Journal of Tourism and Hospitality Management
December 2018, Vol. 6, No. 2, pp. 93-101
ISSN: 2372-5125 (Print), 2372-5133 (Online)

Published by American Research Institute for Policy Development
DOI: 10.15640/jthm.v6n2a8
URL: https://doi.org/10.15640/jthm.v6n2a8

Korean Sauna (Jjimjilbang) Wellness Tourism as Perceived by Westerners Living in South Korea

Ph.D. Candidate D. Kessler[1], Professor K.J. Chung[1], & Professor B.J. Jang[1]

Abstract

In this paper, we examined attitudes of westerners living in South Korea regarding Korean saunas (jjimjilbangs). We surveyed (n=225) westerners living in South Korea who have visited a Korean sauna at least once during their stay. The purpose of our research was to measure subjective attitudes, frequency, and motivation towards sauna usage along with their self-reported health evaluations and basic demographic variables. We hypothesized there would be a positive correlation between the respondent's self-reported health evaluations and the frequency of usage of the spa. Additionally, we hypothesized that there would be a positive correlation between the length of time living in South Korea and the frequency of spa usage. Using the SF-36 to measure self-reported health characteristics, results of our statistical analysis indicate a Pearson Correlation of .428 between the frequency of spa usage and SF-36 respondents scores. Moreover, we found no correlation in the length of staying in Korea and frequency of spa usage. Findings from this research are consistent with the findings from our literature review of the general health benefits of saunas.

Keywords: South Korea, tourism, sauna, spa, wellness, health

1. Introduction

Turkish Hammam, Russian Banya, and Native American sweat lodges are just some of the many wellness treatments that have been harnessed throughout human history. These heat treatments have been used to cure sickness and disease, as a community gathering areas, as places to relieve stress and warm up from cold winter temperatures. Each culture has its own etiquette as well as special techniques to achieve wellness in these heated structures. In Korea, the Hanjeungmak (한증막) was a traditional Korean Sauna, which was state-supported and maintained by Buddhist monks since 1429. The Hanjeungmak was originally mentioned in the Annals of Sejong in the 15th century during the Joseon Dynasty period in Korean history. The record also mentions that the Korean saunas were used for medicinal purposes. A modern-day evolution of the Hanjeungmak is the Korean jjimjilbang. (Jjimjilbang: a microcosm of Korean leisure culture, 2010).

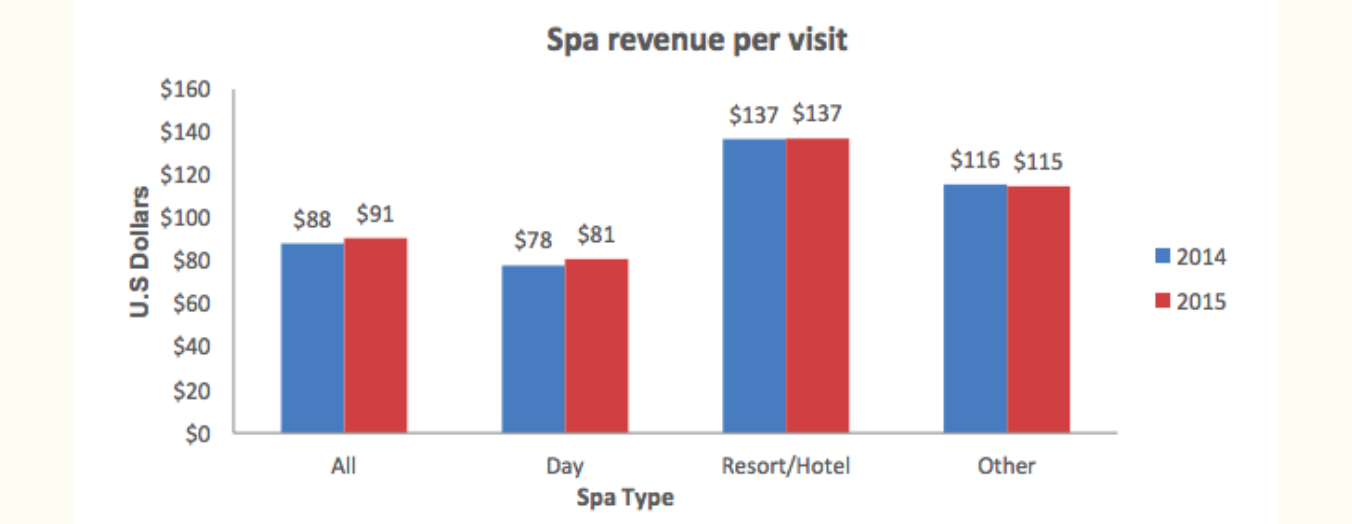
In South Korea, jjimjilbangs are a unique form of this wellness heat-treatment that millions of Koreans utilize each year. Korean jjimjilbang is a large public bathhouse in Korea. "Jjimjil" means heating and the jjimjilbang's are heated by ondol-heated floors, a unique aspect of Korean wellness culture and architectural design. (Donald, 2000). The main areas of a jjimjilbang are gender segregated with wet and dry saunas and hot and cold soaking pools of various temperatures. Often open 24 hours a day, the jjimjilbangs have communal sleeping areas heated by ondol-heating technology. The sleeping area has various temperature rooms with a variety of themes, including walls decorated with wood, mineral, crystals, stones, and clay rooms often with herbal infusions. These aspects are all part of the traditional Korean medicinal healing practices.

