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Editorial: Ethical Decisions

This is the 160th issue of *EJAIB*, and it features a range of papers in bioethics. Miki Fukuyama and colleagues report on a descriptive bioethics study of the factors that are important for Japanese elderly acute patients regarding their long term care. We can compare the conclusions with the paper of Yanguang Wang that compares the concept of common morality proposed by Beauchamp and Childress with the ethos and practice of medical ethics in China. The principles model is useful for making decisions, as has been the conclusion of many earlier explorations of the international nature of ethical decision-making. The theme of Asian bioethics will be explored further in October at the 18th Asian Bioethics Conference.

New genetic technology is discussed in the papers from Bang-Ook Jun on the use of gene drive technologies in vector borne diseases, in particular with mosquitoes. Ann Boyd discusses the use of CRISPR in human beings. Recent papers in *Nature* have shown its use in human embryos, raising questions to discuss the limits we have placed on the growth of human embryos in Culture (See also the 2017 Nuffield Council report on the topic). These topics look at the limits of ethics, a topic also explored in terms of authorship and journal retraction policies by Jaime A. Teixeira da Silva.

Alex Waller reports a difference in attitudes to the use of renewable energy between the public and teenagers in Thailand. This is interesting to repeat in other countries. Manjae Kim describes the newspaper images of the causes of particulate matter in Korea, and asks whether ethics is lacking in the portrayal of data, as well as in practices. Governments have responsibilities in developing policy for a sustainable and healthy environment. Some decisions are clearly the mandate of individuals, while others beg government responsibilities in setting standards and guidelines. If we cannot see many ethical decisions today we can have serious concerns about opening up the choices of genetic engineering of embryos, and using gene drive to modify the biosphere. We need to continue to develop better models for how the cumulative impact of individual decisions shapes our global societies. - Darryl Macer

Factors influencing the decision-making of elderly acute leukemia patients in Japan regarding their treatment

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Abstract

Objective: This study examined the process through which elderly patients with new-onset acute leukemia make treatment decisions from the time of diagnosis, in order to identify factors influencing this decision-making process in Japan.

Methods: Semi-structured interviews were conducted with twenty-two elderly patients with leukemia. The data were analyzed using the modified grounded theory approach.

Results: The process of decision-making in elderly patients with leukemia includes three stages: Initial reactions at diagnosis, change in attitudes, and entrusting the physician with the treatment plan. Initial reactions at diagnosis were affected by interactions with others that brought peace of mind to the patients. Change in attitudes was affected by encouragement from others to undergo treatment and their own motivation to face treatment. Patients came to entrust their treatment plan completely to their physician, because they wanted to feel relief and did not want to have to grapple with difficult medical information that was relevant to decision-making about their disease and treatment options.

Conclusions: The process of decision-making in elderly patients with leukemia is affected by several factors and included three stages. Our present study findings can provide suggestions on how medical professionals might better support the process of decision-making in elderly patients with leukemia.

Introduction

In 2009, 6.3 persons (7.8 males and 4.9 females) per 100,000 population developed acute leukemia (hereafter, leukemia) in Japan, with a total of 7,900 deaths (Japan Adult Leukemia Study Group 2011). Similarly, in the United States and Sweden, acute myeloid leukemia is much more common in elderly people (Juliusson et al. 2012). The number of elderly Japanese patients undergoing treatment for leukemia is expected to increase in the future, due to progress in treatment methods for elderly patients with leukemia as well as an increase in the size of the aging population.

Against this backdrop, it is important to identify how elderly patients with leukemia make decisions to undergo treatment and what factors affect this decision-making process. Sekeres et al. (2004) reported that elderly patients with leukemia make decisions without fully understanding the treatment involved, and recommended that elderly patients acquire solid knowledge about treatment and participate in the decision-making. However, few studies have investigated this process from the perspectives of the elderly patients with leukemia when they make the decision to undergo treatment. The present study clarified the process through which elderly patients with leukemia make decisions about treatment from the time of diagnosis, and identified factors that affect this decision-making process in Japan.

The results of this study may provide useful suggestions for medical professionals as they consider how to offer support for decision-making to elderly patients with leukemia.

Materials and Methods

Ethical considerations in recruitment of subjects:

The present study was reviewed and approved by the Ethics Committees at each medical institution involved in the study as well as that of Kumamoto University (Registration Number 239, Approved December 27, 2007). We received consent from all participants before including them in this study.

Recruitment procedure:

First, the investigator asked physicians at cooperating institutions to provide an explanation of the study to elderly patients (aged ≥ 65 years). Physicians were instructed to contact the investigator if any patient indicated a desire to cooperate. The investigator then met with the patient to provide a detailed explanation about the purpose of the study, as well as ethical considerations. After obtaining a written consent, an interview was performed.

The study period was from May 2008 to March 2012 (interrupted from July 2009 to August 2010 while the investigator was on maternity leave).

Data Collection

The investigator conducted all interviews with patients face-to-face. During the interviews, patients were asked about their awareness, attitudes, and thoughts regarding leukemia and their life with medical treatment. This report includes patient narratives regarding the period from diagnosis to treatment decision. Interview contents were recorded using an IC recorder.

Method of analysis

Data were analyzed using the modified grounded theory approach (Kinoshita 1999 & 2003). In this study, the analysis theme was as follows: "From the time of diagnosis to treatment initiation, how do elderly patients make decisions? What factors affect the process of decision-making?" To analyze data, an analysis worksheet comprising the columns for concept name, concept definition, examples, and theoretical memo was used. Verbatim records were carefully reviewed, while paying attention to data related to the analysis theme. Data were recorded in the example column. Next, the data were interpreted from the viewpoint of elderly patients, and ideas that emerged during the analysis were recorded in the theoretical memo column. The concept definition and the concept name were created, followed by comparative analysis based on the concept definition to seek out other similar/contrasting examples from the data. Other concepts were created in the same way as described above. An analysis worksheet was created for each concept. The relationship between each concept was examined and categories were created from the relationships between multiple concepts. Finally, the mutual relationships between categories were examined, yielding a map of categories.

Results

Participants

Twenty-two elderly patients agreed to be interviewed. Nine of the participants were in their 60s, ten in their 70s, and three in their 80s. Fourteen were male and eight were female. Two had been diagnosed with acute lymphocytic leukemia and twenty with acute myeloid leukemia. The interview duration ranged from 29 to 79 min, with a mean of 55 min. Patient information is shown in Table 1.

Overall results

The process of decision-making in elderly patients with leukemia comprised three stages: Initial reactions at diagnosis, change in attitudes, and entrusting the physician with the treatment plan.

Table 1: Participants' information

case	Sex	Age	Disease	Treatment
A	M	70s	ALL	Remission induction therapy→4 courses consolidation therapy
B	M	80s	AML	3 courses CAG (quiloside, aclacinon, G-CFS) therapy
C	M	70s	AML	Remission induction therapy→3 courses consolidation therapy
D	M	70s	AML	2 courses CAG
E	M	70s	AML	5 courses CAG
F	M	60s	AML	Remission induction therapy→consolidation therapy→1 course intensification therapy
G	M	60s	AML	RIT IDA AraC (rituxan, idamycin, quiloside)→CAG→VP (vepesid)+3 courses CAG
H	M	70s	AML	Remission induction therapy→3 courses consolidation therapy
I	M	60s	AML	Remission induction therapy, 1 course CAG
J	F	70s	AML	4 courses CAG
K	F	60s	AML	2 courses CAG
L	M	80s	AML	2 courses CAG
M	F	70s	AML	3 courses CAG
N	F	60s	AML	Remission induction therapy→consolidation therapy
O	F	60s	ALL	Remission induction therapy→consolidation therapy
P	M	70s	APL	Remission induction therapy→consolidation therapy
Q	F	70s	AML	2 courses CAG
R	M	60s	AML	CAG twice, MIT-Arac (novantron, quiloside) 2 nd course of vidaza
S	M	60s	AML	Remission induction therapy, 1 course CAG
T	F	70s	AML	Remission induction therapy, CAG, MIT-AraC, DNR-AraC (daunomycin, quiloside), CAG
U	F	60s	AML	Remission induction therapy, 3 courses CAG
V	M	80s	AML	4 courses CAG

※60s ; 65 years and older

※ALL ; Acute lymphocytic leukaemia; AML: acute myelogenous leukaemia

APL ; Acute promyelocytic leukaemia

※M: male; F: female

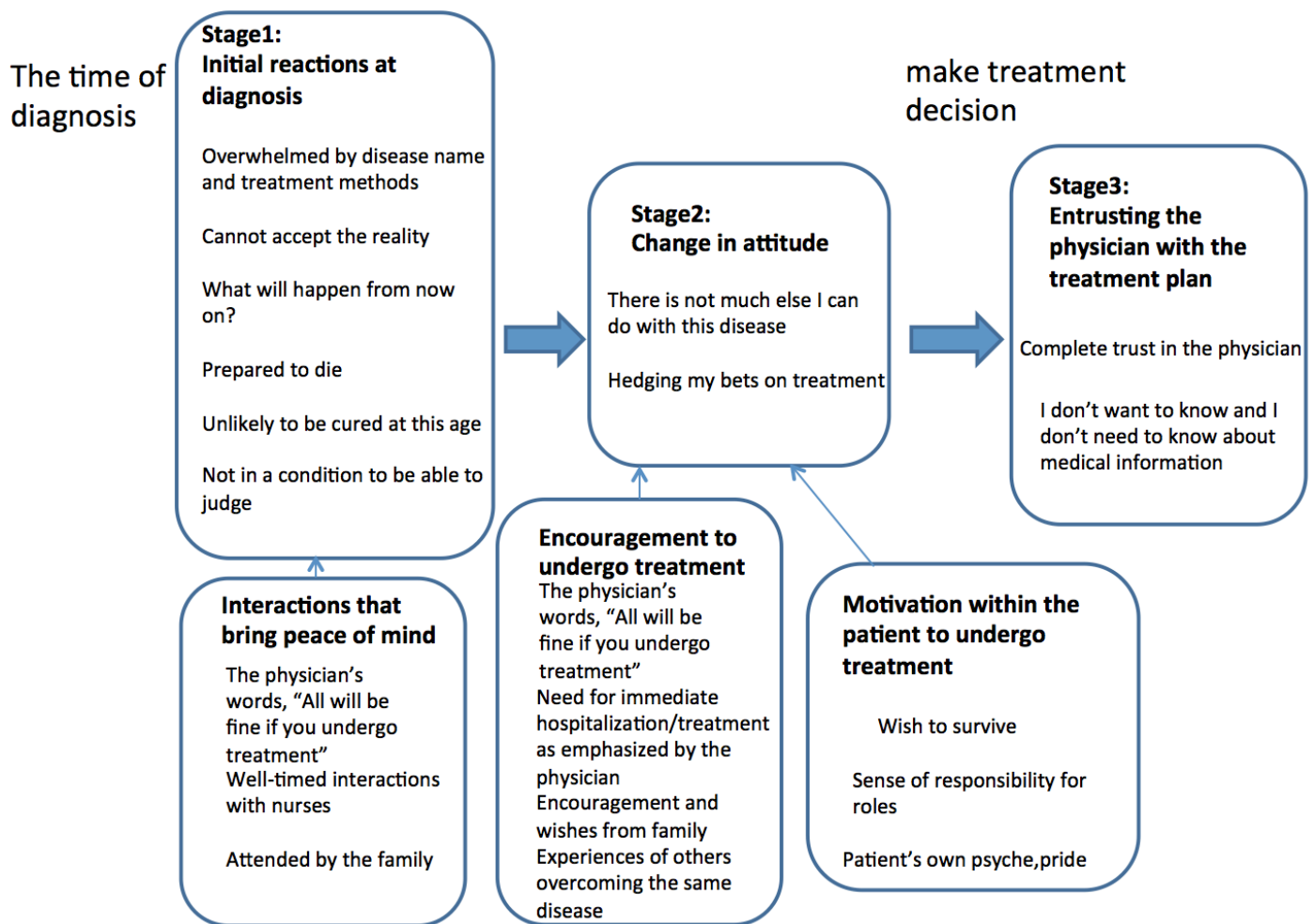


Figure 1: The decision-making process and associated factors in elderly patients with acute leukemia in Japan

Patients' initial reactions at diagnosis comprised negative feelings, but interactions with others brought them peace of mind. Patients changed their attitudes toward the disease through encouragement from others and their own motivation to undergo treatment. Patients came to entrust their treatment plans completely to their physicians, because they wanted to feel relief and did not want to have to grapple with difficult medical information pertaining to decision-making about their disease and treatment. Overall results are shown in Figure 1.

Stage 1: Initial reactions at diagnosis

In this study, elderly patients described six feelings including psychological distress that they experienced immediately after diagnosis. First, patients were overwhelmed by the name of the disease and its treatment methods. This occurred immediately after diagnosis, as many elderly patients had stereotypes associated with leukemia due to the influence of the media, e.g., that leukemia is an incurable disease. Some elderly patients formed an image of leukemia based on the experience of a close friend or acquaintance with leukemia from several decades ago.

"About 40 years ago, my wife's mother died of leukemia. Her doctor at the time said that leukemia was an incurable disease. This experience has been stuck in my head."

Second, elderly patients had difficulty accepting the reality, and some were unaware of leukemia, particularly among those with few subjective symptoms. Moreover, some patients were not convinced that they had developed leukemia, as they could not think of any cause.

"When I was told directly by my physician that [I had] myeloid leukemia, I said: Why? Really? Then I said: I'm in such good health. I really was healthy. No dizziness. So, I kept saying: No way, no way..."

Third, at initial diagnosis, patients were worried about the nature of disease progression and treatment to undergo in the future because they could not understand the relevant information.

"What treatment will be conducted? Will the treatment be painful?"

Fourth, in preparing for death, some elderly patients became strongly conscious of death, felt depressed, or became very reflective as they looked back on their lives.

"I have lived for 80 years already, and it's not like I have a family, or kids, so I'd say that if I were to die, it would be OK."

Fifth, some elderly patients felt that their disease was unlikely to be cured at their age.

"I felt pessimistic, thinking that, at my age, if I get sick with a disease like that, I would probably not get better again."

Finally, they were in no physical or mental state to listen to physicians' explanations or make any judgment concerning treatment decisions.

"When I was told that [I had] acute myeloid leukemia, I plainly asked: What is it, doctor? He said: It's a cancer of the blood. Then my mind just went completely blank, and while my doctor explained various things, I asked (my family): Please listen (to the doctor's explanations) on my behalf."

Interactions that brought peace of mind

Immediately after diagnosis, the distress that elderly patients experienced was alleviated to some extent through interactions that brought peace of mind. In particular, the physician's words calmed the distressed patients.

"My doctor said: It's a big deal to undergo anti-cancer therapy, but if you do, you will get better. We will cure you."

Furthermore, well-timed interactions with nurses also helped the anguished patients.

"When I said: I wonder if I will get through this New Year. I wonder if I will get through...; a nurse cheerfully said to me: Oh, everyone gets better and goes home. I remember how happy that made me."

Family members accompanying the patient also helped reduce the distress.

