status, region of origin, immigrant status, and Holocaust survivorship. We controlled for potential confounders, including comorbidities, primary care visits and hospitalizations, as well as the physician's gender and region of origin.

Results. Overall, vaccination rates were 72% for pneumonia and 59% for influenza. The strongest socio-demographic barriers to vaccination included female gender, rural residency, low socio-economic status, recent immigration, and being from or having a physician from the Former Soviet Union.

Conclusion. Efforts to further explore barriers to influenza and pneumococcal vaccination and interventions to reduce disparities in vaccination rates should focus on the sub-groups identified in this paper, with careful thought being given as to how to overcome these barriers.

Introduction

Background

Geriatric vaccination rates remain suboptimal in developed countries, despite broad calls for adults aged 65 and older to receive a single pneumococcal vaccination (PV) and annual influenza vaccination (IV) to prevent morbidity and mortality (Blank et al., 2009; Endrich et al., 2009; Lu and Nuorti, 2010). In Israel as well, vaccination rates among older adults lag behind national target goals of 90% (Rosenberg et al., 2003), despite universal national health insurance, paid for via taxes and provided by four privately-run government-funded non-profit sick funds (preferred provider organizations/PPOs), which provide both vaccinations at no or low cost (Chernichovsky, 2009). In 2010, vaccination rates for adults aged 65 and older in Israel were 57% for IV and 70% for PV (National Program, 2012).[1]

Socio-demographic factors such as age, gender, socio-economic status (SES), race/ethnicity, and immigration status may serve as barriers to vaccination (Haviland et al., 2011; Rangel et al., 2005; Zimmerman et al., 2003). Health beliefs and past experiences with vaccination also play a role in the decision to be vaccinated (Tsutsui et al., 2010). Understanding disparities can determine priorities for further research and interventions to increase vaccination rates and ultimately decrease morbidity and mortality in the geriatric population.

☆ The work was conducted while the author was at the Mount Sinai School of Medicine and The Hebrew University of Jerusalem, Israel.

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[1] PV was defined as the percentage of those aged 65–71 who had received PV at least once after the age of 65 or in the last five years.

Table 1
Socio-demographic characteristics by pneumococcal vaccination status, Israel, 2004–2009; n = 136,944.

Characteristic	Total N	%Pop	%PV	PR	AOR (95% CI)
Age (years)					
65–74	81,767	59.7	70.4	Ref	Ref
75–84	41,783	30.5	76.6	1.27	1.23 (1.19–1.27)
85 and up	13,394	9.8	69.9	0.98	1.01 (0.96–1.06)[a]
Gender					
Female	76,080	55.6	69.7	0.93	0.72 (0.70–0.74)
Male	60,864	44.4	75.4	Ref	Ref
Region of Israel					
Rural	48,010	35.1	69.7	0.95	0.87 (0.84–0.90)
Urban	88,929	64.9	73.6	Ref	Ref
SES[b]					
Low	9794	7.2	69.9	0.78	0.79 (0.74–0.84)
Low–Mid	30,159	22.0	68.7	0.75	0.79 (0.76–0.83)
Mid–High	51,135	37.3	71.5	0.82	0.84 (0.81–0.87)
High	32,745	23.9	76.5	Ref	Ref
Patient region of origin[c]					
Israel	47,611	39.3	74.4	Ref	Ref
FSU	54,373	44.9	70.0	0.85	0.73 (0.70–0.77)
Western	6557	5.4	73.7	0.97	0.91 (0.84–0.98)
Middle East	12,674	10.5	78.8	1.21	1.21 (1.15–1.28)
Years since immigration					
Up to 15 years	12,931	9.4	65.1	0.77	0.79 (0.76–0.83)
16 to 30 years	6256	4.6	69.1	0.87	0.79 (0.74–0.84)
31 years or more	117,757	86.0	73.2	Ref	Ref
Holocaust survivor					
Yes	43,188	31.5	76.5	Ref	Ref
No	93,756	68.5	70.3	0.79	0.66 (0.63–0.68)
Physician region of origin[d]					
Israel	32,789	29.9	78.5	Ref	Ref
FSU	63,523	57.9	72.7	0.79	0.84 (0.81–0.88)
Middle East	2074	1.9	71.9	0.76	0.72 (0.65–0.80)
Western	11,285	10.3	79.1	1.03	0.97 (0.91–1.02)[e]
Total	136,944	100.0	72.2		

The significance was $p<0.001$ unless otherwise indicated.
%Pop = percentage of the total population for which data about this characteristic was available.
%PV = percentage of the sub-group who received pneumonia vaccination, defined as having ever received a pneumococcal vaccination from age 65 onwards.
%IV = percentage of the sub-group who received influenza vaccination, defined as having received 2 or more influenza vaccinations during the 5 years of the study period.
AOR = adjusted odds ratio comparing the prevalence of vaccination among the specific subgroup compared to the referent group when adjusting for the variables included in the regression model: see below for explanation.
CI = confidence interval.
FSU = Former Soviet Union.
Holocaust survivor: whether or not the patient self-reported as a Holocaust survivor upon enrollment into the Maccabi Healthcare Services.
PR = unadjusted prevalence ratio comparing the prevalence of vaccination among the specific subgroup compared to the referent group.
Ref = referent.
Rural = defined as whether or not the patient was reported as living in the northernmost or southernmost regions of Israel during the study years.
SES = socio-economic status, defined by the income quartile assigned by zip code of the patient's residence, as defined by the Israeli national census of 1995, the most recent year for which this data was available; scale = 1–4 with 4 being highest.
Variables included in the adjusted models: age, gender, rural residency, socio-economic status, region of origin, immigrant status, Holocaust survivorship, number of chronic medical conditions, number of primary care visits in the past 5 years, number of days of hospitalization in the past 5 years, primary physician's region of origin and gender.
Variables not included in the final models due to non-significance, missing data or collinearity: BMI (body mass index); number of hospitalizations; whether the patient had been diagnosed with hypertension, COPD (chronic obstructive pulmonary disease), asthma or diabetes; smoking status; mammography; physician contract type; physician specialty; and physician age.
[a] $p = 0.768$.
[b] 9.8% missing data (N = 123833).
[c] 11.5% missing data (N = 121215).
[d] 20% missing data (N = 109631).
[e] $p = 0.241$.

In Israel, a popular quip states, "the parents learn the mother tongue from their children" (Kishon, 1952). Indeed, a majority of Israel's population aged 65 and older, expected to number 1.2 million by 2025, immigrated from other countries, whether as Holocaust survivors from post-war Europe, as refugees from surrounding Arab countries or voluntarily from Western countries, learning Hebrew on arrival and bringing with them diverse attitudes to health care (Clarfield, et al., 2006). Previous studies in Israel have demonstrated the impact of gender, SES (Shahrabani and Benzion, 2006), race/ethnicity (Baron-Epel et al., 2007), immigration status (Gross et al., 2001), and health beliefs (Balicer et al., 2007) on health care utilization and health status.

However, these studies generally focus on younger populations, and do not address the question of how socio-demographic characteristics affect vaccination rates among elderly Israelis. Our study aims to fill a gap in the literature by examining the relationship between socio-demographic characteristics and influenza and pneumonia vaccination among older adults in Israel.