[1] **Graduate School of Hotel and Tourism, Youngsan University**, Busan South Korea, Haeundae Campus 602-743, 142 Bansongsunhwan-ro, Haeundae-gu, Busan Korea

In Korea, Jjimjilbangs are accessible and affordable destinations for Korean families on the weekends costing around 10 USD per person. With thousands of jjimjilbangs in Seoul, this bathing activity is a unique aspect of Korean culture. According to Susie Ellis, Chairman, and CEO of the Global Wellness Institute and coauthor of Understanding the Global Spa Industry, she writes "Though several natural springs grew into spa facilities, the North American spa industry did not capitalize on bathing and water therapy. Rather, it developed around fitness, weight loss, health, and beauty." (Ellis, 2008 p. 71).

According to https://experienceispa.com the average amount of money spent at a day SPA is 78$ in 2014 and 81$ in 2015. These prices are very costly when compared to a Korea sauna. (See figure 1)

(Figure 1)



Additionally, Korean jjimjilbang etiquette requires that the customer should be completely naked when entering the hot baths, saunas, and the steam room areas. These customs are very different from saunas in North America. How do westerners experience the Korean jjimjilbang? What demographic of westerners are more frequent visitors to the Korean sauna? What is their motivation for going to a Korean spa? What are the westerner's perceptions of a quality sauna experience? What is the general health of the westerner's who go to a Korean jjimjilbang? Do foreigners who have lived in Korea for a long time more likely to go to a Korean spa? Korean jjimjilbangs (saunas) are unique and wonderful wellness healing medium that Koreans frequent, but as a result of conducting a literature review, Koreans do not have information about how foreigners who are staying in Korea experience Korean saunas.

1.2 Definitions and Distinctions:

In defining the modern meaning of a spa, Smith and Puczkó write "Spas are now of a highly complex and diverse nature. This diverse nature starts with the name and its likely meanings. Bath, bano, bad, therme/terme, grotto, spa,˝ – all mean a thermal water-based spa, in various languages. The translation of the name from the original language often uses the term 'spa', but these establishments are not really always spas. Furthermore, their complexity lies in the fact that almost any service provider with some kind of health-oriented services can and does call itself a spa. Spas may differ widely in terms of what they offer, that is their services or treatment supply, however, they have one thing in common, which is the aspiration to improve health and well-being" (Smith and Puczkó, 2009 p.86).

Additionally, Smith and Puczko write regarding the definition of "spa": "Perceptions differ greatly, for example, tourists in Central and Eastern Europe are very familiar with the concept of historic medical spas, whereas other visitors (e.g., from the United States or the United Kingdom) would expect something similar to a beauty salon."(Smith and Puczkó, 2008 p.86).

While Korean saunas are used by millions of Koreans every year, in America, saunas are not nearly as convenient as they are in Korea. According to an article titled *Are Saunas Good For Your Brain* "In the U.S., many Americans use a sauna only occasionally, perhaps while at the gym or on vacation — if at all. In Finland, in contrast, 99 percent of Finns take at least one sauna a week, and some far more often than that." (Mercola, 2017).

In Korea, these facilities are called; Jjimjilbang (찜질방) and Mogatong (목욕탕). The difference between these two facilities is the jjimjilbangis a gender-segregated public bathhouse usually open 24 hours a day with communal sleeping areas and various features mentioned above. Whereas the Mogatong is a public bathhouse without the extra features, sometimes attached to a fitness establishment.

Foreigners living in Korea (who are unfamiliar with Korean culture) may not make the distinction between these two and refer to both of these as a "sauna" or "spa." In our research survey, we chose to use the word "sauna" to simplify the linguistic confusion for westerners being researched. The word "sauna" most closely resembles the western colloquial definition of a jjimjilbang. (We will use "spa", "sauna" and "jjimjilbang" interchangeably throughout this paper and in our research survey.)