"My husband was always by my side."

Stage 2: Change in attitude

Elderly patients managed to change their attitudes while going through a number of hardships. They accepted their leukemia development as their fate, with the mindset that nothing can be done about it because they already have the disease, and tried to focus on treatment.

There's nothing that can be done about the fact that I got leukemia. I just need to do my absolute best to be a faithful patient and follow all that the doctor is recommending for treatment.

Some elderly patients prepared to take on this fate by hedging their bets on treatment, even though they were uncertain of the efficacy.

"As I had already resigned myself to the fact that I might not get better, I was in a position where I felt like taking a chance with treatment, even if it cost me my life."

Encouragement to undergo treatment

Encouragement from others to undergo treatment influenced elderly patients to change their attitudes. Many patients mentioned the physician's words; the only thing that elderly patients remembered clearly was physicians saying that they will try their best to cure them. This quote was noted in the context of 'Interactions that bring peace of mind.'

Moreover, the physician emphasizing the need for immediate hospitalization and/or treatment also greatly motivated elderly patients to move towards treatment.

"You only have one month to live. We can't just leave you in a state where the airplane is going straight down, [my doctor] said."

The family's encouragement and wishes, including the gathering of the family to make decisions, the collection of active information, and asking the physician instead of other patients, also pushed patients to undergo treatment.

"Two of my daughters and my son-in-law, who is a doctor, said: Nowadays, even with a leukemia diagnosis you can get better if you undergo proper treatment, so you should do it."

Furthermore, having seen or heard of patients who had overcome the same disease prior to diagnosis also served as motivation for elderly patients to summon their courage.

"My friend had acute lymphatic leukemia. He, though it's been 4 years already, has gotten considerably better. Seeing the way he is now makes me want to push myself, and hang in there a little more."

Motivation within the patient to undergo treatment

Some elderly patients were able to change their attitudes with motivation they found within themselves to undergo treatment. These elderly patients first felt the desire to survive, and this led them to switch their attitudes toward receiving treatment.

"I was filled with the idea that I must break myself away from this illness."

With regard to the sense of responsibility for their roles, there were patients who stepped into treatment with a strong sense of relationship between themselves and family or society.

"If I can live, I must live [for my family] as long as I can. After all, that's what caring for my family is about, I think."

Other elderly patients decided to undergo treatment by becoming conscious of their own psyche and pride.

"I want to be able to live my own life. Nothing bothers me. I've always kept a spirit of 'que sera, sera.'"

Stage 3: Entrusting the physician with the treatment plan

After changing their attitudes, elderly patients embarked on the first round of treatment by leaving treatment plans entirely up to their physicians. Patients placed complete trust in their physicians. In particular, the degree of reliance on the expertise of physicians at a hospital treating leukemia and doing chemotherapy tended to be high from the very beginning.

"I was still worried but I felt peace of mind because I was hospitalized and trusted my physician. This entrustment made me feel good."

The elderly patients did not need detailed information about their disease and treatment. Some of them even tried to limit their intake of such information, which may have increased their anxiety.

"I don't really want to know about the efficacy of drugs and what is involved in this disease. "

(Regarding supply of books about leukemia): *"I couldn't look at them at all. I was afraid that if I read those books, the knowledge about the disease entering my mind would make me more anxious."*

Discussion

Initial reactions at diagnosis

The elderly patients of this study experienced several kinds of distress, as described in previous reports (Friis et al. 2003; Koenigsmann et al. 2006; Meenaghan & Dowling 2010; Rodin et al. 2013). Also, the elderly patients' reaction to their onset of leukemia took into account their age. For example, they felt that their disease was unlikely to be cured at their age, or they began to prepare for death. In addition, we found that they were unable to listen to the physicians' explanations or make any judgments about their treatment. Their Initial reactions at diagnosis were based on stereotypes that had developed based on information from the media as well as their own experiences from several decades ago.

In Japan, TV dramas, documentaries, and films often feature patients who battle leukemia. Many elderly patients were exposed to instances in which

effective treatment for leukemia was not established. Interactions with others brought elderly leukemia patients peace of mind. In particular, physicians' words alleviated their psychological distress. LeBlanc et al. reported that many patients with leukemia described blunt communication between medical professionals that lacked emotional support, resulting in feelings of disappointment, fear, and even abandonment (LeBlanc et al. 2016). Therefore, we would propose that healthcare professionals can improve patients' initial reactions by exploring and correcting their outdated assumptions about leukemia, as well as through verbal communication that provides emotional support.

Change in attitude

A change in attitude came about when elderly patients managed to change how they perceived the fact that they developed leukemia. This change in perception likely resembles one of the coping strategies described by Lazarus et al., emotion-focused coping, in which one seeks to find a different meaning in an incident that he or she encountered and deemed stressful, by changing how the cause of this stress is interpreted (Chaen 2006). In this study, patients' change in attitude was influenced by encouragement from their physicians, family members and other leukemia patients. Some elderly patients found within themselves the motivation to undergo treatment, which led to a change in attitude. This motivation was driven by their desire to survive, patient's psyche, pride, and a sense of responsibility toward fulfilling their roles.

Physicians' words in particular appeared to have a major impact on patients as they considered undergoing treatment. In this study, the wish to live was expressed by many elderly patients. For elderly patients with such thoughts, a physician's encouragement evoked a feeling of great hope that they could undergo treatment, which led to a change in attitude. Puts et al. reported that chemotherapy, as the last resort to prolong life, was one of the most important reasons to face treatment (Puts et al. 2017). We surmise that the physician's explanation significantly influenced this change in attitude of patients.

The present study also revealed that the families of the elderly patients were active participants in the decision-making process. In Japan, patients and their families often desire to make decisions following a consultation with both the physician and the family present (Ito et al. 2010). In fact, some elderly patients in the present study decided to undergo treatment after obtaining information from their family members. Thus, involvement of

the patients' family members as mentors greatly impacts the changes in patient attitudes.

The present study revealed that experiences of others overcoming the same disease served as encouragement to elderly patients. Yogaparan et al. reported that family, friends, other patients, and the Internet were uncommon sources of information (2009). Peer support is a flexible concept used in healthcare across diverse areas to describe the activities of individuals acting in a non-professional capacity offering support to others with whom they have some experience in common (McLeish & Redshaw 2015); in recent years, peer support has become widespread in clinical practice for cancer (Kawakami et al. 2014). A report on peer support for patients with breast cancer found that patients were relieved to see others with the same disease doing well and that their true inner feelings were heard by others (Osaka et al. 2011). In this study, some patients experienced a desire to overcome the disease after listening to the experiences of other patients. Interactions with other patients who had overcome the same disease seem to contribute greatly toward the changes in attitude in patients.

The elderly patients' sense of responsibility toward fulfilling their roles also influenced changes in attitude. With regard to their responsibility toward their family members, some patients thought that receiving no treatment would make their family feel regret. This thought may be influenced by Confucianism, which values blood relationships, and collectivism, which not only considers individuals to be consistently part of a larger group, but also expects them to downplay their own personal goals relative to those of the group (Kaji 2015; Ishikawa & Yamazaki 2005). In fact, elderly patients of this study reported that they thought about how their decision affected their family, and chose to undergo treatment not only for themselves, but for their family as well.

The present study also revealed that patients' psyche and pride contribute greatly to changes in attitude among patients. One patient expressed that she had an unwavering mindset of "*que sera, sera*". Other patients took pride in themselves due to their past discipline (mental and physical), as well as their experience in overcoming many difficulties. For elderly patients, these types of psychological predisposition and pride can serve as sources of power that enables them to overcome difficulties and encouragement that can lead to a change in attitude. With regard to decision-making about treatment for elderly patients, some researchers have emphasized the need for sufficient consideration of treatment risks (Klepin 2015), while others have clarified that some elderly patients turn the decisions over to their family members (Miyama 2016). However, we would

suggest that a patient's psyche, pride, and sense of responsibility in fulfilling their various roles should also be taken into consideration when making decisions about treatment.

Entrusting the physician with the treatment plan

The present study revealed that elderly patients suffering from leukemia often opted to entrust the physician completely with their treatment plan. Underlying such a posture may be complete trust in the physician for their peace of mind, the lack of desire to obtain medical information, and the difficulty to understand such information.

With regard to complete trust in the physician, Nissim et al. reported similar patient attitudes as their psychological response (2013). Specifically, they found that patients with leukemia expressed a strong sense of trust in their health care providers, which provided a sense of "safety" in the midst of the chaotic and traumatic experience of the illness. In this study, after elderly patients changed their attitude and decided to receive treatment, they were still worried about their disease. Some patients stated that they entrusted their physician completely with their treatment plans so that they might eliminate the anxiety and feel relieved.

Previous studies on leukemia patients' need for information have reported that patients did not want to know detailed medical information, such as numerical data or potential side effects (LeBlanc et al. 2016; Puts et al. 2017). The elderly in particular expressed no desire to receive further medical details about their disease (Friis et al. 2003). Elderly patients of this study also exhibited little desire to obtain medical information. Some patients limited their intake of medical information in order to avoid anxiety. Friis et al. reported that avoiding information in this manner could be explained as a strategy to maintain hope, and that most patients more readily sought after information on problems affecting their everyday life and how other patients had coped with their disease (Friis et al. 2003). Similarly, some elderly patients of this study found themselves asking, "What will happen from now on?" Medical professionals who are interested in why patients are not eager to obtain medical information, or what kinds of information the elderly patients desire, may benefit from providing information consistent with patient preference.

With regard to the difficulty of understanding medical information, LeBlanc et al. argued that patients with leukemia face a particularly daunting task in trying to understand and contextualize incredibly complex information (LeBlanc et al. 2016). In addition, because the subjects of this study were elderly patients, declined cognitive

function was likely to increase this difficulty (Uldry et al. 2013).

In addition to a low desire to obtain medical information, participants of this survey exhibited complete trust in their physicians. In Japan, such an attitude is known as *omakase*, a traditional Japanese approach to medical decision-making (Specker Sullivan 2017). The term means to entrust decisions to another person, and is often heard in restaurants in Japan, where asking for the *omakase* set is to have the chef determine the contents of one's meal (Specker Sullivan 2017). In medical settings, it implies that a patient wishes to leave the decisions up to the physician (Specker Sullivan 2017). One reason why Japanese patients prefer *omakase*, Specker Sullivan argues, goes back to the importance of trusting relationships in the Japanese society, which may explain why they do not prefer to make decisions alone and take responsibility for these (2017). In this study, elderly patients placed a high value on their relationship with their physicians. To this end, they chose to entrust their physicians with their treatment plans.

Limitations

First, the sample size was small, and it was difficult to describe the process of decision-making for all Japanese elderly patients with leukemia. There may be other contributing factors in addition to those identified in this study.

Second, given the background of the study participants, recruitment was limited. Many of the participants had a decent support system. It will be necessary to study decision-making in elderly patients with various backgrounds.

Finally, the present study did not adequately compare decision-making in elderly patients with leukemia from a cultural perspective. In the future, similar studies in other cultures might help clarify the extent of involvement of certain Japanese cultural factors.

Conclusions

This study examined the thought processes of Japanese elderly patients with newly-onset acute leukemia from the time of diagnosis to decision-making on treatment, and identified factors that affected decision-making. Based on our findings, medical professionals should acknowledge the significance of their role in influencing patients and their decision-making; in particular, words from the physicians were reported to calm patient distress and encourage them to change their attitude. Second, medical professionals should pay attention to patient characteristics such as their sense of responsibility toward fulfilling their roles, their psyche, and pride, as these characteristics can bring about positive changes in a patient's attitude

toward treatment. Third, families of patients play a major role in the decision-making process, so medical professionals should offer support to the families as stakeholders. Finally, medical professionals should proceed with their decision-making regarding treatment for elderly leukemia patients knowing that the patients may seek relief in the form of entrusting their treatment plans to the physician and not obtaining detailed medical information.

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References

- Chaen, M. "Theories on needs" and "stress-coping theory" in nursing. *Journal of the Japanese Society of Intensive Care Medicine*. 2006; 13: 431-435. (in Japanese)
- Friis, LS, Elverdam, B, Schmidt, KG. The patient's perspective: a qualitative study of acute myeloid leukemia patients' need for information and their information-seeking behaviour. *Supportive Care in Cancer*. 2003; 11(3): 162-70.
- Ishikawa, H, Yamazaki, Y. How Applicable are Western Models of Patient-Physician Relationship in Asia? : Changing Patient-Physician Relationship in Contemporary Japan. *International Journal of Japanese Sociology*. 2005; 14: 84-93.
- Ito, M, Tanida, N, Turale, S. Perceptions of Japanese patients and their family about medical treatment decisions. *Nursing and Health Sciences*. 2010; 12(3): 314-321.
- Japan Adult Leukemia Study Group. For Better Leukemia Medical Treatment. Easy-to-understand story about leukemia. The revised fifth edition. Chapter 4 Incidence of leukemia. 2011 <http://www.jalsg.jp/leukemia/frequency.html> Accessed May1, 2016.
- Juliussen, G, Lazarevic, V, Hörstedt, AS, Hagberg, O, Höglund, M, Swedish Acute Leukemia Registry Group. Acute myeloid leukemia in the real world: why population-based registries are needed. *Blood*. 2012;119: 3890-3899.
- Kaji, N. What is Confucianism? augmented edition CHUOKORON-SHINSHA, INC. 2015. (in Japanese)
- Kawakami, S, Yanagisawa, A, Konishi, T, Iwase, S. Agenda for Dissemination of Peer Support by Cancer Survivors. *Gan To Kagaku Ryoho*. 2014; 41(1):31-35. (in Japanese)

