

FEAR OF INJECTIONS IN YOUNG ADULTS: PREVALENCE AND ASSOCIATIONS

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Abstract. Fear of injections may interfere with receipt of vaccines. The frequency, associations, and precipitators of fear-provoking factors of 400 travelers visiting a travel health clinic were evaluated. The median age of this group was 25, 7% were medical staff members, and 2.8% were regular injectors (insulin). Eighty-five (21.7%; 95% confidence interval, 17.3–25.6%) of the travelers indicated that they were afraid of injections, and in 8.2%, the fear was unreasonably intense. Multivariate analysis revealed that watching other people being vaccinated, fear of pain, needle size, and a history of fainting were highly and independently associated with injection phobia. The sensitivity, specificity, and discrimination accuracy of this model were 79.5%, 78.0%, and 78.3%, respectively. Injection phobia and a bad past vaccination experience were significantly associated with fainting. Perceived empathy, on the other hand, was a significant protective factor. Fear of injections was common in this cohort and was highly associated with past fainting after vaccination.

INTRODUCTION

Broadly defined, the fear of injections has been associated with fear of needles, hospitals, surgical operations, wounds, pain, doctors, and dentists. Most research in this area has focused on injection phobia, which is the more dramatic form of this type of anxiety.^{1–5} A recent study estimated the lifetime prevalence of this phobia in the American population at 3.5% and the median age of onset at 5.5 yr.⁶ The phenomenon of injection-injury phobia was found to be more common in females and lower in the elderly. Unpublished observations at our travel health clinic led us to the hypothesis that the prevalence of fear of injections is substantially higher. In addition, we found little published data, either quantitative or qualitative, on the epidemiology, causes, and associations of fear of injections.

Injection phobia can be a major impediment to the provision of important health care measures, e.g., vaccinations, blood donations, and preparation for intravenous infusions.⁷ A recent study among Irish mothers found that barriers to uptake of the *Haemophilus influenzae* vaccine included a fear of vaccine overload and distress at separate injections.⁸ This fear may include health care personnel as well.⁹ Fear of injections may lead to syncopal attacks, with dire consequences.^{10,11} Identification of the specific factors associated with fear of injections could, for example, improve planning of the workspace and procedures inside vaccination clinics¹² and, ultimately, increase the acceptance of vaccinations.

According to data provided by the World Tourism Organization, more than 50 million travelers visit tropical countries each year.¹³ These travelers are advised to take multiple vaccinations before travel. As such, this population appears to be an almost-unbiased sample for the study of injection phobia. The characteristics of this type of population and its attitude toward injections in general, and multiple vaccinations in particular, have never been explored.

MATERIALS AND METHODS

Setup. The study was carried out at the travel health clinic of the Bnai Zion Medical Center in Haifa, Israel, where service is provided to approximately 2,000 travelers each year. The enrollment period began November 1, 2000 and continued until 400 travelers had enrolled. Although some travelers

visited the clinic two or three times, each traveler was enrolled only once.

Travelers self-refer to the clinic. Upon arrival, they are asked to watch a 30-min videotaped lecture on the health risks of travel. The vaccination needs of each traveler are then discussed with an infectious diseases/travel medicine specialist, and the traveler then proceeds to the vaccination room. This is a larger room separated by a curtain, and is occupied by a nurse and secretary. A maximum of four travelers are allowed in the room at any time. Most vaccines provided by our clinic are hepatitis A and B, yellow fever, meningococcal, injectable typhoid, and Japanese B encephalitis vaccines.

Questionnaires. In addition to the routine travel-related questionnaire, each traveler was asked to fill out an anonymous structured questionnaire regarding fear of injections. The purpose of the study was explained to the travelers in writing. Reading the explanation and agreeing to fill out the questionnaire constituted informed consent.

The following questions were asked: Age? Sex? Years of education? Are you medical staff? Do you receive injections (e.g., insulin) regularly? Have you ever been hospitalized? How many injections do you expect to receive today? (The actual number of injections received was filled in by Y.N.) What, in your opinion, is a reasonable number of injections? Are you afraid of needles? If so, is this a reasonable fear? Did you eat/drink in the 2 hr before arrival? Did you ever faint after injections?

To study the effect of certain factors regarding the fear of injections, the travelers were asked: What frightens you most about injections? Seven possible answers (pain, listening to the nurse discuss the injection, watching the syringe and the needle, seeing the size of the needle, observing other people get vaccines, certain smells in the room, and previous bad experience with injections) were graded on a scale of 0–5, where 0 = least important and 5 = most important.