2. Literature Review

In the book *Wellness Tourism*, Smith and Puczkó define spa tourism as "Tourism which focuses on the relaxation or healing of the body using mainly water-based treatments; such as, mineral or thermal pools, steam rooms; and saunas. Emphasis tends to be focused on curing, rehabilitating, or resting the body." (Smith and Puczkó, 2008 p. 85).

Modern science has been elucidating what these cultures have known for hundreds of years regarding the physical and psychological benefits of using a sauna. In a systematic review of dry Sauna bathing with papers from 2000 onwards, Cohen and Hussain concluded in their paper *Clinical Effects of Regular Dry Sauna Bathing*: "Regular infrared and/or Finnish sauna bathing has the potential to provide many beneficial health effects, especially for those with cardiovascular-related and rheumatological disease, as well as athletes seeking improved exercise performance."(Hussain and Cohen 2018, p. 29).

In his paper *Sauna as a Valuable Clinical Tool for Cardiovascular, Autoimmune, Toxicant induced and other Chronic Health Problems* Crinnion writes, "Sauna therapy has a long history of safe use in several populations." (Crinnion, 2011 p.223).

Laukkanen, in his most recent paper summarizing the available epidemiological, experimental and interventional evidence linking sauna bathing and health writes "Emerging evidence suggests that beyond its use for pleasure, sauna bathing may be linked to several health benefits, which include a reduction in the risk of vascular diseases such as high blood pressure, cardiovascular disease, and neurocognitive diseases; nonvascular conditions such as pulmonary diseases; mortality; as well as amelioration of conditions such as arthritis, headache, and the flu. The beneficial effects of sauna bathing on these outcomes have been linked to its effect on circulatory, cardiovascular, and immune functions. It has been postulated that regular sauna bathing may improve cardiovascular function via improved endothelium-dependent dilatation, reduced arterial stiffness, modulation of the autonomic nervous system, beneficial changes in circulating lipid profiles, and lowering of systemic blood pressure." (Laukkanen, 2018 p.1111). He concludes "Sauna bathing, an activity used for the purposes of pleasure, wellness, and relaxation, is linked to a remarkable array of health benefits. (Laukkanen, 2018 p. 1119).

In a previous paper, Laukkanen conducted long-term trials looking for the health effects of sauna use in a population of 2,315 middle-aged men in Finland. (Laukkanen, 2015). Twenty years later, in follow up studies, he discovered, elegantly summarized by Patrick "4-7 times per week at a temperature of 79% Celsius (174% Fahrenheit) for an average of at least 20 minutes per session was associated with a 40% reduction in all-cause mortality compared to the men that only used a sauna once per week and the inverse, dose-relationship between sauna use and all-cause mortality: 24% for 2-3 times per week, 40% for 4-7 times. (Patrick, 2017). Laukkanen also discovered in his newest study that now shows a reduction in risk in a similar dose-response fashion for dementia and Alzheimer's disease by around 65% for the most frequent sauna users. (Patrick, 2017)

In a study about hypertension, Winterfeld discovered that sauna usage reduced blood pressure and incidents of hypertension. He gave 46 subjects a 3-month period of biweekly sauna bathing treatment which lowered patients mean blood pressure from 166/101 to 143/92 mm HG. (Winterfeld et al., 1998).

A 30 minute 163.4 sauna session in healthy young adults has been shown to cause an increase in the production of heat shock proteins for up to 48 hours after usage. "When you heat stress the body, you activate a signaling pathway called heat shock proteins." (Patrick, 2017) Heat shock proteins stabilize new proteins to ensure correct repair from cells that were damaged, so they can maintain their three-dimensional structure and protect against cardiovascular and neurodegenerative diseases.

(Selsby, J. T. et al., 1985) A genotype associated with heat shock proteins is associated with an increased likelihood of living to be a centenarian" (Patrick, 2017) (Singh, R. et al., 2010). In a study of growth hormone and climate chambers, Kukkonen-Harjula found "Growth hormone seems to be the most sensitive hormone when compared with other pituitary hormones and reacts even to mild heat in a climate chamber." (Kukkonen-Harjula, K. et al. 1989) "Growth hormone goes up 200-300% even after a single sauna session. Growth hormone plays an important role in preventing muscle atrophy, which is also linked to longevity. The more muscle mass you have and muscle strength is associated with lower all-cause mortality." (Patrick 2017) In men,2 one-hour sauna sessions a day at 80°C (176°F) for 7 days was shown to increase growth hormone by 1,600%. (Leppaluoto, 1986).

In regards to the benefits of sauna use for the brain "Sauna use has characteristics of exercise" (Patrick, 2017). Exercise with a combination of heat stress has been shown to increase BDNF (Brain-Derived Neurotrophic Factor) more effectively than exercise alone. BDNF is essential for memory recollection, it enhances learning, and it increases the growth of new brain cells (Goekint et al., 2011).

As for saunas improving athletic endurance, in one study, six distance runners had on average 12 30-minute sauna sessions two times a week after intense exercise. The result of the heat stress was a 32% increase in the distance they could run before reaching the point of exhaustion. Saunas increase blood flow to the heart, muscles, and skin, enhancing the dissipation of heat throughout the body. "It is thought that heat acclimation boosts the RBC count through erythropoietin (EPO) because the body is trying to compensate for the corresponding rise in plasma volume" (Patrick, 2017) (Scoon, 2007).

"Heat shocking the body holds promise as safe, rapid-acting, antidepressant modality with sustained therapeutic benefit" (Patrick 2017) Also, "sauna exposure causes a significant release of Dopamine, a neurotransmitter, and Beta-Endorphin, a neuropeptide hormone. These substances cause a sense of euphoria, as well as improved mood, energy, a sense of calm, and pain tolerance. The level of endorphins released during sauna bathing can be three times normal, similar to a middle distance training run." (Sauna Society, 2018) (Janssen, Clemens W. et al., 2016). "Muscle relaxation also occurs, along with increased elastic properties of the tendons and joint capsule and a reduced viscosity of synovial joint fluid" (Hasan J, 1967).

As for circulation and sauna usage, it was found that saunas increase blood circulation and stimulate sweat glands, releasing built-up toxins and waste. "Existing evidence supports the use of saunas as a component of depuration (purification or cleansing) protocols for environmentally-induced illness." (Crinnion, 2011 p.215) "Overall, regular sauna therapy (either radiant heat or far-infrared units) appears to be safe and offers multiple health benefits to regular users." (Crinnion, 2011 p.215).

2. Purpose

The benefits of using spas are positive, and millions of Koreans enjoy the health and wellness benefits of these establishments every day. However, there is a gap in the literature regarding the preferences of foreigners living and working in South Korea in how they experience these Korean wellness establishments. How do westerners experience the Korean jjimjilbang? What demographic of westerners are more frequent visitors to the Korean sauna? What is their motivation for going to a Korean spa? What are the westerner's perceptions of a quality sauna experience? What is the general health status of the westerners who go to a Korean jjimjilbang? Do foreigners who have lived in Korea for a long time more likely to go to a Korean spa? What is the general health status of the westerners who go to a Korean jjimjilbang? Do foreigners who have lived in Korea for a long time more likely to go to a Korean spa?

2.1 Hypothesis:

To answer these questions, we created a survey using the SF-36, which is one of the most widely evaluated internationally recognized and standardized questionnaire health and quality of life measurement.

It consists of 36 questions that examine physical, mental health and well being. All 36 questions are scored on a scale of 0 to 100, with 100 representing the highest level of functioning possible. The questionnaire was created to satisfy minimum psychometric standards necessary for group norm comparisons. The **e**ight health concepts measured are; vitality, physical functioning, bodily pain, general health perceptions, physical role functioning; emotional role functioning, social role functioning, and mental health. (Ware, 1992). With the SF-36 being one of the most valid self-reported health instrument to determine the well-being of survey respondents, we postulate:

Hypothesis 1: A positive correlation between the respondent's self-reported health evaluations SF-36 and the frequency of usage of the spa.

Do foreigners who have lived in Korea for a long time more likely to go to a Korean spa? Acculturation is the process of social, psychological, and cultural change that stems from blending between cultures. (Wesley, 1902). Based on Berry's fourfold acculturation model "The fourfold model is a bilinear model that categorizes acculturation strategies along two dimensions. The first dimension concerns the retention or rejection of an individual's minority or native culture (i.e., "Is it considered to be of value to maintain one's identity and characteristics?"), whereas the second dimension concerns the adoption or rejection of the dominant group or host culture. ("Is it considered to be of value to maintain relationships with the larger society?") From this, four acculturation strategies emerge. "Assimilation" occurs when individuals adopt the cultural norms of a dominant or host culture, over their original culture. "Separation**"** occurs when individuals reject the dominant or host culture in favor of preserving their culture of origin. Separation is often facilitated by immigration to ethnic enclaves. "Integration" occurs when individuals are able to adopt the cultural norms of the dominant or host culture while maintaining their culture of origin. Integration leads to and is often synonymous with biculturalism. "Marginalization**"** occurs when individuals reject both their culture of origin and the dominant host culture." (Berry, 1997 p. 46). As a result of Berry's acculturation and integration theory we postulate:

Hypothesis 2: A positive correlation between the length of time living in South Korea and the frequency of spa usage

3. Methodology

3.1 Survey Population:

In our study, the participants must be a foreigner from a native English speaking country. The countries included in our criteria were Canada, United States, United Kingdom, South Africa, Australia or New Zealand. The person taking the survey must qualify by having had at least one Korean sauna experience.

3.2 Study Design:

In creating our survey, we followed the C-OAR-SE method. Doing qualitative developmental research helped us to define what we were studying precisely. Additionally, short surveys reduce fieldwork cost and systematic errors. According to Dolnicar regarding the reliability of data from surveys, she writes "Rater error occurs when respondents make mistakes, due to fatigue or lack of motivation." (Dolnicar, 2013 p. 557)

Phase 1: First we obtained qualitative developmental research. We surveyed n=10 and asked what specific attributes of the Korean sauna they enjoyed. Additionally, we asked them about the benefits of the sauna, both physical, emotional and mental. The goal of this initial phase of the research was to develop unambiguous constructs of the sauna aspects. In this phase, we discovered thirteen physical benefits and five emotional or mental benefits of sauna usage. We also discovered eight attributes of the Korean sauna that westerners found beneficial.

Phase 2: Secondly, we created a survey based on the information gathered from Phase 1, including demographic information. Additionally, we added the SF-36 questions discussed at the beginning of the methodology section. We pre-tested the survey study of n=30 westerners. We asked them to talk out-loud when they completed the survey to see if they had any misunderstandings.

Phase 3: Our query was reviewed by a survey expert to check content validity. We surveyed n=225 foreigners living in South Korea that met our criteria.

3.3 Data Collection

For phase 3 of our research, we used an online survey as well as an offline survey to garner 242 responses. 13 were excluded after a review of the survey data. Additionally, three respondents were eliminated from the final data analysis because they did not fit the criteria of our survey. A total number of 225 respondents were counted. Our research team attended events such as Canada Day, American Independence Day, both places where many Americans and Canadians gathered to celebrate their holidays. The survey participants had the option to fill out an online survey or the paper version of our survey. Also, we attended other local Busan events that foreigners frequent and offered the same survey options. Additionally, the online version of our survey was posted in various groups on Facebook and popular websites that foreigners in Korea visit.

4. Results

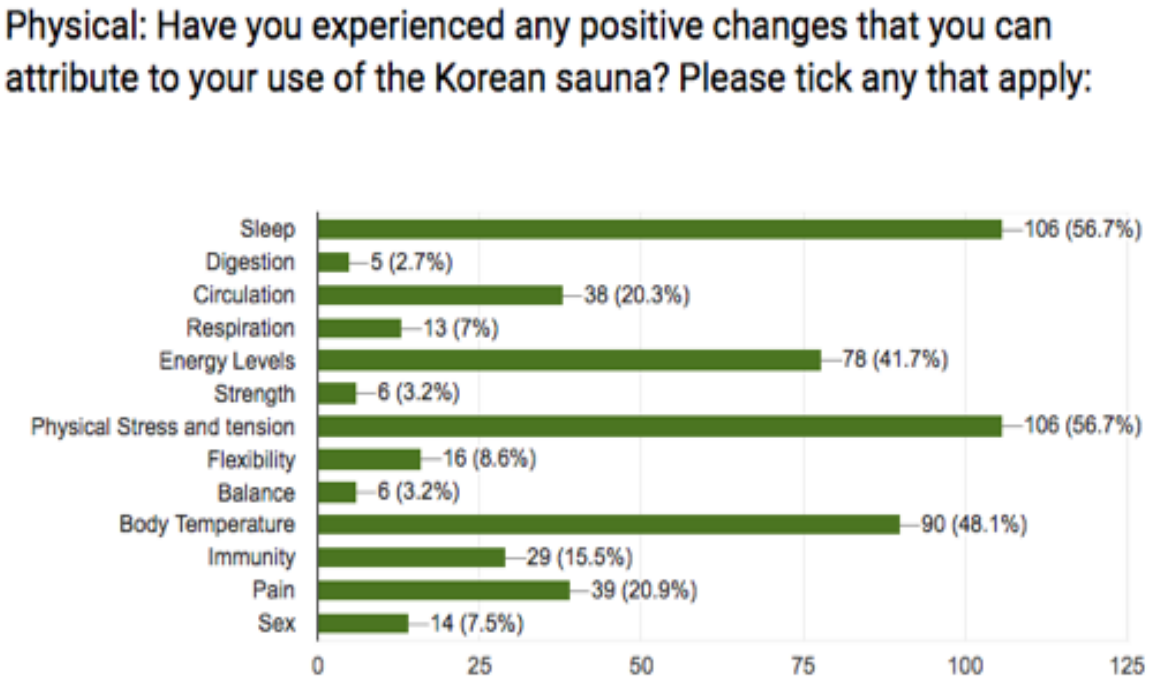
4.1 Demographics

In our survey, 57.3 % of men and 42.7 percent of women responded to our survey with an average age of 32.8 years old. 51% of Americans took the survey and 31.1 Canadians which makes 82.6 percent of survey respondents were from North America. (See figure 2 and figure 3)

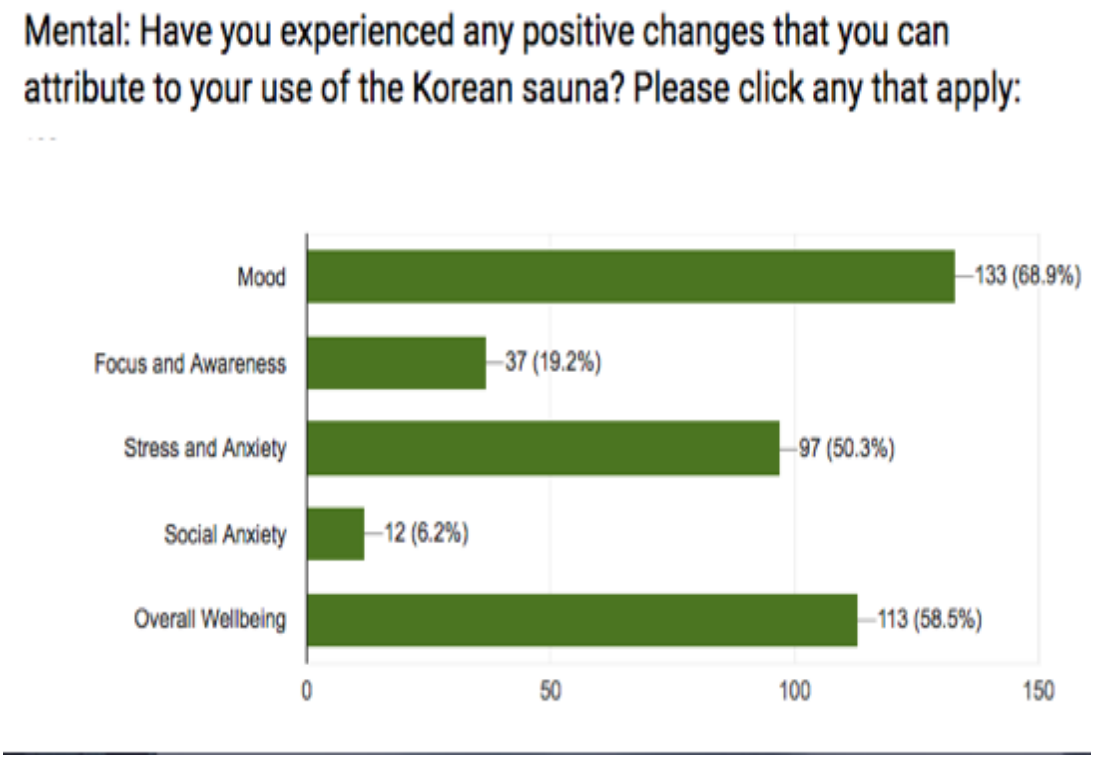
4.2 Findings: As for our question about frequency of usage, 28% responded reported that they rarely go to the sauna and 23.3% said they go every few months. Only 5.3 percent of the respondents reported that they go 3-4x per week. (See table 3)

In regards to the question, "What aspects of the sauna are important to you?" 84.3% said they like the Hot baths (jacuzzi) followed by hygiene and massage baths. As for our questions regarding the positive benefits in which we asked; "Have you experienced any positive changes you can attribute to your use of the Korean sauna?" the most popular answers were "sleep" and "physical stress and tension "58.6 followed by "body temperature" with 48.1% of survey respondents. (See figure 2) With our question about mental benefits "Have you experienced any positive changes that you can attribute to the use of the Korea sauna? 68.9% said, "mood" followed by "overall Well Being" with a response of 58.5%. (See figure 3)

(Figure 2)



(Figure 3)



4.3 Statistical analysis

After coding the SF-36 for **Hypothesis 1**, we found a positive correlation between the respondent's self-reported health evaluations and the frequency of usage of the spa. The results of our statistical analysis indicate a Pearson's Correlation of .428 between the frequency of spa usage and the respondent's SF-36 scores. However, in **Hypothesis 2**: A positive correlation between the length of time living in South Korea and the frequency of spa usage. We found no correlation between in the length of staying in Korea and the frequency of spa usage. Some findings from this research were consistent with the findings from our literature review of the general health benefits of saunas, especially the findings from Laukkanen's research on the frequency of sauna usage increase of health benefits.

5. Implications of the study

5.1 Marketing:

Based on our sauna research, Korean wellness establishments could improve marketing to western populations domestically and internationally. Spas should emphasize the benefits of the "hot baths (Jacuzzis)" and advertise and improve facility hygiene to attract and maintain customer satisfaction. Spas should advertise using the following words to describe the benefits "improve mood," "overall well-being," "stress reduction," "reduce physical tension" and "improve sleep."

5.2 Discussions

Russians have a population of 44,000 living in South Korea and Uzbekistan have a population of 62,000 living in South Korea. They have a similar "sauna" in their countries called the "Banya". It would be interesting to conduct a similar research project comparing their experience with the jjimjilbang in Korea. Also, it would be interesting to explore what the successful jjimjilbangs in major cities in North America are doing differently than Korean jjimjilbangs.

6. Limitations

6.1 Online surveys

Some of our surveys were collected online, for the ease of data entree. Many of the online surveys were conducted in front of our research team, therefore has good face validity. However, some surveys were posted on facebook groups, thus; anyone could participate, and people with interest in changing the results could take the survey over and over again. However, we compared the data from the online surveys and the offline surveys to test the reliability of the data. We concluded no significant difference in the data collected between the online and offline surveys.

6.2 Population limitations

Additionally, with a limited number of foreigners living in South Korea, the majority of people we surveyed were from the United States and Canada. We have little data regarding foreigners from other western countries and how they compare to North American perceptions of the Korean sauna.

6.3 Variability

Saunas in Korea have a significant difference in quality based on the specific location of the survey participant and limited accessibility. For example, one person could have a bad experience in one sauna and a great experience in another sauna. The locations of the survey participants would affect the outcome of this type of survey.

6.4 Generalizable data

With only testing a small sample size of 225 participants in the survey, we could not say the data is generalizable for all North Americans living in South Korea.

References

A. Masuda, M. Nakazato, T. Kihara, S. Minagoe, and C. Tei, "Repeated Thermal Therapy Diminishes Appetite Loss and Subjective Complaints in Mildly Depressed Patients," Psychosomatic Medicine 67, no. 4 (Jul.–Aug. 2005): 643–47."

Amano K., Yanagihori R., Tei C. Waon therapy is effective as the treatment of myalgic encephalomyelitis/chronic fatigue syndrome. *Journal of Japanese Association of Physical Medicine Balneology and Climatology*. 2015;78(3):285–302

Beever R. (2010). Far-infrared saunas for treatment of cardiovascular risk factors: summary of published evidence. *Canadian Family Physician*. 2009;55(7):691–696.

Dolnicar, S. (2013). Asking good survey questions. *Journal of Travel Research*, *52*(5), 551-574.

Health Benefits of Sauna. (n.d.). Retrieved June 5, 2018, from http://www.saunasociety.org/

Campbell, L. (2017, March 01). Do Saunas Really Offer Any Health Benefits? Retrieved from https://www.huffingtonpost.com.au/2016/12/05/do-saunas-really-offer-any-health-benefits_a_21620427/

Clark. D. N. (2000). *Culture and Customs of Korea*. GreenwoodPress. p. 94. ISBN0313304564.

Crinnion WJ. Results of a decade of naturopathic treatment for environmental illnesses. Journal of Naturopathic Medicine 1997;l7:21-27

Goekint M, Roelands B, Heyman E, Njemini R, &Meeusen R. Influence of citalopram and environmental temperature on exercise-induced changes in BDNF. Neuroscience Letters, 2011;494(2):150–4. PMID:21385602;

Hasan, J., Karvonen, M. J., &Piironen, P. (1967). Physiological Effects Of Extreme Heat 1 As Studied In The Finnish "sauna" Bath. *American Journal of Physical Medicine & Rehabilitation*, *46*(2), 1226-1246.

Hussain, J., & Cohen, M. (2018). Clinical Effects of Regular Dry Sauna Bathing: A Systematic Review. *Evidence-Based Complementary and Alternative Medicine,2018*, 1-30. doi:10.1155/2018/1857413

Janssen CW, Lowry CA, Mehl MR, Allen JJ, Kelly KL, Gartner DE, et al. (2016): Whole-body hyperthermia for the treatment of major depressive disorder: A randomized clinical trial. JAMA Psychiatry 73:789–795.

"Jjimjilbang: a microcosm of Korean leisure culture". *The Korea Herald*. 1 April 2010. Retrieved 25 March 2017.

Leppäluoto, J., Huttunen, P., Hirvonen, J., Väänänen, A., Tuominen, M., &Vuori, J. (1986). Endocrine effects of repeated sauna bathing. *ActaPhysiologicaScandinavica*, *128*(3), 467-470.

Laukkanen, T., Kunustor, S., Kauhanen, J., &Laukkanen, J.A. (2016) Sauna bathing is inverssely associated with demential and Alzheimer's disease in middle middle-aged Finnish men. *Age and Ageing*, *46*(2), 245-249.

Marc, C., & Gerard, B. (2015). *Understanding the global spa industry*. Place of publication not identified: Routledge.

Mair, G. (2015, September 29). Bronze Age 'sauna' discovered off Scottish coast: Building may have been used for religious ceremonies 4,000 years ago. Retrieved April 8, 2018, from http://www.dailymail.co.uk/sciencetech/article-3253643/Bronze-Age-sauna-discovered-Scottish-coast-Building-used-religious-ceremonies-4-000-years-ago.html

Matsumoto, S., Shimodozono, M., Etoh, S., Miyata, R., &Kawahira, K. (2011). Effects of thermal therapy combining sauna therapy and underwater exercise in patients with fibromyalgia. *Complementary therapies in clinical practice*, *17*(3), 162-166.

Mercola, J. (2017, January 12). This is What Can Happen to Your Dementia and Alzheimer's Risk When You Use a Sauna 4-7 Times Per Week. Retrieved April 7, 2018, from https://articles.mercola.com/ sites/articles/ archive/2017/0 1/12/sauna-health-benefits.aspx

McHorney, C. A., Ware Jr, J. E., Lu, J. R., &Sherbourne, C. D. (1994). The MOS 36-item Short-Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Medical care*, 40-66.

Krause, M., Ludwig, M. S., Heck, T. G., & Takahashi, H. K. (2015). Heat shock proteins and heat therapy for type 2 diabetes: pros and cons. *Current Opinion in Clinical Nutrition & Metabolic Care*, *18*(4), 374-380.

Patrick, R. (2017, June 15). Dr. JariLaukkanen on Sauna Use for the Prevention of Cardiovascular & Alzheimer's Disease. Retrieved from https://www.youtube.com/watch?v=jL7vVG_CFWA

Patrick, R. (2017). Hyperthermic Conditioning Role In Increasing Endurance, Muscle Mass, and Neurogenesis, 10-11.

Pharmacist, R. (2017, May 05). Sauna Exposed: What Happens to Your Body After Using a Sauna. Retrieved April 4, 2018, from https://therenegadepharmacist.com/sauna-exposed/

Ross, G. H., & Sternquist, M. C. (2012). Methamphetamine exposure and chronic illness in police officers: significant improvement with sauna-based detoxification therapy. *Toxicology and industrial health*, *28*(8), 758-768.

Sam, D. L., & Berry, J. W. (2010). Acculturation: When individuals and groups of different cultural backgrounds meet. *Perspectives on Psychological Science*, *5*(4), 472-481.

Scoon, G. S., Hopkins, W. G., Mayhew, S., & Cotter, J. D. (2007). Effect of post-exercise sauna bathing on the endurance performance of competitive male runners. *Journal of Science and Medicine in Sport*, *10*(4), 259-262.

Singh, R., Kolvraa, S., Bross, P., Christensen, K., Bathum, L., Gregersen, N., ... & Rattan, S. I. S. (2010). Anti-inflammatory heat shock protein 70 genes are positively associated with human survival. *Current pharmaceutical design*, *16*(7), 796-801.

The Science of Saunas. (2017, October 10). Retrieved April 17, 2018, from https://bengreenfieldfitness.com /article/biohacking-articles/science-of-sauna/

Welcome to the International Spa Association | The Voice of the Spa Industry. (n.d.). Retrieved April 06, 2018, from https://experienceispa.com/

Ware, J. E. (1993). Scoring the SF-36. *SF-36. Health Survey: Manual and Interpretation Guide*.

한영준. "조선보다못한'한증막안전". *세이프타임즈* (in Korean). Retrieved 25 March 2017.

문서뷰어. (n.d.). Retrieved July 5, 2018, from http://www.moj.go.kr/doc _html/ viewer/skin/ doc.html?fn=82b1c994fb7b0a79aacb531ff4ff397f&rs=/doc_html/viewer/result/201806/