- Kinoshita, Y. Grounded Theory Approach: The rebirth of qualitative empirical research. Koubundou; 1999. (in Japanese)
- Kinoshita, Y. Grounded Theory Approach in practice: an invitation to qualitative research. : Koubundou; 2003. (in Japanese)
- Klepin, HD. Elderly acute myeloid leukemia: assessing risk. *Current Hematologic Malignancy Reports*. 2015; 10(2):118-25.
- Koenigsman, M, Koehler, K, Regner, A, Franke, A, Frommer, J. Facing mortality: a qualitative in-depth interview study on illness perception, lay theories and coping strategies of adult patients with acute leukemia 1 week after diagnosis. *Leukemia Research*. 2006; 30(9): 1127–1134.
- LeBlanc, TW, Fish, LJ, Bloom, CT, El-Jawahri, A, Davis, DM, Locke, SC, Steinhilber, KE, Pollak, KI. Patient experiences of acute myeloid leukemia: A qualitative study about diagnosis, illness understanding, and treatment decision-making. *Psychooncology* 2016; Nov 15 Epub (ahead of print)
- McLeish, J, Redshaw, M. Peer support during pregnancy and early parenthood: a qualitative study of models and perceptions. *BMC Pregnancy Childbirth*. 2015; Oct 12; 15:257.
- Meenaghan, T, Dowling, M. Treatment for acute leukemia: elderly patients' lived experiences. *British Journal of Nursing*. 2010; 19(1): 52-57.
- Miyama, T. Nursing about the informed consent for the late elderly patient who is admitted to the hospital for the immediate nature period. *Journal of Japanese Nursing Ethics*. 2016; 8(1):32-38. (in Japanese)
- Nissim, R, Zimmermann, C, Minden, M, Rydall, A, Yuen, D, Mischitelle, A, Gagliese, L, Schimmer, A, Rodin, G. Abducted by the illness: a qualitative study of traumatic stress in individuals with acute leukemia. *Leukemia Research*. 2013; 37(5): 496-502.
- Osaka W, Yagasaki K, Kanamori A, Tamahashi Y, Kanai H, Wagatsuma S, Hosokawa K, Higashi Y, Ohata M, Suzuki K, Komatsu H. Report of Peer Support Service "St. Luke's Smile Community" for Breast Cancer Patients: Implementation through a Collaborative Partnership with Breast Cancer Survivor Volunteers and Medical Professionals. *Bulletin of St. Luke's Nursing University* 2011; 37: 36-41. (in Japanese)
- Puts, MT, Sattar, S, McWatters, K, Lee, K, Kulik, M, MacDonald, ME, Jang, R, Amir, E, Krzyzanowska, MK, Leighl, N, Fitch, M, Joshua, AM, Warde, P, Tourangeau, AE, Alibhai, SM. Chemotherapy treatment decision-making experiences of older adults with cancer, their family members, oncologists and family physicians: a mixed methods study. *Supportive Care in Cancer*. 25(3), 2017; 879-886.
- Rodin, G, Yuen, D, Mischitelle, A, Minden, MD, Brandwein, J, Schimmer, A, Marmar, C, Gagliese, L, Lo, C, Rydall, A, Zimmermann, C. Traumatic stress in acute leukemia. *Psychooncology*. 2013; 22(2): 299-307.
- Sekeres, MA, Stone, RM, Zahrieh, D, Neuberg, D, Morrison, V, De Angelo, DJ, Galinsky, I, Lee, SJ. Decision-making and quality of life in older adults with acute myeloid leukemia or advanced myelodysplastic syndrome. *Leukemia*. 2004; 18(4): 809-816.
- Specker Sullivan, L. Dynamic axes of informed consent in Japan. *Social Science & Medicine*. 2017; 174: 159-168
- Uldry, E, Schäfer, M, Saadi, A, Rousson, V, Demartines, N. Patients' preferences on information and involvement in decision making for gastrointestinal surgery. *World Journal of Surgery*. 2013; 37(9): 2162–2171.
- Yogaparan, T, Panju, A, Minden, M, Brandwein, J, Mohamedali, HZ, Alibhai, SM. Information needs of adult patients 50 or older with newly diagnosed acute myeloid leukemia. *Leukemia Research*. 2009; 33(9): 1288–90.

Eradicating Mosquitoes? The Promise and Peril of Gene Drive Technologies

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Abstract

This paper discusses the ethical issues associated with genetic modification of mosquito species that are human disease vectors. The Oxitec genetically changed mosquito—a variant of a species called *Aedes aegypti*, OX513A, is taken as an example. The benefits and risks are discussed, and questions need to be discussed in public prior to release of this gene drive system.

Introduction

Mosquitoes are high-impact disease vectors with the capacity to transmit pathogen agents that cause diseases such as malaria, yellow fever, chikungunya, dengue, and most recently Zika (Overcash 2015). Mosquitoes kill an average of 725,000 people every year. Since scientists first made the connection between malaria and mosquito bites, the mosquito has been the subject of important research, and also the vector of at least a dozen fatal diseases (Dawson 2016).

There are as many as 3,500 different mosquito species, of which 30 spread malaria, which kills more than 400,000 people, mostly children, every year. Zika virus, closely associated with birth defects and severe neurological symptoms, has

spread to dozens of countries. If species such as *Anopheles gambiae*, a major malaria vector and *Aedes aegypti*, a Zika virus vector could be eradicated, the world would surely be relieved from the deadly diseases (Economist 2016). The most common manners in which to target the mosquito are familiar. Nets, spray repellent, and insecticides are used worldwide to keep mosquitoes away and to reduce population density. But more recently, genetically-modified mosquitoes have been developed, which could potentially be used to reduce mosquito populations. A British company named Oxitec has developed a genetically changed mosquito—a variant of a species called *Aedes aegypti*. This mosquito, called OX513A, is a sterile male, modified so that when a male OX513A mates with a wild female, the resultant eggs will not be viable. They will never hatch. These male *A. aegypti* mosquitoes have been released in Brazil, and sought approval to release the male OX513A mosquitoes in Florida, as a way to combat the spread of the Zika virus (Wolf 2016).

While there is no vaccine for Zika virus, many people are so excited at using genetic engineering to kill off mosquitoes. However, no one yet knows if this method is an effective solution (Plumer 2016).

Gene drive

A tool called gene drive may be even more effective than Oxitec's GM mosquito. Unlike an ordinary gene, which is passed on to just half of all offspring, a gene drive construct could be passed on to virtually all offspring (Adelman 2016). By combining a revolutionary new technology called CRISPR-Cas9 with gene drive, eradicating the mosquito has become reality. CRISPR (an acronym for "clustered regularly interspaced short palindromic repeats") refers to bits of viral DNA that bacteria have incorporated into their own genomes. With assistance from the splitting enzyme known as Cas9, CRISPRs help bacteria defend themselves against viruses. In 2012, researchers modified the CRISPR system into a gene-editing tool to cut and paste any gene in any organism (Saey 2015). Guide RNA helps the Cas9 enzyme to find and cut the pre-selected location in double DNA. As the cell moves to repair the cut strand of DNA, it replaces it with DNA that matches the selected DNA. It inserts a pre-selected gene sequence precisely where researchers want to put it.

Because the CRISPR-Cas9 tool can be made of DNA (that code single guide RNA and Cas9 protein), it is possible to use CRISPR to insert it into the target organism. Whenever the cells divide, the CRISPR-Cas9 tool is spliced into each genome, and brings with it whatever genetic sequence

researchers select. In this way, a genetic sequence can be inserted into every wild-type DNA sequence with which it is paired. This mechanism is called a "gene drive," because it can be used to drive a selected genetic sequence into a population so that, eventually, if the genes function as expected, every descendent organism will possess the phenotypic trait associated with the selected sequence (Wolf 2016).

Gene-drive technology essentially creates genetically modified organisms to stimulate the inheritance of certain genes combating malaria throughout entire populations. Last year, a research team at Imperial College successfully modified *Anopheles gambiae* mosquitoes to have 95% male offspring (Hammond et al. 2015); this sex ratio bias was further inherited by the modified offspring. The long-term effect of this modification would be the eradication of this mosquito species.

The research team of the University of California, San Diego and Irvine campuses reported that they successfully modified the mosquitoes to carry genes for antibodies that target the *Plasmodium* parasite (Gantz et al. 2015). The anti-malarial gene was inherited by 99.5% of the modified offspring. These mosquitoes would then mate with non-modified mosquitoes in the wild and pass the anti-malarial genes on to their offspring, ideally leading to all future generations being resistant to the malaria parasite.

As noted above, a trait is a genetically determined characteristic of an organism. In normal sexual reproduction, a trait generally has only a 50% chance of being expressed. With a gene drive, however, that trait is "driven" into the organism's reproductive cycle so that every single offspring always carries and expresses the specified trait (SynBio Watch 2016).

The promise

The implications are huge, with both tremendous potential and risks. Among the possibilities, gene drive could be used to spread genes that reduce the ability of mosquitoes to transmit parasites or that produce mostly male mosquitoes to twist the sex ratio. Such systems could stop mosquito-borne deadly diseases, including malaria, Zika, and dengue (Otto 2016).

Gene-drive-based approaches differ from traditional vector control methods such as insecticides and removing breeding sites. With a gene-drive system, the population of the target species could be massively disrupted, without directly affecting any other species.

The development of gene drive approaches, combined with current mosquito control practices, holds the promise of reversing this trend and bringing us closer to the goal of eradication of a

mosquito species and the terrible pathogens that depend on it (Adelman 2016). Some researchers even contend that the eradication of deadly mosquito is our moral duty (Meador 2016).

The risks

Many people including some researchers are uncomfortable with the idea of gene drives that have the potential to eradicate an entire species. Though we might assume that mosquito lack significant moral status, we can distinguish killing of individual organisms from the eradication of a whole species. For example, Holmes Rolston III argues that to kill a species is the “super killing” of a whole pattern of life, and as such is less acceptable than the killing of an individual organism. Although species lack moral agency, self-awareness, sentience or individuality, Rolston’s contention is that species lines are individual systems, whose parts are individual organisms. The argument for species-level respect might be to accept the traditional deontological view that a duty requires a moral agent, while denying that this agent must be a person or an individual organism (Jebari 2015).

Yet, there has been a degree of moral concern about eradicating mosquitoes. It seems ridiculous to claim that humans were overly bold in eradicating the mosquitoes responsible for malaria or Zika transmission through the development of gene drive, and even more problematic to claim that such boldness was morally wrong; the wrong of the supposed bold attitude here is surely morally outweighed by the value of the many human lives that were saved by eradicating mosquitoes (Pugh 2016).

On the other hand, the risks of gene drive following release can be also huge. Driven genes could spread beyond the intended area. Applying gene drive to reduce or eliminate the species may have unintended side effects (Otto 2016). Gene drive might act in unexpected ways and cause a variety of environmental harms, while not deliver the promised benefits. And, it’s impossible to predict the ecological consequences of such a rapid, massive, and unprecedented disruption (SynBio Watch 2016).

Mosquitoes might play key roles in ecosystems, such as providing food for bats and other insectivores, and “scientists have minimal experience engineering biological systems for evolutionary robustness”. It’s possible that a gene drive might not distribute the intended trait throughout a target population, or might find its work blocked by a naturally occurring mutation, or might spread the trait to non-targeted species. It’s also possible that a gene drive could stimulate other unforeseen evolutionary responses over a longer term in both target and non-target species.

And, again, the ability to redress any of these unintended consequences could be sharply limited by the lack of reliable reversal mechanisms (Meador 2016).

However, many scientists who research mosquito biology and ecology are skeptical that the eradication of mosquitoes would have particularly bad ecological consequences.

“Mosquitoes don’t occupy an assailable niche in the environment. If we eradicated them tomorrow, the ecosystems where they are active will hiccup and then get on with life. Something better or worse would take over (Fang 2010).”

Scientists are unclear whether gene drives could spread to closely related species. Eight species known as the *Anopheles gambiae* complex of mosquitoes in Africa came from common ancestors less than 5 million years ago, and they sometimes still interbreed, producing fertile hybrids. Gene drives might transfer from one species to another by this interbreeding. But given that almost all species can carry malaria, transfer from one species into another might even be desirable (Saey 2015). In contrast, the eradication of a mosquito lets another mosquito occupy the same niche, making things even worse. Once *Aedes aegypti* is gone, *Aedes albopictus* might move in and serve as a Zika vector (Adelman 2016).

Conclusion

The ethical, ecological and societal implications of gene drives are especially complex and challenging. Activists and even some experts in the field are on alert against this powerful technology. This raises the basic question: Who will benefit from this technology and who decides how it will be used? How would anyone be able to assess the risks of gene drives? Would the public be informed and have a say in how they would be used? And if an accident were to occur, given that the damage would be massive and irreversible, who would be held accountable (Civil Society Working Group 2016)?

Until recently, such questions are exclusively in the hands of scientists, who promise to regulate themselves so as to push their research to the limit (Akbari et al. 2015). As attractive as the promise of eradicating mosquitoes and halting the advance of malaria and Zika using CRISPR-Cas9 gene drives may be, we need a deliberation on the risks of gene drive technologies. We need to have a genuinely inclusive debate about the issues raised by this new technology, addressing the ethical, legal, and social implications of gene drive (Dawson 2016).

References

- Adelman, Zach. 2016. When Extinction is a humanitarian cause. The mosquito spreading Zika doesn't belong in our environment. Soon we may be able to eradicate it with new technology. MIT Technology Review. Posted February 12, 2016. <https://www.technologyreview.com/s/600793/when-extinction-is-a-humanitarian-cause/>.
- Dawson, Ashley. 2016. Save the mosquitoes: we should fight Zika with better public health, not genetically modified mosquitoes. Posted April 22, 2016. <https://www.jacobinmag.com/2016/04/zika-mosquitos-crispr-genetic-engineering-puerto-rico/>.
- Economist (The). Extinctions to order: Gene-ocide. The promise and peril of "gene drives". Posted September 17, 2016. <http://www.economist.com/news/leaders/21707211-promise-and-peril-gene-drives-gene-ocide>.
- Gantz, Valentino M, Nijole Jasinskiene, Olag Tatarenkova, Aniko Fazekas, Vanessa M Macias, Ethan Bier, Anthony Gantz. 2015. Highly efficient Cas9-mediated gene drive for population modification of malaria vector mosquito *Anopheles stephensi*. Proceedings of National Academy of Sciences U.S.A. 112. E6736-E6743.
- Hammond, Andrew, R. Galizi, K. Kyrou, A. Simoni, C. Siniscalchi, D. Katsanos, M. Gribble, D. Baker, E. Marois, S. Russell, A. Burt, N. Windbichler, A. Crisanti, T. Nolan. 2015. A CRISPR-Cas9 gene drive system targeting female reproduction in the malaria mosquito vector *Anopheles gambiae*. Nature Biotechnology. Published December 7, 2015. <http://dx.doi.org/10.1038/nbt.3439>.
- Jebari, Karim. 2015. Should extinction be forever? Philosophy & Technology. Published October 17, 2015. DOI: 10.1007/s13347-015-0208-9.
- Meador, Ron. 2016. Argument builds around a genetic tool that can erase an annoying species. MinnPost. Posted September 06, 2016. <https://www.minnpost.com/earth-journal/2016/09/argument-builds-around-genetic-tool-can-erase-annoying-species>.
- Otto, Sally. 2016. Genes in the fast lane: The implications of new gene drive technology-A Canadian perspective. <http://www.rsc.ca/en/about-us/our-people/our-priorities/genes-in-fast-lane-implications-new-gene-drive-technology>.
- Overcash, Justin M., Azadeh Aryan, Kevin M. Myles, Zach N. Adelman. 2015. Understanding the DNA damage response in order to achieve desired gene editing outcomes in mosquitoes. Chromosome Research 23:31-42.
- Plumer, Brad. 2016. The unsexy truth about how to kill off mosquitoes and stop the Zika virus. Posted February 7, 2016. <http://www.vox.com/2016/2/4/10908754/zika->
- Pugh, Jonathan. 2016. Driven to extinction? The ethics of eradicating mosquitoes with gene-drive technologies. Journal of Medical Ethics 42(9): 578-581.
- Saey, Tina Hesman. 2015. Gene drives spread their wings: CRISPR brings a powerful genetic tool closer to reality. Are we ready? ScienceNews 188(12):16.
- SynBio Watch. 2016. Controversial genetic engineering technology: "Gene drive" and the modification of entire species. Posted August 1, 2016. <http://www.globalresearch.ca/controversial-genetic-engineering-technology-gene-drive-and-the-modification-of-entire-species/5548316>.
- Wolf, Clark. 2016. Engineering Extinction: CRISPR, Gene Drives and Genetically-Modified Mosquitoes. Posted September, 2016. <http://www.biotech.iastate.edu/bib-crispr/>.