A second set of questions focused on the importance travelers ascribed to vaccination-related items. Again, they were asked to grade each variable on a scale of 0–5. The seven variables were protection against infectious diseases, duration of protection afforded by the vaccine, saving time in the clinic, receiving the minimum number of injections, comfort inside the clinic, empathy and support by the medical team, and saving money.

The questionnaire concluded by asking two questions re-

TABLE 1
Fear of injections: demographics and basic data (n = 400)

Parameter	Result
Age (yr)	32.5 ± 14.5 (median = 25)
Men/women	217/183
Education (yr)	13.7 ± 2.7 (median = 12)
Medical personnel*	28 (7)
Regular injections†	11 (2.8)
Ever hospitalized	205 (51.3)

Results are presented as means ± SD; figures in parentheses indicate percentage.
* Indicates worker in a hospital or clinic.
† Indicates regular injector of insulin.

lated to combination vaccines (defined as vaccines against two or more diseases in one injection): Do you think combination vaccines would encourage you to receive vaccines before you travel? and, Do you think combination vaccines would ease completion of the required vaccines by minimizing the number of injections?

Statistical analysis. Statistical analysis was carried out using SPSS software (Release 6.0). At first, we analyzed the demographics of the entire cohort. Logistic regression was then carried out to predict two specific endpoints: who would suffer from fear of injections, and who would faint. Variables found by univariate analysis to be significantly associated with these endpoints were entered into the multivariate analysis. Sensitivity, specificity, and test accuracy of the strongest variables also were calculated.

RESULTS

Altogether, 400 travelers participated in the study (95% response rate). Their median age was 25 (range, 11–80), and slightly more than half (54.3%) were men. Their baseline demographics are given in Table 1. Most of the travelers went to Southeast Asia (70%), and smaller proportions (20%) to South America and Africa (5%). Eighty-five travelers (21.7%; 95% confidence interval [CI], 17.3–25.6%) indicated that they were afraid of injections, and seven of these (8.2%; 95% CI, 3.4–16.2%) said the fear was of an unreasonable magnitude (1.75% of the entire cohort). No travelers included in this study fainted during or after their vaccinations. All those who filled out the questionnaires received injections.

Univariate analysis of the factors associated with the fear of injections revealed a significant association with 10 variables

TABLE 2
Significant factors associated with fear of injections (univariate analysis)

Variable	P-value
Needle size	<0.0001
Smell in the room	<0.0001
Prior bad experience with injections	<0.0001
History of fainting following injection	<0.0001
Hearing the nurse talk about injection	<0.0001
Fear of pain	<0.0001
Watching the nurse prepare the syringe	<0.0001
Watching other people receive injections	<0.0001
Sex*	= 0.018
Age†	= 0.02

* More common in females.
† More common the younger age group.

TABLE 3
Predictors of fear of injections (multivariate analysis)

Variable	P-value
Watching other people receive injections	<0.0001
Needle size	<0.0001
Pain	= 0.0002
History of fainting following injection	= 0.028

(Table 2). Overall, females were more afraid than males, and older people were less afraid than young people. Multivariate analysis revealed that four parameters were highly and independently associated with injection phobia (Table 3): watching other people get injections, fear of pain, size of the needle, and a history of fainting. The sensitivity, specificity, and discrimination accuracy of this model were 79.5%, 78.0%, and 78.3%, respectively.

Univariate analysis of factors associated with past fainting revealed eight variables to be highly significant (Table 4). Multivariate analysis showed that fear of needles, unreasonable fear (subjective), and a bad past experience with injections were all independently and positively associated with fainting (P < 0.0001). Among those with a past history of fainting, the percentage of subjects afraid of needles was more than double than among those not afraid (Figure 1). In contrast, empathy shown by the medical team was significantly but inversely associated with fainting (P < 0.0001). The sensitivity, specificity, and discrimination accuracy of this model in predicting fainting were 72.2%, 82.1%, and 81.4%, respectively.

Subjective scoring by the travelers of vaccination-associated parameters revealed that they considered the protection afforded by the vaccines to be the most important factor (4.9 ± 0.5; mean ± S.D., on a scale of 0–5), followed by the length of protection (4.4 ± 0.9) and empathy shown by the medical team (3.8 ± 1.2). Saving money was the least important factor (3.3 ± 1.6).

We found that demographic factors such as being a medical staff member (P = 0.3), being a regular injector (P = 0.7), or previous hospitalization (P = 0.6) were insignificant predictors of fear of injections.

