Background

Vaccine hesitancy is a growing public health concern and has been classified as a major threat to global health by the WHO. While there has been extensive research on the attitudes of vaccine-hesitant individuals, little is known about the attitudes of pro-vaccination advocates.

Objective

To describe among vaccine advocates: 1) vaccine attitudes, including attitudes about primary care clinic vaccine policies, 2) vaccine advocacy activities, and 3) motivations for vaccine advocacy.

Design and Methods

An internet survey was conducted July-November 2019. Vaccine advocacy groups across the US were invited to partner in survey distribution and participants were recruited from a convenience sample of their members. Advocacy activities were categorized as either policy-related, in-person, or online.

Results

Response rate was 8% (1,239/15,475). Respondents were mostly female, white, and highly educated (Table 1). Most reported Democratic Party affiliation and the most common occupation was healthcare practitioner. The majority of the respondents were from California (45%), Colorado (18%), and Ohio (5%). The majority of respondents (90%) strongly or somewhat agreed that a policy that did not allow patients to refuse or spread-out vaccines would encourage them to join a primary care clinic. The most common policy-related activities were contacting an elected official about vaccines, signing petitions to change vaccine policy, and attending a rally or other organized event to promote vaccine policy (Figure 2). Participants also described ‘other’ policy-related advocacy activities including occupational advocacy work (e.g., physician, nurse, or public health worker) and testifying for pro-vaccine legislation. The most common in-person activities to advocate for vaccines were speaking with a friend or family member, speaking at a school, or speaking at a community event. The most commonly reported online activities to advocate for vaccines were using social media, email and text messages, and interacting with news. The most common motivation for vaccine advocacy was a sense of responsibility as a community member (Figure 1).

Conclusions

Our sample of vaccine advocates engaged in a variety of different advocacy activities and appeared to be a highly motivated by responsibility to their community as well as a range of other factors. Continued work to better understand vaccine advocates may help inform efforts to curb vaccine hesitancy and influence those who accept vaccines to advocate for vaccines.
DBS Card

3 punches → Mass spec Analysis → Blood spot data

BRANCHED CHAIN AMINO ACIDS

LEUCINE  ISOLEUCINE  VALINE

LNS

Decreased

BCAA
Elevated BCAA → Obesity, Insulin Resistance

BRANCHED CHAIN AMINO ACIDS
- Leucine
- Isoleucine
- Valine
LNS

new figure

- LNS

+ LNS
Arm 1

- OW/OB
- NW
- LNS ≥ 3 mon prior to conception + 12 wks gestation

Arm 2

- OW/OB
- NW
- No LNS

Enrollment and Randomization

- Arm 1
  - Lipid nutrient supplementation at 12 wks
- Arm 2
  - Birth

Birth
Glycine, Aspartate, Alanine were lowered in obese mothers receiving the +LNS. They are associated with BCAA catabolism, and thus should be less abundant as BCAA levels lower. This further demonstrates that circulating BCAA reduction took place.
12 week data

- Leptin vs. Sum BCAAs: $R = 0.1336$, $R^2 = 0.01785$, $P = 0.4238$
- Total adiponectin vs. Sum BCAAs: $R = -0.2526$, $R^2 = 0.06382$, $P = 0.1260$
- HMW Adiponectin vs. Sum BCAAs: $R = -0.01519$, $R^2 = 0.0002308$, $P = 0.9299$
- HMW/Total Adiponectin vs. Sum BCAAs: $R = 0.2247$, $R^2 = 0.05048$, $P = 0.1750$
- Leptin/Adiponectin vs. Sum BCAAs: $R = 0.2820$, $R^2 = 0.07954$, $P = 0.09080$
- Zinc vs. Sum BCAAs: $R = -0.1893$, $R^2 = 0.03583$, $P = 0.2689$
36 week data

Leptin

Insulin

Zinc

Total Adiponectin

HMW Adiponectin

HMW/Total Adiponectin Ratio

Leptin/Adiponectin
Leptin vs. Sum BCAAs: $R = 0.2199$, $R^2 = 0.04836$, $P = 0.2198$

Total Insulin vs. Sum BCAAs: $R = -0.05549$, $R^2 = 0.003079$, $P = 0.7629$

Total adiponectin vs. Sum BCAAs: $R = -0.1686$, $R^2 = 0.02843$, $P = 0.3562$

HMW Adiponectin vs. Sum BCAAs: $R = -0.2792$, $R^2 = 0.07795$, $P = 0.1217$

HMW/Total Adiponectin vs. Sum BCAAs: $R = -0.2094$, $R^2 = 0.04386$, $P = 0.2500$

Leptin/Adiponectin vs. Sum BCAAs: $R = 0.1228$, $R^2 = 0.01509$, $P = 0.5255$

Zinc vs. Sum BCAAs: $R = -0.3064$, $R^2 = 0.09388$, $P = 0.0734$
Valine
Leptin
R = 0.1988
R² = 0.03954
P = 0.2673

Valine
Leptin
R = 0.05173
R² = 0.002676
P = 0.7786

Valine
Adiponectin
R = -0.09134
R² = 0.008343
P = 0.6191

Valine
HMW Adiponectin
R = -0.2286
R² = 0.05228
P = 0.2081

Valine
%HMW / Total Adiponectin
R = -0.2305
R² = 0.05315
P = 0.0490

Valine
Leucine / Adiponectin
R = 0.05902
R² = 0.003483
P = 0.7610

Valine
Zinc
R = -0.2588
R² = 0.06697
P = 0.1333
Table 1. Maternal Characteristics ± Lipid Nutrient Supplementation (> 3 month prior to conception) in Normal Weight and Obese Moms

<table>
<thead>
<tr>
<th>Maternal Characteristics</th>
<th>BMI (&lt;25) = NW</th>
<th>BMI (&gt; 25) = OW/OB</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>23.8 ± 1.4</td>
<td>24.7 ± 1.3</td>
<td>25.7 ± 1.5</td>
</tr>
<tr>
<td>Parity</td>
<td>1.6 ± 0.2</td>
<td>1.4 ± 0.3</td>
<td>1.6 ± 0.5</td>
</tr>
<tr>
<td>Prepreg Ht</td>
<td>146 ± 1</td>
<td>145 ± 2</td>
<td>142 ± 2</td>
</tr>
<tr>
<td>Prepreg Wt</td>
<td>47.6 ± 1.1</td>
<td>60.8 ± 1.6</td>
<td>58.6 ± 1.6</td>
</tr>
<tr>
<td>Prepreg BMI</td>
<td>22.3 ± 0.4</td>
<td>28.8 ± 0.7</td>
<td>28.9 ± 0.6</td>
</tr>
</tbody>
</table>

Table 1. Maternal Characteristics ± Lipid Nutrient Supplementation (> 3 month prior to conception) in Normal Weight and Obese Moms

<table>
<thead>
<tr>
<th>12 Weeks</th>
<th>BMI (&lt;25) = NW</th>
<th>BMI (&gt; 25) = OW/OB</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Adiponectin (μg/mL)</td>
<td>4.8 ± 0.8</td>
<td>5.02 ± 1.67</td>
<td>5.6 ± 0.8</td>
</tr>
<tr>
<td>HMW Adiponectin (μg/mL)</td>
<td>3.2 ± 0.3</td>
<td>3.32 ± 1.11</td>
<td>3.7 ± 0.4</td>
</tr>
<tr>
<td>% HMW / Total Adiponectin (μg/mL)</td>
<td>55.9 ± 3.2</td>
<td>67.34 ± 22.51</td>
<td>70.1 ± 4.8</td>
</tr>
<tr>
<td>Leptin (ng/mL)</td>
<td>10.8 ± 3.4</td>
<td>4.2 ± 1.4</td>
<td>14.0 ± 3.2</td>
</tr>
<tr>
<td>Leptin / Adiponectin</td>
<td>0.8</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Insulin (mU/mL)</td>
<td>0.8</td>
<td>0.7</td>
<td>0.8</td>
</tr>
</tbody>
</table>

- NW ± LNS
- OW/OB -LNS
- OW/OB +LNS