Better Humans and evolutionary nudge

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Abstract

Gene therapy especially newly developed CRISPR gene editing spawns complex conversations, ethically, emotionally, politically, and economically, within and among countries. As new technology makes its way through the experimental development, assessment, refinement and application, it is not too soon to begin the policy and ethical dialogues about how and when and for what purpose it is used. Certainly experiments should continue to assess whether CRISPR is the long sought for means to effective gene therapy. It will probably be used in somatic cell gene therapy trials sooner than later. Policy and ethical discussions ought to precede its use at the germline stage.

Introduction

The recent discovery and application of clustered irregularly interspaced short palindromic repeats (CRISPR) Cas9 editing of DNA has generated great optimism for its potential to correct harmful genetic traits. Eliminating all "genetic diseases" stretches the imagination and posits an objective that may be feasible in theory while doubtful in application. New applications, tests, and successes with CRISPR/Cas9 saturate the scientific literature. So prevalent are such reports that the faculty in the Biomedical Sciences Master of Science program at Hood College offered a special topic graduate course on "Gene Editing" in summer 2017. The course had three units: (i) the science of editing, how the guide RNA matches the target DNA to specify where to cut and repair the genetic

sequence, (ii) how the guide RNA and target DNA sequences are evaluated using bioinformatics to insure the most correct fit and the least off-target possible “mistakes” which would create new mutations even while editing a chosen site, (iii) ethical evaluation of the technology. Students were asked to write an address they would give to a policy forum about using CRISPR/Cas9 for gene therapy.

Discovery and Response

Genome editing technology using CRISPR-associated nuclease Cas9 opens the possibility of therapeutic genome editing in diseased cells and tissues (Hsu, 2014). Applying the technology to human embryos, Liang et al. (2015) reported using CRISPR/Cas9 to edit human beta-globin gene in 86 donated human embryos obtained from in vitro fertilization (IVF) clinics. The scientists were careful to report that of the 86 embryos used, 71 survived the manipulation and 54 had corrected DNA sequence in the beta-globin gene. Unintentional mutations were also documented revealing the possibility that the guide RNA would bind to sites other than the target globin sequence and create unintended mutations. Safety and efficacy are the guidelines used to justify moving new “therapeutic” discoveries into clinical practice. Finding ways to hit only the target sequence and eliminating off target hits is the current focus of research using CRISPR for gene editing. Delivery of the CRISPR/Cas9 to the intended cells is equally important if the editing technique is to be used in patients to reduce symptoms of a genetic disease.

UNESCO, the Council of Europe and the European Union has stated that modification of the germline is unethical and an abuse of human rights. The National Institute of Health (NIH) director, Francis Collins, released a statement saying no national research money would be used to edit human embryos within weeks of a report by Zhang (2015). Similar protests have been made about establishment of human stem cell therapeutics but private enterprises have found ways to continue applications. Denial of European or US federal support drives technology into the private sphere. It is not a given but a recognized risk that privatization of technology may result in inequitable access.

If the potential for gene editing is shown to be reliable and therapeutic, what is to prevent using the technology? Three considerations are important in reaching an answer: the history of eugenics as it affected gene therapy policy, genetic literacy among the population, and just allocation. Eugenic laws in the 1920s in the US and other countries aimed at improving the human species through selective breeding. Once legalized, it took

decades to reverse the perception that involuntary sterilization was for the “greater good” when in truth it is a breach of human rights. Eugenics is a dark chapter in human history and before germline gene editing becomes the new eugenics, care ought to be taken to ensure applications are understood regarding risks and benefits and that personal autonomy is protected and respected (Sparrow, 2011). Moving away from negative eugenics toward a positive application aimed at correction of genes with disease and disability phenotypes, gene therapy became the hope of scientists late 20th century. One of the lessons of the gene therapy experiments is that results using cell culture in vitro generates more positive data than when used in vivo in living organisms, especially in human clinical applications. The amount of DNA that can be inserted into a virus vector is limited as well as the ability to direct the DNA to the right genomic location to either replace the mutated sequence or to add a functional gene (Misra, 2013).

To date somatic gene therapy protocols have been limited to somatic (non-reproductive) cells, specifically in experimental treatment of cystic fibrosis, hemophilia B, Fanconi’s anemia, hypercholesterolemia, adenosine deaminase (ADA) deficiency and three types of cancer (Misra, 2013). Each of the clinical trials aimed at relieving symptoms of a genetic deficiency by supplying a functioning gene or its product. Delivery has been problematic as well as consequences of adding a third gene to restore function. In cases where the foreign DNA can integrate into the genome, the site has not been limited to the target gene causing unanticipated damage and/or pathology (Check, 2002). Enthusiasm for ADA gene therapy turned to disappointment when the patients subsequently developed leukemia (Misra, 2013). The lesson learned is that the results of gene therapy applications are not always immediately obvious.

Policy Debates

Individuals and groups who take a test, evaluate, move forward deliberately in advancing new technology, are often labeled “bioconservatives”. In contrast, advocates for swift application of new technology to benefit suffering patients are called “bioliberals” (Giubilini, 2015). Bioconservatives tend to bring the gene therapy lack of success into debates about gene editing whereas bioliberals tend to move from a failed system to a new opportunity with renewed enthusiasm, such as the promise of gene editing with CRISPR. Representing two ends of a continuum, the policy debates have resurrected an earlier debate about somatic vs germline gene therapy. It should be clear to all that empirical data is needed to establish risks and benefits of embryo manipulation (without

implantation for the purpose of giving birth to a child), in animal and plant model systems should inform the debate.

It matters how the question is framed and which philosophical foundation is used for the debate. One foundation is the concept of human nature, imperfect but functional. There are groups with specific disabilities that are sensitive to being regarded as inferior, "in need of fixing." Of course there is a significant difference between a genetic loss of hearing in contrast to a genetic loss of muscle strength that steadily progresses. Hearing loss can be compensated for by learning to use sign language and live a life of dignity, whereas in diseases such as Parkinson's the person is reduced to total dependency and lacks the pleasures of communication, mobility, independence, etc. It is not that a person with Parkinson is robbed of dignity as a human being, but that the progressive nature of the disease deprives him or her of capacities that contribute to human dignity, justifying the bioliberals' appeal for aggressive progress towards treatment. Claiming an intent to correct genes that rob individuals of the basic functional abilities we associate with being human aligns with the duty to help relieve suffering.

Beyond 'therapy' at the aggressive end of the spectrum, gene editing enthusiasts dream of applications well beyond therapeutic potential, such as the ability to master engineer evolution in favor of better humans (Powell and Buchanan, 2011). Taking the framework of species survival in an evolving ecosystem that is challenging or even threatening, DNA editing become more than a therapy – it becomes a survival strategy. Harris and Savulescu suggests that we are morally obligated to use genetic technology to produce the best children possible for the survival of the human species (Harris, 2007; Savulescu, 2005). Bioliberals clearly intend to help both relieve suffering from a specific genetic trait and push evolution forward in ways that prevent death from environmental hazards. Modification of a harmful gene to reduce or relieve suffering from a genetic disease benefits the one patient and is therapeutic, however, none of the somatic gene therapy protocols have been successful enough to be standard of care for the thousands of genetic diseases affecting human beings. Therefore, regarding the intervention as a therapeutic tool is good only so far as it has been effective and for the relatively few who have access. There is no evidence that the genes that could confer species improvement are known or what specific changes would lead to better humans.

Bioconservatives tend to frame the question in terms of concern for just allocation. As new discoveries become therapeutic options and the risk-benefit potential inherent in such technologies

is quantified, the new technique replaces older or less effective treatments. This is a long process taking decades of clinical trials and regulatory approval. Careful and sequential development, testing, evaluation, and objective analysis of data slows progress but in the minds of bioconservatives is the means to avoiding harm as much as possible. To counter excitement of a new scientific breakthrough, the conservative is patient enough to see that the uncertainties, and moral concerns are addressed first. Considerations about future impact on the human gene pool may be overstated in the sense that relatively few individuals may elect to use it. It is a leap without supporting data to project improving human beings by gene editing. If approved for enhancement at the germline level unless many participate the human gene pool will not be enhanced, but a minority of individuals may become gene-rich.

Assisted Reproduction

More than five million babies have been born through assisted reproduction since the birth of Louise Brown. In some countries, pre-implantation genetic diagnosis (PGD) is fast becoming part of the IVF process whereby embryos are selected on the basis of their genetics. Within hours of fertilization, the embryo reaches 8 – 16 cells. DNA can be extracted from one of the cells and sequenced revealing entire genetic blueprint. Against a panel of markers for specific genetic diseases it is possible to select embryos that do not have genetic diseases. Families with known risks may request screening Tay-Sachs, Cystic Fibrosis, Sickle Cell, Huntington's Disease, Cooley's anemia etc. In using PGD-IVF a negative selection is taking place: sorting out embryos with risk of a genetic disease and implanting those that do not have risk for the traits being tested. As the list of reliable genetic tests increases and as the cost of sequencing the whole genome of the embryo decreases, the full genetic "score" of the embryo will be within reach. While PGD-IVF was not designed for positive selection, there has been success in selecting siblings with a tissue match suitable to supply cord blood to treat a sibling with leukemia (Kahn and Mastroianni, 2004). The Nash family went through several cycles of IVF and PGD before finding the embryo match for their daughter. It is a success story but has not been replicated often, either because a matching embryo was not found or because of the expense of the procedure.

CRISPR and Gene Editing

CRISPR/Cas9 enters the horizon of hope because it has the potential to repair a genetic abnormality and prevent the disease not only in the person but also in future descendants if used in embryos

(germline therapy). It has been ethically permissible to wipe out diseases caused by viruses or bacteria using vaccines or antibiotics, respectively. Why should human ingenuity not proceed with a means to convert disease causing genes into normal functioning genes? To limit the research because there is not sufficient evidence of benefit and lack of harm is justifiable. To limit the research because the DNA of an embryo might be changed in ways that promote health and wholeness should be re-evaluated (Boyd, 2016a).

When leaders like National Institute of Health Director, Francis Collins, refer to genome editing as “correcting the typos in the book of life” the average person may think the procedure is entirely safe and expect that something so helpful should certainly be made available. In reproductive freedom, couples would expect to use a technology that “guaranteed” genetically healthy children. The laborious research that is required to move an idea into a therapeutic treatment takes years and great financial and human investment. Technology is by design and intent for the use of people, for their benefit (Boyd, 2016b).

If CRISPR can be made safe and specific, effective and efficient, then like any other biomedical invention, it will proceed from animal models, human cells, embryos, somatic corrections, to someday, perhaps germline therapy through PGD-IVF. The time from theory to practical application and general use is often decades. Is there enough data to encourage us to move deliberately and resolutely down the path of gene editing as a therapeutic tool? Do we have enough bioinformatics information and analytical acuity to ensure the edit happens at the target site and nowhere else? As these questions are answered in the progressive progress of science and technology, the ethical deliberators should revisit why germline therapy has been set aside as unethical. It is difficult to get eager science majors to pause and think carefully about risks and benefits. As they rightly point out, almost every therapeutic intervention has some risks. The most effective way to get students to seriously look at the potential for harm was achieved with an assignment directing students to compare three different search algorithms to look for off target sites for a particular target sequence of DNA. The question to answer was: would the guide RNA find sites other than the intended gene sequence? Each algorithm generated different answers. Students were initially confused by these results until they realized that the search tools are limited in scope such that risk identification is not specific enough to be used in risk-benefit assessment. More data is needed using experimental models before proceeding with

human gene editing but this is easier said than done (Boyd, 2016a).

Private enterprise

In vitro fertilization as a reproductive alternative to natural procreation has existed for decades and millions of children have been born with assistance of IVF. In the UK there are national guidelines for the use of IVF that sit within the National Health Service policies of universal health care for all citizens. In the US, where no universal health care has yet been adopted IVF is available within the private sector. Some insurance companies compensate patients for IVF expenses, some do not. This creates a system in which those who have the will, knowledge, and means to use IVF can do so.

The US Census Bureau reports the median household income in 2015 is \$55,775 (Bureau, 2015). The American Society of Reproductive Medicine lists the average cost of a single in vitro fertilization cycle at \$12,400. The cost of one cycle of IVF is 22% of the average household income per year. It is not reasonable or just to expect that a significant number of citizens will have IVF assistance with reproduction. Further costs would be added for genetic screening of embryos and editing genes with CRISPR or some other gene therapy tool. One estimate for current gene therapy offered by Spark Therapeutics is \$500,000 per eye to restore loss of vision caused by a genetic disease (Johnson and Dennis, 2015). While it is possible for costs to decline as the technology becomes more refined, it does not allay fears of injustice based on access.

Social Justice or Injustice

If gene editing is ever approved in the US for germline therapy (which it is not currently) it would most likely be done in the private IVF clinics. If this happens gene editing to correct or improve embryonic genes would be available to a small percentage of the population, unless laws mandated insurance coverage or health care reform in the US moves into a universal single payer system. Current regulations in gene therapy in the US limit clinical trials to somatic cell gene therapy. Bioconservatives generally caution that even if CRISPR's potential for gene therapy is fantastic, we should tread slowly, cautiously and deliberately.

Bioliberals in contrast argue that we have an obligation to provide all the technology and medical support we have to prevent genetic illness at the beginning of life. Even if successful beyond current empirical evidence, who benefits, at what cost, and with what impact on future generations remain uncertain. If any parent has an obligation to improve the genetic constitution of their child in order to provide a better life, then every parent

should at least have an equal opportunity, otherwise gene editing may emerge as the latest expensive acquisition of the economically privileged. How far from the gate of the uber wealthy are those whose genetic endowment are deemed inferior or worse 'in need of enhancement?'

Current efforts to use gene therapy for monogenic diseases such as Huntington's Disease get first priority because the majority of cases affect adults and the one gene responsible for the disease is known. Data from an in vitro model of Huntington's Disease using CRISPR-Cas9 to silence the mutant gene and allow the normal gene to restore function is promising (Kolli et al., 2017). Therefore, the idea that cells expressing the mutant Huntington protein could be corrected in living patients, reversing the symptoms of the disease is very attractive. Huntington's disease is an autosomal dominant genetic disease that shows no discrimination on the basis of gender or ethnicity. The disease is neurodegenerative typically beginning in mid-life and progressively impairs a person's ability to walk, talk, remember, reason, and finally causes death. There is no cure.

Simultaneously with somatic gene therapy, research should continue on gene editing in human embryos, without implantation to determine specificity and efficiency. The research published to date is promising. Scientists have targeted the beta globin gene (HBB) and found that within a population of embryonic cells generated after "editing" that some cells contained corrected genes. This resulted in a mosaic due to inefficient repair of the targeted sequence. Furthermore genes related to the HBB such as endogenous delta-globin, (HBD) caused an error rate of 25% (Liang, et al., 2015; Tang, 2017; Wang et al., 2016; Cox et al., 2015). These data support both conservative caution and liberal hope for gene editing.

Social concerns

Advances in medicine have increased the average human life expectancy. In 1900, the average life span was approximately 50 years, but in 2011, it exceeds 80 years in many countries (HHS 2012). If the current rate of population growth continues the population is predicted to reach 9.5 billion by 2050. Scientists worry whether natural resources can supply human demand. Population needs and natural carrying capacity of planet earth create the beginnings of a new geologic epoch called the Anthropocene (Powell, 2015). While a small subpopulation of people could become genetically rich through gene editing, it is inconsistent with the intent to help that access may be limited to financial affordability rather than on the basis of need. Genetic injustice challenges us to

find pathways to greater equality. Justice corrects injustice.

Ethical Awareness of Technology

Theodore John Rivers recently described the metaphysical significance of human beings and technology (Rivers, 2015). In his analysis he differentiates the process of human maturation and change as a process of will, dependent upon freedom. The appearance of technology changing to meet a purpose may appear to be a process independent of the human agent but will the distinction hold when small computer chips are implanted to trigger a moral response to a repugnant thought? Will there evolve a time when the technology is perceived as having ontological being – a nature of becoming – equivalent to that of the human being?

Human becoming is a way in which humans express their creativity, but it is not true that technology has its own becoming innate to itself. Humans become but technology does not. Technology changes as a consequence of human action. A technique may be improved or replaced or discarded as the need for it changes. Humans are the agents of change.

Technology is a demonstration of our relationship with the world. It reflects our desire, what we will to be. Our desires for what technology does reflects our values and choices, our ideas of the type of world we want or expect. It is quickly becoming the primary means by which we create, manipulate and change the world.

Technology, especially robotics, nanobots, CRISPR-gene editing, gene therapy, enhancement and what we may not yet imagine that hold great hopes for the bioliberal who advocates unimpeded progress using all technology to improve the length and quality of human lives, and maybe the lives of plants and animals too. It is likewise true that technology is becoming a means to the will to power, with an open ended question about whether it will be used for good or ill effect. If or when gene editing is developed and deployed the growing edge of this genetic technology holds the potential to change the world as we currently know it and that may be good or bad.

References

- Boyd, A. (2016a). "Deliberative Democracy for a Gene Editing Policy," *Eubios Journal of Asian and International Bioethics* 26: 185-190.
- Boyd, A. (2016b). "Science and Ethics in Dialogue: Ethical Research Conduct and Genetic Information Application" IN *Colloquium Series on the Genetic Basis of Human Diseases #7*, Morgan & Claypool Life Sciences (ed) Michael Dean DOI 10.4199/COO138ED1V1Y201509GBD007.

- Bureau, US Census. (2015). "Library." Map: Median Household Income in the United States: N.p., 15 Sept. 2016.
- Check, E. (2002). "Gene therapy: A tragic setback." *Nature* 420: 116-118.
- Cox, D.B.T, R.J. Platt and F. Zhang. (2015) "Therapeutic genome editing: prospects and challenges, *Nature Medicine* 21 (2) 121-131.
- Hsu, P.D. Lander, E.S. and Zhang, F. (2014). "Development and applications of CRISPR-Cas9 for genome engineering." *Cell* 157: 1262-1278.
- Liang, P., Y. Xu, X. Zhang, C. Ding, R. Huang, Z. Zhang, J. Lv, X. Xie, Y. Chen, Y. Li, Y. Sun, Y. Bai, Z. Songyang, W. Ma, C. Zhou, J. Huang (2015). "CRISPR/Cas9-mediated gene editing in human tripronuclear zygotes" *Protein & Cell* 6 (5): 363-372.
- Giubilini, A. (2015). "Don't Mind the Gap: Intuitions, Emotions, and Reasons in the Enhancement Debate," *Hastings Center Report* 45 (5): 39-47.
- Harris, J. (2007). "Enhancing Evolution: The ethical case for making better people" Princeton NJ: Princeton University Press.
- Johnson, C. Y., and B. Dennis (2015). "Gene therapies offer dramatic promise but shocking costs." *The Washington Post*. WP Company, 11 Nov.
- Kahn, J.P. A.C. Mastroianni, (2004). "Creating a Stem Cell Donor: A Case Study in Reproductive Genetics, *Kennedy Institute of Ethics Journal* 14 (1): 81-96.
- Carrying capacity, World Population, N.p.n.d.web 31 May 2017
- Kolli, N. M. Lu, P. Malti, J. Rossignoi, G. Dunbar, (2017) "CRISPR_Cas9 mediated gene-silencing of the mutant Huntingtin gene in an in vitro model of Huntington's Disease," *Int. J. Mol. Science* 18:754-768.
- Living longer, (2012). National Institute on Aging, U.S. Department of Health and Human Services, 26 Mar 2012, web. 01 June 2017.
- Misra, S. (2013). "Human Gene Therapy: A Brief Overview of the Genetic Revolution." *JAPI* 61: 127-133.
- Powell, R. and A. Buchanan. (2011) "Breaking Evolution's Chains: The prospect of deliberate genetic modification in humans, *Journal of Medicine and Philosophy* 36: 6-27.
- Rivers, T.J. (2015) "Technology and Being: A discussion of their metaphysical significance." *Advances in Historical Studies* 4:43-50.
- Savulescu, J. (2005). "New Breeds of Humans: The Moral Obligation to Enhance," *Ethics, Law, and Moral Philosophy of Reproductive Biomedicine* 1 (1): 36-39.
- Sparrow, R. (2011). "A Not-So-New Eugenics: Harris and Savulescu on Human Enhancement, *Hastings Center Report* 41 (1): 32-42.
- Tang, L., Y. Zeng, H. Du, M. Gong, J. Peng, B. Zhang, M. Lei, F. Zhao, W. Wang, X. Li, J. Liu (2017) "CRISPR/Cas9-mediated gene editing in human zygotes using Cas9 protein." *Molecular Genetics and genomics* 292: 525-533.
- Wang, H., M.L. Russa, L.S. Qi (2016). "CRISPR/Cas9 in genome editing and beyond." *Annual Review of Biochemistry* 85: 227-264.
- Zhang, F. (2015). "CRISPR/Cas9: Prospects and challenges." *Human Gene Therapy* 26 (7): 409-410.

The lack of environmental ethics in dealing with particulate matter in Korea

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Abstract

This paper discusses some of the data and the ethical issues associated with problems of particulate matter in Korea. The major sources of household particulate matter are grilling mackerel and pollution from China. Diesel is a further source. Semantic network analysis that focuses on associations between words was used to examine the words used in the media. The issues raised in the media are discussed in light of ethical theory.

Introduction

Problems of particulate matter have recently become a sensational issue in Korea. According to the news search service, Kinds, almost a third of related news articles have been produced in 2016 (as of July 19), since "particulate matter" appeared for the first time in 1993 as an article title(<http://www.bigkinds.or.kr>).

Particulate matter is known to cause serious illness such as lung cancer, stroke, and heart and respiratory diseases. In spite of its toxic effects, however, it is still confusing to identify what is causing it and what we ought to do for policy decisions. Is China responsible for the harmful dust in Korea? Is grilling mackerel without proper ventilation causing air pollution? Do we have to impose stricter regulations of diesel cars? Media have provided contradictory disputes, and the Korean government has failed to answer these questions.

Therefore, this paper aims to present how Korean government and media have played an ambiguous role in dealing with particulate matter by using a semantic network analysis largely based on news articles. It finally claims that the lack of environmental ethics can be a crucial cause of all these disputes. There are three possible causes for particulate matter:

Mackerel

Accusing mackerel as a main cause of particulate matter began with the Ministry of Environment's May 23 report referring "frying mackerel in one's kitchen with the windows closed releases 25 times more fine particulate matter than one would experience with a PM2.5 level of 90 micrograms per cubic meter" (Chung & Sung 2016), the highest among foods cooked and tested by the ministry. The Ministry of Environment also added that "the amount of fine dust created from pan-fried mackerel is several times that of air pollution levels rated by meteorologists as 'very bad'" (Choi 2016). Although the survey of 32 households carried out between May and November in 2015 (K. Lee 2016) was not at fault, the news immediately affected the market, resulting in "at Garak Market in southeastern Seoul, a 10-kilogram box of small mackerel was auctioned off at 12,000 won, down from 40,000 won a week earlier" (S. Kim 2016a).

As mackerel fishermen's protests grew fiercely (Choi 2016), the ministry attempted to resolve the mackerel scandal by insisting that "it was not the ministry's intention to single out mackerel as the cause of air pollution," and explaining that "the study had only referenced indoor pollution levels and not pollution in general" (Chung & Sung 2016).

China

China's influence on yellow dust in Korea's air quality goes back to the 13th century (S. Kim 2016b). As environmental problems are more serious in China than Korea, with South Korea ranked 80th of 180 countries while China was 109th in the 2016 Environmental Performance Index (Yale Center for Environmental Law & Policy), China has been easily blamed for recent problems of particulate matter. The Korea Environment Corporation affiliated with the Ministry of Environment also pointed to China as the primary origin of the hazardous air pollution (Kang 2016).

There seems to be no doubt that the dirty air in Korea is "the combination of what is being generated within Seoul and within the broader, very industrial environment of Korea, added onto transport of pollution from China" (Hu 2016). Shapiro, however, insists that it is the Korean media that "largely frame transboundary air pollution in the region as a problem emanating from China" (Shapiro 2016: 1).

Diesel

Diesel cars are so popular in Korea that more than half of the newly registered automobiles in 2015 (960,000 of 1.83 million) were diesel (Editorial 2016a). Largely due to the clean diesel policy which was introduced by the Lee Myung-bak government to "promote low CO₂ emissions by granting tax benefits to diesel cars that met the European Union's Euro 5 emission standards" (Y. Kang 2016); diesel fuel is less expensive than gasoline.

As concerns about increasing pollution get more attention than before, the Korean government has planned to apply new measures. However, probably the most effective way such as raising the diesel prices has faced strong opposition by the Ministry of Strategy and Finance. Furthermore, the Ministry of Trade, Industry and Energy plans to build nine more coal-burning power stations by 2022 due to the increasing difficulty in constructing nuclear power plants (Korea Herald Editorial 2016).

Research Methods

Semantic network analysis is a research paradigm that uses "network analytic techniques on paired associations based on shared meaning" (Doerfel 1998: 16) and focuses on associations between words. Using the KrKwic (Korean Key Word In Context) which is a computer-based content analysis software, frequency analysis and co-occurrence matrix were retrieved (Park & Leydesdorff 2004), and UCINET 6.0 was applied to calculate centrality values and network visualization (Borgatti et al. 2002).

Google news was used to collect the data between January 1 and September 30 in 2016. Among 58 news articles in total, those combining "particulate matter" with mackerel were 17, while China or diesel related particulate matter news were 13 and 28 respectively.

Results

1) Particulate Matter and Mackerel

Table 1 shows that particulate matter and mackerel rank top two, while according to the Ministry of Environment, cooking and grill follow next. Because the mackerel scandal was initiated by the Ministry of Environment, almost all top 20 keywords are closely related with cooking mackerel inside the kitchen except for diesel car. Results of degree centrality are very similar to those of keyword frequency. Fig. 1 shows that particulate matter, mackerel, and ministry of environment occupy the central position.

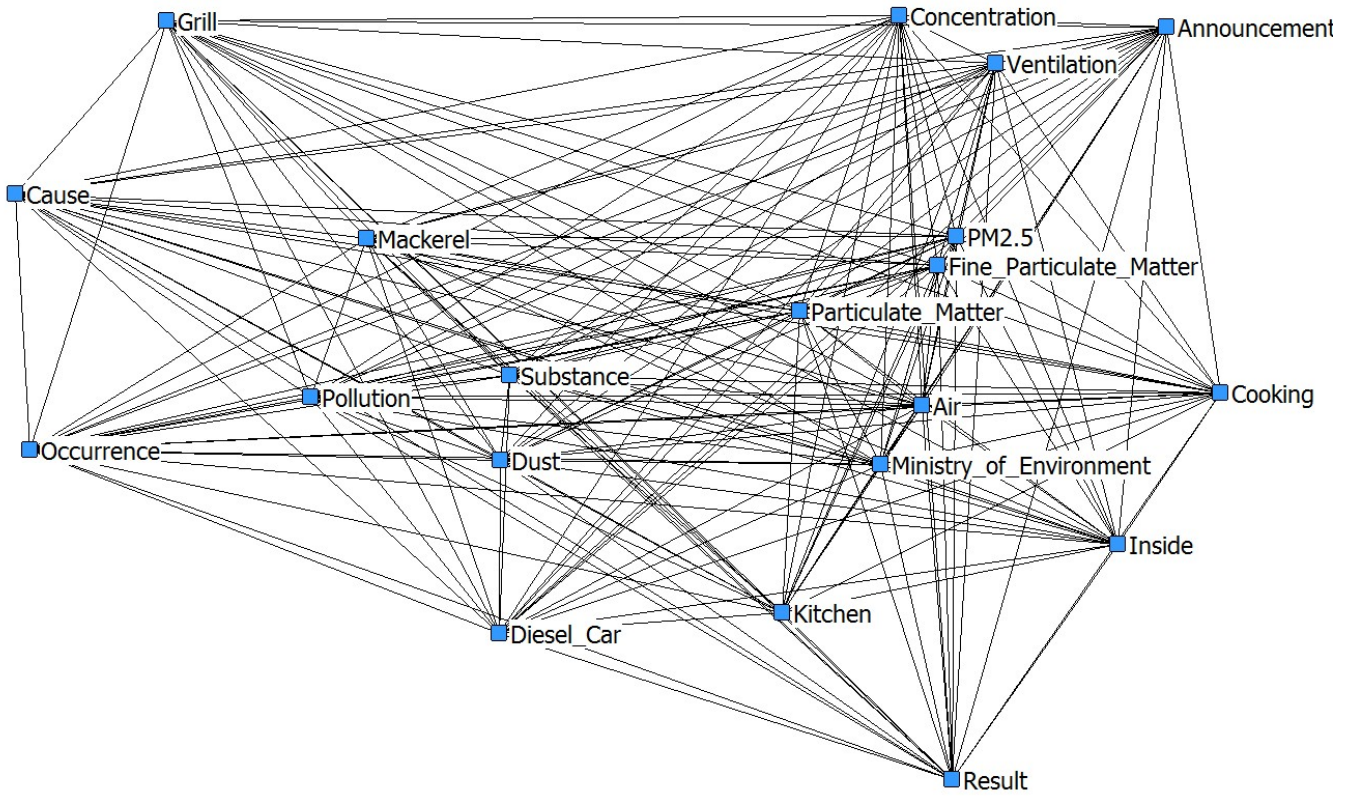


Figure 1: Visualizing mackerel related particulate matter news

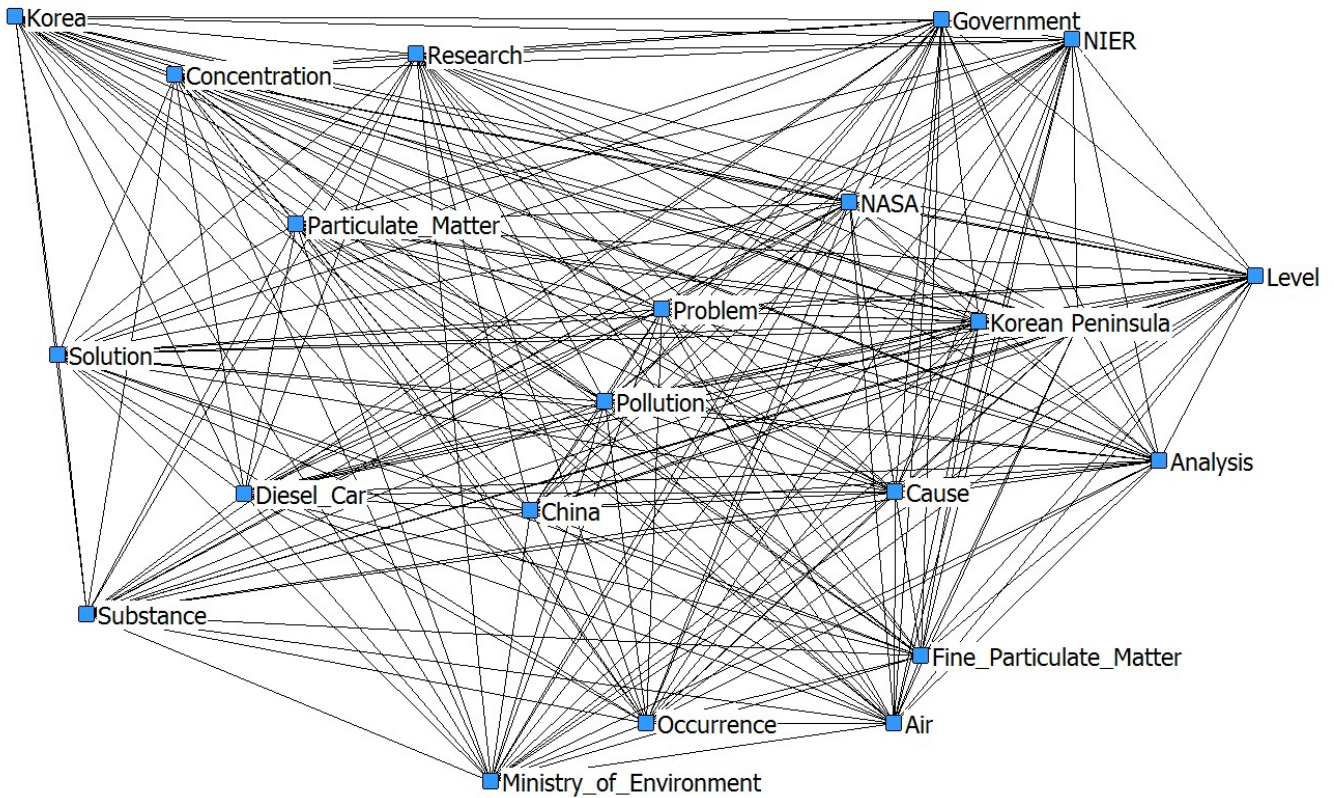


Figure 2: Visualizing China related particulate matter news

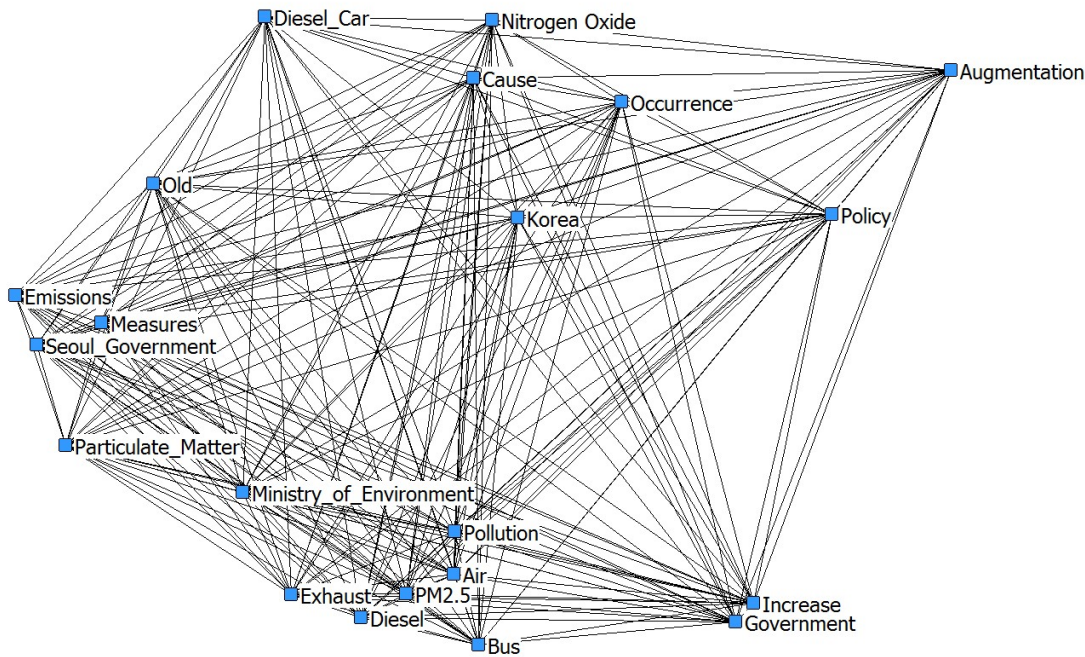


Figure 3: Visualizing diesel related particulate matter news

Table 1: Top 20 keywords for mackerel related particulate matter news

keyword	f	keyword	f
Particulate_Matter	233	Diesel_Car	31
Mackerel	154	Pollution	30
Ministry_of_Environment	91	Announcement	29
Cooking	86	Ventilation	28
Grill	76	Dust	26
Occurrence	57	Substance	25
Concentration	48	Cause	25
Air	39	PM2.5	22
Fine_Partuculate_Matter	33	Result	22
Kitchen	32	Inside	21

2) Particulate Matter and China

Using two primary words of particulate matter and China, the top 20 results present three contents. First, blaming China as a primary cause of air pollution in Korea appeared in news with keywords such as Korea, Korean Peninsula, fine particulate matter, pollution, cause and air. Second, stressing internal problems instead of China gets results expressed through keywords including diesel car and exhaust. Finally, keywords such as NASA, NIER, and analysis indicate NASA’s efforts to try to answer questions of how much pollution drifts over and how much is home-grown (Zastrow 2016).

The analysis of degree centrality shows a similar order to be seen in Table 2. China as a main reason of pollution problem is also indicated in Figure 2.

Table 2: Top 20 keywords for China related particulate matter news

keyword	f	keyword	f
Particulate_Matter	114	Exhaust	20
China	74	Problem	19
Korea	58	Korean Peninsula	19
Fine_Partuculate_Matter	51	Concentration	18
Pollution	43	Diesel_Car	15
Cause	30	NASA	15
Air	28	NIER(National_Institute_of_Environmental_Research)	13
Substance	25	Analysis	12
Government	25	Level	12
Occurrence	22	Solution	12
Research	21	Ministry_of_Environment	12

3) Particulate Matter and Diesel

As seen in Table 3, most words are related with how diesel cars affect air pollution and how government including Ministry of Environment, and Seoul Metropolitan Government respond to these problems.

Table 3: Top 20 keywords for diesel related particulate matter news

Keyword	f	keyword	f
Particulate_Matter	325	Exhaust	54
Diesel_Car	242	Increase	51
Diesel	155	Occurrence	47
Bus	101	Seoul_Government	46
Government	80	Cause	44
Measures	72	Nitrogen Oxide	43
Ministry_of_Environment	63	PM2.5	42
Air	62	Emissions	42
Old	60	Policy	41
Korea	60	Augmentation	41
Pollution	57		

Conclusion

Policy debates regarding three factors causing particulate matter in Korea clearly show the lack of environmental ethics. Mackerel issues turned out to be a scandal carelessly initiated by the Ministry of Environment. Concerning China impacts, blaming others is easy but fails to suggest any constructive solution. Even the fact itself is not clear at this moment. One study commissioned by Seoul Government concluded that “the problem comes roughly equally from local sources and countries upwind of South Korea,” while Greenpeace claimed that as much as 70 % of some types of pollution originated locally (Zastrow, 2016).

Diesel debates provide more serious problems than others. The nation’s Green Growth Policy of 2009 has pictured diesel as eco-friendly, resulting a sharp increase in the percentage of diesel cars from 18.5 percent in 2010 to 44.7 percent in 2015 (J. Lee, 2016). Despite growing concern over particulate matter, the government plans to construct new coal-fired plants (J. Kim, 2016).

The analysis of this paper also indicates that diesel and government are at the center of debates. Keywords such as air, cause, diesel car, Ministry of Environment, occurrence, particulate matter and pollution are listed in all three network analyses. Among seven key words, it is only natural that “particulate matter” occupies the top. Whatever the main cause of particulate matter, Ministry of Environment and diesel car appear in all cases, which implies that they are two keywords of particulate matter. Therefore, the government policy on diesel vehicles needs to be reestablished based on environmental ethics.

However, conflicts within the central government make things worse. For example, the Ministry of Environment and the Ministry of Strategy and

Finance take different positions on whether to increase the price of diesel fuels or not (Chung & Sung 2016). Setting a long term environmental ethics based on facts and sharing them seem to be needed more than else.

References

- Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Choi, Dung-jin. “Mackerel fishermen anger with environmental report” Korea Times 2016, May 28.
- Chung, Esther and Sung Si-Yoon, “Mackerel let off the hook as major fine particle pollutant” JongAng Daily 2016, June 8.
- Doerfel, M. L. 1998. What constitutes semantic network analysis? A comparison of research and methodologies. *Connections*, 21(2): 16-26.
- Hankyoreh Editorial. “Need to find diesel cars’ role in South Korea’s terrible air quality” The. 2016a, May 19.
- Hu, Elise. “Korea’s air is dirty, but it’s not all close-neighbor China’s fault” NPR, 2016, June 3.
- Kang, Ki-heon. “Gov’t criticized for not accurately forecasting air pollution” JongAng Daily 2016, April 10.
- Kang, Yewon. “South Korea shuns diesel following emissions scandal” Nikkei Asian Review. 2016, June 29.
- Kim, Jeong-su. “South Korea must choose energy future: dirty coal or renewable?” The Hankyoreh. 2016, July 16.
- Kim, Se-jeong. “Mackerel shunned as cause of fine dust” Korea Times 2016a, May 30.
- Kim, Se-jeong. “Korea at loss over fine dust from China” Korea Times 2016b, May 31.
- Korea Herald Editorial. “Quarrel over dust” The. 2016b, June. 1.
- Lee, Jae-min. “A more breathable Seoul” The Korea Herald 2016, May 17.
- Lee, Kyung-min. “Indoor cooking creates fine dust” Korea Times 2016, May 23.
- Park, H. W. and L. Leydesdorff. 2004. Understanding the KrKwic: A computer program for the analysis of Korean text. *Journal of the Korean Data Analysis Society*. 6, 5: 1377-1388
- Shapiro, Matthew. 2016. *Transboundary air pollution in Northeast Asia: the political economy of yellow dust, particulate matter, and PM2.5*. Korea Economic Institute of America.
- Yale Center for Environmental Law & Policy et als. 2016. *Global Metrics for the Environment* (www.epi.yale.edu)
- Zastrow, Mark. “NASA jet gets a sniff of pollution over South Korea” Nature: International Weekly Journal of Science. 2016, May 9.

Contrasting views of the public vs. teenage students regarding renewable energy

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Abstract

This paper reports on the compared views of and some attitudes towards the use of renewable energy technologies and some feedstocks for biofuels in a sample of the general public in the North Eastern region of Thailand with a similar number of local secondary school students. The data collected provides a small snapshot into public opinion of socioeconomic, scientific and political factors that are relevant to the transition towards more renewable energy provision within Thailand. In addition to this, participants indicated which subjects they considered would be of value for school students to study in more detail to equip them with knowledge to make informed choices of their own. The results reveal some holes in the general public knowledge of government policy, as well as a few issues in their thoughts, which demonstrated that generally people are aware of the complexity of energy transition. Environmental ethical issues also ranked high in peoples' opinions of topics for secondary school educational improvement. An adjunct to the results of the survey was carried out in 2013, with a partial analysis of a small repeat survey completed in July 2017. This gives a small insight into opinion trends over a four year period. The findings of the pilot study provide some useful baseline data for a refined and larger survey of a wider section of the general public to help inform educational curriculum planners and RE community education programmes of some attitudinal barriers to learning.

Introduction

There are daily reports in the media of issues relating to climate change and the increased provision of RE technology to meet governmental targets and international agreements. Many socioeconomic, political, scientific and technological factors contribute towards the transition towards renewable energy and reaching these targets (1). A growing body of evidence also draws a link between deterioration in psychological and spiritual or mental health with human disconnectedness from the natural environment (2). Several religious organisations of different faiths endorse the need for environmental

protection (15,18). The motivation for alternative energy can be focused on energy security such as UK nuclear policy or the Sufficiency Economy Philosophy of the late king Bhumibol Adulyadej of Thailand (3), on economic reasons such as investment in new technology (4,6) and incentives (6) or ethical concern over the sustainable use of environment (7, 8).

This survey was carried out following a pilot study of the opinions of students studying a master degree in public administration, which reveal an importance placed on religious values, a lack of knowledge relevant to science and a very high level of concern over the issue of climate change. The aims of the survey were firstly to gauge public opinion, the level of scientific awareness and attitudes towards environmental issues that have ethical implications. Secondly, this survey could be used for formative assessments of secondary students' prior levels of knowledge and understanding during the development of a renewable energy and environmental ethics course. The results and partial analysis of data may also be of use for further societal and educational research as reference, comparative or baseline data when reporting on societal opinions of and possible barriers to renewable energy transition.

Pilot Study

The pilot study was completed in 2012 using a similar questionnaire on the opinions of 53 voluntary respondents who were students studying part-time on the master in Public Administration course at the Sikiew Campus of National Institute of Development Administration (NIDA). The results revealed some fundamental gaps in scientific knowledge (94% thought carbon dioxide was poisonous and 89% could not state electricity consumption is measured in units or kilowatt hours) and others revealed partial understanding such as suggesting volts or amps for the units of electricity consumption or suggesting fire, fossils, air, pressure, dynamos and the environment as sources of energy. This lack of scientific knowledge and understanding may explain in part why there was a very high level of concern over climate change. 74% were very concerned, 11% had some concern, 13% admitted they wanted more information first and 2% did not believe in anthropogenic causes of climate change.

When asked about questions relating to development, less than half (43%) thought that electricity should be a basic human right but over half (53%) thought it should be funded by the state. Yet only just over a quarter (26%) of respondents considered that electricity was one of the most important requirements for their work. This was rated slightly more important than democracy

(25%), yet combating corruption, the legal system and the economy were seen as significantly more relevant (45%, 49% and 51% respectively).

In response to questions on ethical frameworks that they felt most relevant in their lives 83% said that each individual was responsible to develop their own virtues, 38% applied utilitarian principles of seeking the greatest benefit for the majority and 21% felt that rules and laws should govern social behavior. Over three quarters of the respondents considered that society as a whole was responsible for moral education rather than is being mainly the duty of parents (55%), teachers (32%), religious leaders (30%). In contrast to this although 72% believed that moral education should include religious content only 15% considered health issues relevant in moral development. However, 50% considered that work responsibilities, environmental issues and human rights should also be included in moral education. At work 79% said that safety was of paramount importance, although they survey did not reveal whether they were referring to personal or third party safety concerns. Full results of this pilot test and copies of the questionnaire in Thai and English are available from the author upon request.

Methodology of the Current Study

A survey was conducted of 103 randomly selected adult members of the public in Nakhon Ratchasima province of Thailand in July 2013. These general public (GP) participants were customers at a liquefied gas, diesel and petrol station, at a rural section of the main route 2 highway. The results were compared with data from the same questionnaire completed by 62 secondary school students at the local Pak Chong Worldclass School (PCS) and 45 secondary students at St Stephen's International School, (Khao Yai) SISKY. The school student numbers were combined to make a total of 107 for analysis in this paper, called the teenage sample. The nine part questionnaire was available in both Thai and English, and respondents could select which language they preferred to make their responses. The customers at the service station volunteered their time to respond to the questionnaire questions, and the students at the schools were given it as an optional task to complete in their own time. The same survey was distributed at the schools and service station again in July 2017; this survey has been analysed in less detail but some comparisons in results have been made. There were fewer respondents in the repeat trial: 79 in the 2017 group and 67 in the 2017 sample.

Some of the questions were designed to test if some findings of the pilot study were illustrative of the perceptions of ethics education and level of

knowledge of the general public many of whom would have had limited scientific or philosophical education. Other questions were designed to give greater insight on what the wider public saw as push and pull factors in addition to barriers against combating climate change or making the transition towards more renewable energy. There was some attempt in the questions to ask respondents to confirm their opinions, for example if respondents showed concern for spiritual wellbeing in one question did they later indicate that religious instruction was an important component of ethics education.

The first two questions were to gain an insight into knowledge of governmental energy policy targets. The third and fourth were to determine if people knew of various biofuel feedstocks. The fifth question asked directly about people's views of a human right of access to energy. The sixth and seventh questions were based on selection from twelve multiple choice statements, including one invalid statement about fossil fuels and ozone depletion. The seventh question requesting them to identify a statement relating to carbon dioxide was aimed to gain an insight into the level of knowledge of atmospheric pollution issues. The eighth question made reference to the late King Bhumibol Adulyadej's Sufficiency Economy Philosophy and the need for moderation. Respondents were asked to state what they personally could do to reduce fuel consumption. The final question was regarding what schools should teach more about to help students make responsible energy choices in the future.

Results and analysis

Question 1 revealed that students generally had high expectations of government targets with an average target of 49.5% of renewable energy use in Thailand within a decade. The GP average target was lower at 39.9%. However, 51% of the public respondents and 22% of the teenage group made no response. In question 2 both the public and teenage respondents correctly thought that more electricity is planned to be generated through hydro and solar than by wind turbines or biomass combustion. Although more of the teenage incorrectly believed that solar would generate more than hydropower.

In the third question the majority of public group ranked palm nuts (40%) and cassava (34%) as the main biofuel feedstocks, whereas the cassava (23%) was replaced by sugarcane (30%) in the ranked order of teenage responses. Both adults and students thought that rice husks would be the least likely feedstocks for a biofuel. The average percentage of ranked values are given in Table 1 below.

Table 1: Average ranked scores for the suggested order of use of different vehicle biofuel feedstocks.

Group	Cassava	Sugarcane	Rice husks	Palm nuts
GP	34	19	7	40
SS	23	30	9	38

The collective data from question four indicated that both students and adults were most in favour of fossil fuel liquefied petroleum gas over renewable alternatives. Yet for the adults animal dung was a more favourable alternative to plant waste and much more so than fermentation by genetically modified organisms (GMO) or the use of municipal and household (M&H) waste. The teenage group were generally less in favour of fossil fuel and comparatively more in favour of plant waste and GMO fermentation than the adult group. The average ranked scores are given in Table 2.

Table 2: Average ranked scores of preferences for various biogas feedstocks for home cooking use.

Group	LPG	Animal dung	Plant waste	M & H waste	GMO ferment
GP	36	30	13	13	8
SS	28	19	25	12	16

In the response to the question of whether access to energy should be considered as a human right comparable to the right of access to water, more students were undecided about this than the adults. In the pilot study 43% of university respondents considered that there should be basic human right of access to energy. However, unlike the pilot trial, the majority within both groups in this study considered that it should be a human right. The percentage of responses in this study are in Table 3.

Table 3: The percentages of respondents who considered access to energy should be a human right (GP,) . (N=103; SS, N=107)

Group	In favour	Against	Undecided	No answer
GP	55	8	3	34
SS	62	3	16	19

Table 4: Reasons selected for the replacement of fossil fuels with renewable energy technologies

Group	1st	2nd	3rd	4th	Least relevant
GP (n=103)	Rising fossil fuel cost	Spiritual value of nature	Sharing planet with animals	Climate change floods	Toxic carbon monoxide
SISKY (n=45)	Climate change floods	Safety factors	Sharing planet with animals	Finite nature of fossil fuels	Toxic carbon monoxide
PCS)n=62(Thai energy security	Rising fossil fuel cost	Finite nature of fossil fuels	Protection of ozone)false(Spiritual value of nature

Table 5: The percentages of respondents in favour of different school subjects to support renewable energy education (GP, N=103; SS, N=107)

Group	Buddhism	Economics	Ethics	Philosophy	Politics	Science	Society
GP	42	42	35	17	24	48	33
SS	19	47	44	37	21	63	40

Table 6: The 2017 percentages of respondents who thought access to energy should be a human right

Group	In favour	Against	Undecided	No answer
GP (n=67)	65	23	1	11
SS (n=79)	60	36	2	2

Table 7: The percentages of respondents in favour of different school subjects to support renewable energy education

Group	Buddhism	Economics	Ethics	Philosophy	Politics	Science	Society
GP n=67	23	15	26	16	18	31	13
SS n=78	21	26	19	14	21	28	23

The statements selected for reasons why renewable energy (RE) should be used to replace fossil fuels showed variation between the public and teenager groups and within the SISKY and PCS schools there was also variation. The adults have primarily cited an economic reason. However, along with SISKY students, they also selected two reasons that indicate an appreciation some slightly more intrinsic and less instrumental values or environmental ethical reasons that show value was placed on the environment. The PCS students generally chose more scientific and economic political reasons. Generally, few respondents from both groups selected reasons of conflict (16%), acid rain (17%) future generations (13%). There was even less concern for future generations amongst the SS group (7%) than the adult GP (22%). The primary four reasons selected by the groups are given in Table 4.

The following question was only answered correctly by three out of the total 210 respondents, 45 respondents (33 from GP and 12 from SS) actually cited ozone depletion as a valid reason for not using fossil fuels. This indicates a lack of knowledge and understanding, or at least a misconception, of the scientific basis of atmospheric pollution. The lower rate of this error in the responses from SISKY students could be a reflection that the damage of CFCs to the ozone layer is specifically included within the lower secondary Science curriculum. This leads to the final question asking them to state what subjects they considered important for students to learn to become competent at making energy choices. The percentages of the responses to question nine are given in Table 5. There is a consistency of opinion between both adults and students, although adults predominantly thought Buddhist values would be of more use than learning philosophy yet the converse is true in the teenagers' opinions. In both groups politics was seen as the less important social science but science as the most relevant or beneficial, with students being particularly in favour of science. Ethics and socioeconomic education was also rated as important by over one third of the respondents.

The answers given to question 8 about how respondents could personally use less energy are not analysed in this paper. The question was included to promote reflective thought and for raising awareness. Answers included sharing or using public transport, walking and cycling, turning off lights and other appliances when not in use. There were very few responses that suggested converting to or buying energy efficient appliances or using insulation to reduce air conditioning costs.

Initial results from survey in July 2017

In response to the first question the respondents were much more ready to offer a suggested value with only 13 of the total 146 not submitting a numerical value. The average values of these public (2017) and teenage (2017) groups this time were also very close to each other with the public (n=63) average of 45.1% and the teenage (n=70) average of 44.7%. This average however does not determine the range and standard deviation of these data and although closer to actual governmental targets does not demonstrate how many respondents actually knew the real target value.

The results for question 5 regarding the right of access to energy are given in Table 6. This shows relatively consistent student opinions in favour of a right to energy, compared to the data from 2013 in table 3, but there has been a shift in confidence to express a negative response to the question. The responses are generally much more clearly expressed with few undecided or unanswered responses in the student cohort. This may indicate a greater confidence in making responses regardless of giving the perceived correct answer¹. There has been a 10% rise in the number of adult responses in favour of this potential right since 2013, which was also higher than the 43% reported the year before during the pilot.

The results of the final question regarding educational subject choice to assist students to make informed energy choices, is given in Table 7. For many subjects there is a degree of consistency between the adult and teenage opinions for this question, although the students are slightly more in favour of the social sciences compared to the adults' opinions. This latter point of students seeing social sciences as more relevant than adults do, and the ranked importance of science compared to other subjects mirrors the results of the 2013 survey. The recent results show that although science is still believed to be the most relevant subject for making choices of energy it was rated as relatively less important than in the 2013 survey. There were generally much fewer subjects selected by each respondent in the 2017 survey compared to the data from the 2013 survey, which explains in part why the averages for each subject were generally lower. An exception to this trend was that Politics maintained a level of importance by

¹ Thai students are reluctant to volunteer answers to foreign teachers on a cultural phenomenon unless they are sure that they know the correct answer; anecdotal evidence from teacher conversations with the author suggest that this trend may be changing and that there is a growing confidence within classrooms. The validity of this proposition and possible reasons for it relating to changing teaching practices and educational philosophy merits further research.

approximately one fifth of respondents. Buddhist Studies was also slightly more important in this year's student responses, although an increase of 2 percentage points in a sample of the size may not be statistically significant ($n=78$) for this question. It remains far below the 72% of university students sampled in the pilot study who professed a desire to include Buddhist studies in a curriculum for moral development within schools.

Discussion

From these results there is some evidence that there are gaps in fundamental scientific knowledge of climate change issues relating to environmental ethics that may hinder future learning until addressed. The general public and school students are aware of RE being a topic of media interest, yet they have little accurate knowledge of the socioeconomic issues and political factors involved in the governance of energy transition. The lack of GP responses and the overestimation of governmental targets, just prior to the time of this survey had been set at 20% by 2020 but were increased to 30% by 2025. The media had been reporting this as a success of Thai policy in providing subsidies for electricity generation through RE technologies in the form of economic adders to electricity sold to the national grid. There was awareness in the media of the issue of overdependence on fossil fuels, the transition towards gasohol blends for petrol driven cars, new exhaust gas emission limits and differentially rising fuel costs. The wider international media were raising socioeconomic and ecological environmental issues including the loss of biodiversity associated with palm oil plantations in South East Asia, flooding due to climate change² as well as ongoing conflict in the Middle East being attributed, to various degrees, to the fight for access to oil. There is some evidence supporting that these issues were perceived as relevant to RE transition in the responses to question 6, yet generally the costs of fuel was reported as higher significance than fuel security, conflict and other socioeconomic factors. The factors that had a direct impact on participants were of more consequence than the remoteness of war in far away countries.

² In October 2010 there had been extensive flooding in urban parts of Korat and Pak Chong in Nakhon Ratchasima province. The following year throughout Thailand flood waters moved south through central Thailand with serious socioeconomic impact on the agricultural, industrial and retail industries and housing. The management of this extensive flooding had political ramifications as the prime minister was accused of mismanagement.

The final response from participants regarding what school students should be able to learn is encouraging for educationalists who are seeking to promote environmental ethics within the secondary school curriculum (11,12). The response rate of the GP group in question 6 of the importance of nature to spiritual and mental health was high along with their relatively high rating of religious instruction to be included in school curricula in question 9. The benefits of religious debate and the inclusion of religious institutions promoting sustainable practices has been stressed by many authors regarding the environmental initiatives in different faith and interfaith organisations (15,16,17,18). The importance of understanding the scientific aspects when applying bioethical principles is referred to by many researchers (7,8,9,10). Teachers play a vital role in this transmission of knowledge (11) but often the teachers themselves have limited understanding of current RE issues (13). The aim within Thailand has been associated with further promoting the SEP which is already included in the secondary school curriculum, yet the further challenge is to make sufficiency and sustainability part of the mindset (14).

Discussion of some initial results of 2017 survey

The increased number of responses to the question of governmental RE policy targets and the similarity between adult and student responses is intriguing and merits further exploration; a first step will be a statistical analysis of the data in addition to extend the sampling of both the general public and student groups. The consistency of responses in favour of the right to energy is a useful reference for researchers seeking to data to support this case. The results indicate that there may be a trend where although Science is perceived as the most relevant subject for making RE choices that other subjects including religious studies, ethics, social, political and economic studies are ranked relatively more important in relation to Science than they were in the study conducted four years ago. This snapshot flags up that, within these small samples, there is a growing preference for a more balanced curriculum to include relatively more socioeconomic, political and ethical religious studies than curricula with technical scientific bias that were deemed as preferential four years ago. This needs greater exploration through collection of data from a wider population.

Limitations

The length of this questionnaire was quite long and some respondents complained of feeling weary

and others remarked that it felt like an examination. This fatigue may have caused certain respondents to skim and or skip answers. The questionnaire could be simplified yet still provide insightful results, for example by using Likert scales. The small sample size and limited regional sample pool make this an interesting snapshot as a pilot study, but for more reliable results a survey should be conducted over a wider area and using larger numbers.

The data from both surveys indicates that there are gaps in teenage and the wider general public knowledge of the scientific and technological factors and socioeconomic issues relevant in the RE debate. There is a recognition by both adults and school students that modifications to school curricula would help to empower students to make more informed choices of their own. There is an indication that this means a shift away from curricula with technical scientific emphasis to one with a greater balance between social sciences, ethical or religious studies and science. This pilot study provides a useful baseline reference to launch further investigation from a wider population base, which could subsequently be used to inform education policy and curriculum developers. It is also a useful reference study for community educators who are seeking to promote acceptance of RE technology within the general public, some of whom had not had the benefit of complete or recent secondary school education.

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References

- 1 Verbong, G and Loorbach, D(Eds). 2012. *Governing the Energy Transition :Reality, Illusion or Necessity?* New York and London :Routledge, Taylor & Francis.
- 2 Kidner, DW. 2001. *Nature and Psyche :Radical Environmentalism and the Politics of Subjectivity* . Albany, NY :State University of New York Press.
- 3 Pavarolarvidya, S (Ed). 2010. *Sufficiency Economy :A New Philosophy in the Global World* .Bangkok :Thai Chamber of Commerce and Amarin Publishing Company.
- 4 Negro, SO, Suurs, RAA and Hekkert, MP. 2008. The bumpy road of biomass gasification in the Netherlands :Explaining the rise and fall of an emerging innovation system ".*Technological Forecasting and Social Change* 75 :57 77.
- 5 Hekkert, MP, Suurs, RAA, Negro, SO, Kulmann, S and Smits, REHM. 2007. Functions of Innovation Systems: A new approach for analysing technological change ". *Technological Forecasting and Social Change* 74 :413 432.
- 6 Mendonca, M. 2007. *Energy, Ethics and Feed in Tariffs*. Renewable Energy World] Available online at: <http://www.renewableenergyworld.com/articles/2007/04/energy-ethics-and-feed-in-tariffs-48310.html>
- 7 Macer, DRJ (Ed). 2008. *Asia Pacific Perspectives on Environmental Ethics*. Bangkok: UNESCO Bangkok.
- 8 Macer, DRJ (Ed). 2011. *Energy Equity and Environmental Security* .Bangkok: UNESCO Bangkok.
- 9 Kanaly, RA, Manzanero, LIO, Foley, G, Panneerselvam, S and Macer, DRJ (Ed). 2010. *Energy Flow, Environment and Ethical Implications for Meat Production* Bangkok: UNESCO Bangkok.
- 10 Schroeder, D and Pisupati, B. 2010. *Ethics, Justice and the Convention on Biological Diversity* University of Central Lancashire and UNEP.
- 11 Macer, DRJ. 2011. *UNESCO Core Curriculum and Teaching Resources*. Bangladesh Journal of Bioethics 2(1): 5 6.
- 12 Waller, AR. 2012. *Methodology for assessing the impact of learning environmental ethics on the personal values and energy choices at secondary school level* ".Poster presentation at 1st TRESERT Conference Naresuan University, Phitsanulok, Thailand 18th June 2012 .
- 13 Zyadin, A, Puhakka, A, Ahponen, P and Pelkonen, P. 2014. *Secondary school teachers 'knowledge, perceptions and attitudes toward renewable energy in Jordan* ".*Renewable Energy* 62 :341 348.
- 14 Dharmapiya, P and Saratun, M. 2015. *Cultivating a "Sufficiency "Mindset :Thailand's Educational Strategy for a Sustainable Society* .Thailand Sustainable Development Foundation :Bangkok.
- 15 Palmer, M and Finlay, V. 2003. *Faith in Conservation: New Approaches to Religions and the Environment* The World Bank :Washington, DC.
- 16 Choudhury, N. 2013. *Is the rise of Islamic finance good news for the environment?* Available online from: <http://www.climatechangenews.com/2013/11/05/is-the-rise-of-islamic-finance-good-news-for-the-environment/>
- 17 Kamaruzzaman, S, Baharuddi, A and Nilofar, A. 2011. *Strategies for renewable energy applications in the organization of Islamic conference (OIC) countries*.

Renewable and Sustainable Energy Reviews 15(9):
4706-4725.

- 18 Dorje, ODT in Molloy. 2013. Experiencing the World's Religions :Tradition, Challenge and Change.6th Edn. McGraw Hill :New York.
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A Chinese perspective on the concept of common morality by Beauchamp and Childress

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Abstract

T.L. Beauchamp and J.F. Childress are American bioethicists. They formulated four clusters of principles of biomedical ethics in their book, *"The Principles of Biomedical Ethics."* They are the Principle of Respect for Autonomy, the Principle of Non-Maleficence, the Principle of Beneficence, and the Principle of Justice. Beauchamp and Childress also developed their theory of common morality as the source of considered judgments for the principles and the method of bioethics. These principles and common morality are used internationally and successfully. This book has been revised to the seventh edition to allow for improvements. The principles are being used in China, but the understanding of common morality is not enough. This paper studies the implications of common morality. This work is useful for the development of Chinese bioethics.

Introduction

Professors Thomas L. Beauchamp and James F. Childress are American bioethicists who formulated four clusters as principles of biomedical ethics in their book *"The Principles of Biomedical Ethics"*. Professor Beauchamp received graduate degrees from Yale University and Johns Hopkins University, where he received a Ph.D. in 1970. He then joined the Philosophy Department at Georgetown University, and in mid-70s accepted a joint appointment at the Kennedy Institute of Ethics where he later served as Professor of Philosophy and Senior Research Scholar. His research interests include the ethics of human-subjects research, the position of universal principles and rights in biomedical ethics, and methods of bioethics. In 1975, he joined the staff of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, where he later wrote the bulk of The Belmont Report (1978).

Professor Beauchamp thinks that a method based on principles can work well for medical ethics. In 1998, he published the paper *"An Inquiry concerning the Principles of Morals"* (Oxford: Clarendon Press, 1998). In 2010, he published the book *"Standing on Principles: Collected Essays"* (Oxford University Press, 2010). The Collected Essays include his philosophical theory, principles,

and methods. After finishing the Belmont Report, in 1979, he co-authored a book entitled *"Principles of Biomedical Ethics"*. This book has been revised to seven editions to allow for improvements from the years 1979 to 2013. This book was translated to Japanese, Polish, Spanish, Portuguese, French, Korean, and German. In 2014, the Chinese translation book was published. These books have built a philosophical and doctrinal function for American bioethics. Also *"The Principles of Biomedical Ethics"* has played an important role in the development of bioethics worldwide.

The Principles Approach and Common Morality

In *"The Principles of Biomedical Ethics,"* Professor Beauchamp formulated four clusters of principles for biomedical ethics. They are the Principle of Respect for Autonomy, the Principle of Non-Maleficence, the Principle of Beneficence, and the Principle of Justice. Respect for autonomy is rooted in Western liberal moral traditions. This principle gives a central role to respect for autonomy of the subject or patient. This principle proposes an autonomous authorization model for the doctrine of informed consent and the patients' capacities for autonomous choice, obligating the professionals to foster it in decision making.

Non-maleficence was the basic requirement of traditional medical ethics. Contrary to the other traditional standard distinctions, this principle gives considerable weight to quality-of-life judgments as to whether treatments are optional or obligatory. Beauchamp and Childress endorsed a criterion of acting as an advocate in the best interests of patients. The Principle of Beneficence includes all forms of action intended to benefit other persons. In developing the principle of beneficence, Beauchamp and Childress proposed that a person had obligations of beneficence when conditions were satisfied. Concerning the Principle of Justice, they argued that the right to a decent minimum of health care is one of universal accessibility, in a two-tiered system of health care. These principles are used internationally and successfully.

Beauchamp and Childress developed their theory of common morality as the source of considered judgments for the principles and the method of bioethics. They regard the source of the four principles as common morality. Common morality is not merely a morality, in contrast to other moralities, but is applicable to all places, and we rightly judge all human conduct by its standards.

The following are norms that are examples (though not a complete list) of standards of action (rules of obligation) found in common morality: Do

not kill; Do not cause pain or suffering to others; Prevent evil or harm from occurring; Rescue persons in danger; Tell the truth; Nurture the young and dependent; keep your promises; Do not steal; Do not punish the innocent; and Obey the law. The set of norms shared by all persons committed to morality, and the shared features are universal and pluralistic (Beauchamp 2009).

Common morality includes, in addition, standards other than rules of obligation. Here are examples (not a complete list) of moral character traits or virtues, recognized in common morality: non-malevolence; honesty; integrity; conscientiousness; trustworthiness; fidelity; gratitude; truthfulness; lovingness; and kindness. These virtues are universally admired traits of character. We can find the relationship from the norms and moral character traits in common morality with the four clusters of the principles of biomedical ethics. (Beauchamp 2009)

Interaction with Chinese bioethics

Biomedical ethical principles are being used in China, but the understanding of the implications is not enough. From the beginning of the development of bioethics in China, for the most part, it depended heavily upon the scholars who were exposed to its tenets at foreign universities or conferences. These pioneers also made persistent efforts at establishing and developing bioethics at educational, governmental, and health care levels of China. After studying bioethics in the USA, in 1987, Professor Renzong Qiu published the first Chinese book of "bioethics". With this book, Beauchamp's and Childress's "Principles of the Medical Ethics, American Bioethics" was introduced to China.

However, most Chinese bioethical text books only focused on introducing the four principles. In the early 1980s, many Chinese scholars misunderstood bioethics as a subject that specifically only used these proposed four principles to deal with ethical issues arising from the application of advanced technologies in biomedical practice. They did not understand the basic theory of common morality. After 1998, this situation was changed by some Chinese bioethicists who studied American bioethics in the USA. They came back to China or other Asian countries, and continued working on Chinese bioethics. Before that time, most Chinese bioethicists did not use more ethical theories or approaches to do philosophical analysis and discussion (Baker 2009).

During the development of Chinese bioethics, the bioethical principles were guidelines for protection of human subjects of research and clinical medical ethics. Chinese bioethicists paid attention to the ethical issues of research on human subjects. It is

marked by the establishment of the Medical Ethics Committee in the Chinese Ministry of Health and Family Planning and the Committee for the Protection of Human Subjects in Biomedical and Behavioral Research. These committees have advised their administrations on the importance, meaning and possible implementation or regulation of rapidly developing biomedical technologies at the national level.

In this way, Chinese bioethics has become institutionalized through hospital ethics committees and IRBs (Institutional Review Boards). This allows for one to bring ethical questions about cases, if the hospital ethics committee is unable to provide an answer. The four clusters of principles of biomedical ethics have yet to determine the relevant doctrine to resolve the issues. Therefore, philosophers and bioethicists are expected to produce relevant analysis and arguments with the hope that after some debate, an initial consensus will be reached that can define the appropriate guidelines for practical use.

During this process, Chinese philosophers and bioethicists regarded Beauchamp and Childress' "The Principles of Biomedical Ethics" as the only significant source for the theory of the philosophical nature and doctrinal function. After 2014, the Chinese translation of Beauchamp and Childress's book "The Principles of Biomedical Ethics" was a big help to understand the deeper meanings of bioethical principles and, in particular, the clarification of the view of common morality and the related method of reflective equilibrium for Chinese bioethicists. In recent years, a small group of scholars in the Chinese Academy of Social Sciences participated in a project funded by a national foundation researching the theories of Beauchamp's "common morality" and the debates. This team works on conceptual, moral, methodological, and policy dimensions of the distinction between research and practice (Wang 2016).

Discussion

There are debates about whether there is universality in common morality of Beauchamp and Childress. Some have argued that particular moralities, including Confucian bioethics, differ from common morality. They disagree that common morality and Confucian bioethics could be developed in a Reflective Equilibrium Method to create practical guidelines with varying degrees of coherence (Fan 2011). After I researched the views of Confucius, I tried to compare the principles of bioethics with the views of Confucius, doing an inquiry on common morality within Confucian bioethics, and whether Confucian bioethics could be developed to create practical guidelines with

varying degrees of coherence and whether there is any possibility to harmonize American bioethics and Chinese bioethics.

I agree with some Chinese bioethicists' opinion that there are principles inside Confucianism, and that the principles are relevant to American bioethics principles and common morality. Some Chinese bioethicists think that although Confucius' ethics demonstrates distinctive features of deontological ethics, his philosophy is both ethical and political in its concern to promote public welfare. This duality of approach inevitably incorporates a utilitarian reasoning on certain occasions. This made Confucius' ethics resemble that of certain contemporary ethicists' mixed deontological ethics. These ethics are basically rule-centered but in such a way as to take into account the teleological aspect of utilitarianism (Oiu 2004).

A Taiwan bioethicist thought that there is actually a resemblance between Confucius' ethics and the framework of principles approach to bioethics. In Confucius' ethics, the basic ethical "principles" of "Ren", "yi", "li", and "he", provide guidance for more specific action. This action is similar to "rule" and "recommended action." Confucius' "Ren", "yi", "li", "he", comprise the most fundamental thoughts and principles in Confucius' ethics. "Ren" (humaneness) has been translated as love, benevolence, humanity, human-heartedness, virtue, perfect virtue, true manhood, and humaneness. It also signifies the ideal relationship between persons. "Yi" (righteousness) generally means appropriateness, obligation and justice, and is "the principle of setting things right and proper." "Li" (rules of propriety) indicates ceremony, rites, decorum, courtesy, etiquette, and at first represents the ceremonial order. "He" (seeking harmony) could be described as the outer form and standard of morality that is concrete for man to abide by in the context of human society (Li 2008).

Another Chinese bioethicist said, "Ren" means loving the people. "Yi" means respecting the virtuous. "Li" means ritual—that is a complex of embodied pattern of interactions that announce and sustain virtues, obligations, and the communal ground approach to bioethics issues. The key concepts in Chinese philosophy are non-maleficence, compassion, respect, and righteousness. (Cheng-Tek Tai 2008) In their book, Beauchamp and Childress also proposed five focal virtues for health professional: compassion, discernment, trustworthiness, integrity and conscientiousness. It seems there are some similarities.

Most Chinese bioethicists favor the American bioethicists' views. The seven traditional virtues are placed into two categories; they are the

theological virtues of prudence, temperance, fortitude, and Justice. The seven deadly sins or vices are pride, gluttony, lust, anger, greed, envy, and despair. Perhaps the noblest and most practical point of balance between religion and science should be to love justice and humaneness. This balancing test between religion and science is the achievement of a point of equilibrium that promotes policies, and shapes direct actions that minimize suffering and improve the social and human well-being (Kane 2011).

A Chinese-Western bioethicist has said in China that some aspects of traditional Chinese medicine ethics are still alive, and are shaping Western bioethics. Western bioethics has been integrated into Chinese health care and modern medical morality. He thinks a number of generalized comparisons or dichotomous terms about "China vs. the West" have been formulated to indicate these supposed differences in cultural values and social morals. There is a serious problem with that notion. It is oversimplifying and distorts the complex reality of both Chinese and Western cultures (Nie 2011).

"The Guiding Ethical Principles on Stem Cell Research," issued by the Ministry of Health of China in 2003, was met with big objections from American religious bioethicists. During the administration of then-President George W. Bush, there was a federal prohibition on the use of government funds to create new lines of stem cells. However, certain cell lines already in existence could still be used in research with federal funding. The Obama administration lifted that ban. This administration permitted, with certain limits, the production of new cell lines with the use of government funds by using unwanted embryos. Also, in 2010, the first experiments using stem cells in humans progressed in USA. Therefore, American and Chinese policies worked to direct actions that minimize suffering and improve social and human well-being (President's Bioethics Commission, 2012).

I will continue to research any possibility on this harmonization of common morality between American bioethics and Chinese bioethics with the cross-cultural exchange of Chinese-American bioethics, influencing and comparing of views and practices.

References

- Beauchamp, Tom L. and James F. Childress, *Principles of Biomedical Ethics*, Oxford University Press, 2009, p3.
- Baker, Robert B. *The Cambridge World History of Medical Ethics*, Oxford University Press, 2009, pXXI.
- Cheng-Tek Tai, Micheal *The way of Asia Bioethics*, Asia Bioethics Review, Dec 2008 inaugural edition, p 22.

- Fan, Ruiping *Contemporary Confucian Bioethics*, Peking University Press, 2011, p5.
- Li, