Tattooing and Health Study Results

Thank you for taking part in the Tattoo and health Study in American Samoa in July 2017! Following are study results, your results, and how your results fit in the overall results. Please email us if you have any questions: Drs. Christopher Lynn (cdlynn@ua.edu) and Michaela Howells (howellsm@uncw.edu).

Summary of Collected Data

- We were interested in how tattoo experience over a lifetime influences health (immune response).
- The immune system protects the body against infection. However, it can be suppressed (not work as well) if a person is under stress. Can tattooing help strengthen the immune system?
- To answer this question, we collected information about gender, age, residency, ethnicity, education, marital status, socioeconomic status, current perception of stress, previous experience of tattoo-related problems, recent illness, recent alcohol consumption, cigarettes per week, current medications, occupation, average hours worked/week, hours worked study week, fat%, BMI, handgrip strength, number of friends/family accompanying for tattoo, number of tattoos, years since first tattoo, proportion of body tattooed, lifetime hours tattooed, lifetime number tattoo sessions, total tattoo experience, pain rating of current tattoo, duration of current tattoo, immunoglobulin A in saliva before and after tattoo (measure of immune response), cortisol in saliva before and after tattoo (measure of stress), C-reactive protein (measure of health status) in saliva before and after tattoo.
- What did we find?

Table 1: Participant tattoo and health data

Data collected		Range in sample	Average	Your Results
Fat%		12.1-49.0	30.9	
BMI (body mass index)		20.2-43.4	32.03	
Handgrip strength		46.5-125.9	87.6	
Number of tattoos		0-11	2.7	
Years since first tattoo		0-39	14.5	
Body proportion tattooed		0-19.6	3.5	
Total hours tattooed		0-49.3	7.2	
Number of tattoo sessions		0-15	2.8	
Tattoo experience		0-105.9	25.2	
Immunoglobulin A	Pre-tattoo	34.9-546.4	263.6	
	Post-tattoo	92.01-896.4	325.3	
Cortisol	Pre-tattoo	.03-.39	.14	
	Post-tattoo	.02-.60	.22	
C-reactive protein	Pre-tattoo	152-88140	7043	
	Post-tattoo	92-45959	5021	

Summary of Results

- Based on our question, our analysis included immune response, tattoo experience, biological stress response (cortisol), preexisting health status (C-reactive protein), and tattoo duration (length of time between saliva samples).
- Additionally, the only other items from the list above that influenced immune response were cigarette use, BMI, and marital status.
- Here is what we found:

Table 2: Analysis of pre and post immune response change

Variable	Size of variable effect (Small to large=0-1)	Probability effect is random math accident (below 5% is ideal)
Tattoo experience[1]	0.56 (large)	1%
Pre-tattoo (baseline) C-reactive protein[2]	0.17 (small)	18%
Post-tattoo cortisol[3]	0.26 (medium)	9%
Tattoo duration[4]	0.14 (small)	23%
Age[5]	0.13 (small)	25%
Cigarette use	0.66 (large)	.1%
BMI	0.53 (large)	2%
Marital status	0.56 (large)	6%

[1]We calculated "tattoo experience" by adding number of tattoos, years since first tattoo, proportion of body tattooed, hours tattooed, and number of sessions.

[2]We included baseline (pre-tattoo) C-reactive protein (measure of health status) in our analysis because that is a measure of sickness or inflammation a person has when the tattoo starts.

[3]We included post-tattoo cortisol because cortisol is a measure of stress and, when it increases, it often suppresses immune response.

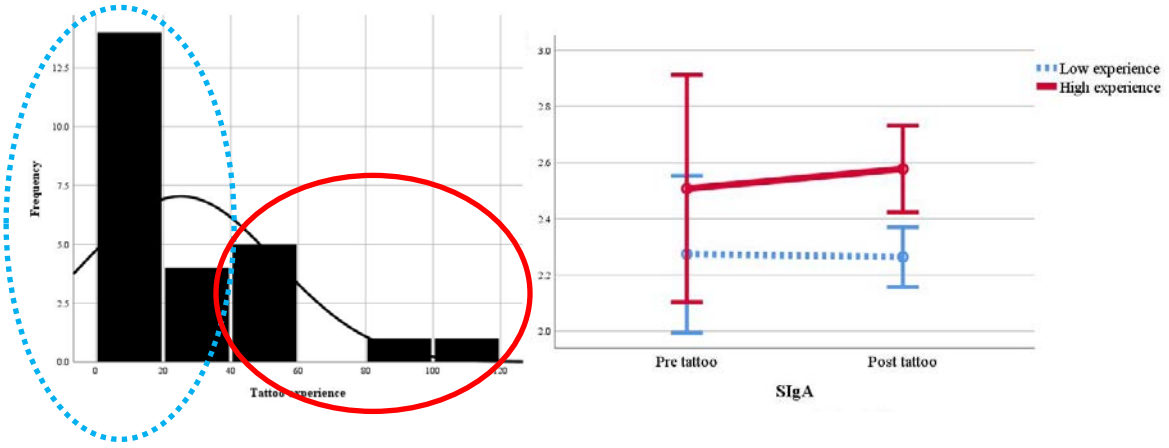
[4]Tattoo duration is the length of time it took between the pre-tattoo and post-tattoo saliva measures.

[5]We included age because part of "tattoo experience" is years since first tattoo and because health is known to change throughout life.

Summary of Results (Continued)

- The numbers from Table 2 don't tell us how tattoo experience impacts immune response (pre-post immunoglobulin A change). Is it a positive influence or negative influence? To check this, we divided participants into two groups based a natural pattern among the sample.
- In the graphs below, the dotted lines indicate the "low tattoo experience" group, and the solid lines indicate the "high tattoo experience group. "SIgA" means salivary immunoglobulin A (immune response):

Figure 1: Immune differences for participants with low and high tattoo experiences



Conclusions

- For the **low tattoo experience group**, immune response goes down. This is caused by the stress hormone cortisol, which suppresses the immune systems of those with less tattoo experience.
- However, the body seems to adjust to this with increased exposure to the stress. For the **high tattoo experience group**, immune response seems to be used to tattooing and continues doing its job!

For more information about this and related tattoo and health research:

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