Our travelers expected to receive a mean (±SD) of 2.7 ± 1.5 injections during their visit, and actually received 2.9 ± 1.0 injections (range, 1–5; P = 0.06). The same mean figure of 2.7 injections per day was considered a reasonable number. A combination vaccine would have encouraged 85.3% of the travelers to receive vaccinations before travel, and 92.5% be-

TABLE 4
Principal factors associated with past fainting (univariate analysis)

Variable	P-value
Prior bad experience with injections	<0.0001
Watching other people receive injections	= 0.002
Comfort in the clinic	= 0.0046
Fear of needles	= 0.0071
History of hospitalization	= 0.008
Unreasonable fear of injections	= 0.015
Watching the nurse prepare the syringe	= 0.018
Empathy shown by the medical team	= 0.029
Needle size	= 0.08 (trend)

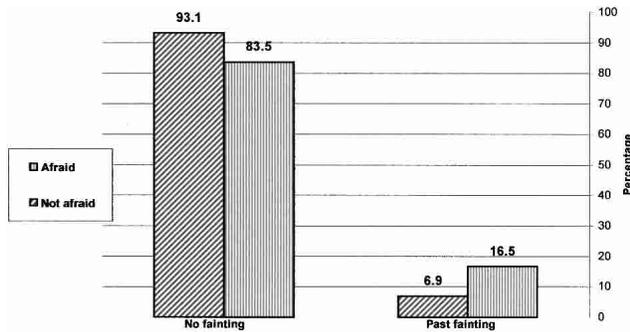


FIGURE 1. Fainting history of travelers who were afraid of injections.

lieved that a combination vaccine might ease completion of the necessary vaccine series. Of six potential predictors of a positive attitude toward combination vaccines—age, sex, education, being a member of a medical staff, fear of injections, and past fainting—none was significantly associated with such an attitude.

DISCUSSION

To elucidate the frequency and associations of variables influencing injection phobia, we conducted a survey of a large cohort of travelers attending our travel clinic. The questionnaire responses revealed that more than a fifth of them had fear of injections, and that of those who were afraid, 8.2% had a fear that was of unreasonable magnitude. These figures reflect higher rates than previously estimated² but agree with a recent study among children.¹² Yet both figures may represent an underestimation, as phobic patients tend to avoid the phobic stimulus, and travelers with the highest degree of fear could travel without vaccination.¹⁴ The high rate of injection phobia that we found fits our hypothesis that the rate is substantial and in accordance with those found in dental clinics around the world.^{15,16}

Reducing the fear of injections may have an enormous impact. About 12 billion injections are administered each year.^{17,18} Every year, about 100 million children receive routine immunizations,¹⁹ this is the age group in which fear of injections is highest. In addition, 50 million people travel to developing countries each year and thus require vaccinations. Low vaccination coverage among travelers has been associated with international spread of potentially lethal diseases.²⁰ In addition, morbidity and mortality have been associated with lack of typhoid vaccine among travelers to Nepal,¹⁴ tick-borne encephalitis among U.S. military forces deployed in Bosnia,²¹ and meningococcal disease among Hajj pilgrims.²² Other fields that may be affected by fear of injections are blood donations,²³ blood sampling for routine tests, and preparation for intravenous infusion lines.

Our observations suggest that certain architectural and behavioral variables within travel clinics can be optimized to reduce the fear of injections. First, the vaccination corner should be separated from the waiting area, as vaccinees are significantly influenced by watching other people receive their vaccines. The curtain used in our setting may have performed inadequately, as it did not block out voices. Second, the nurse should attempt to conceal the preparation of the

vaccine from the vaccinee, particularly from those who are prone to be afraid. In a study performed at a dental clinic in Germany, 47% of the respondents considered the sight of the injection needle fear-provoking.²⁴ Practically, however, this suggestion may be difficult to apply, as the nurse starts to prepare the syringe after the traveler has entered the vaccination area. Fear of pain can be minimized by prior application of an anesthetic patch containing lidocaine/prilocaine to the skin. A question regarding any history of fainting should be incorporated into travel clinic questionnaires to help sort out those who might suffer another vasovagal syncope.

Vaccinations are often taken poorly, even by hospital staff members.^{9,25} The development of combination vaccines, so that fewer injections would be required, would provide an elegant and effective solution to this problem.^{26,27} Our travelers received 1–5 vaccinations at their first visit. The great majority of them (92.5%) believed that a combination vaccine might ease the completion of the necessary vaccine series. The present study is thus another call to boost the development of such vaccines.

Health care professionals regard injections as routine, yet for other individuals, they arouse anxiety. We believe that future studies should address the issues of how to diminish this fear. Tentative avenues include allowing a relative or friend to enter the vaccination room, using distraction devices such as music or television, using topical analgesics, and psychotherapy.

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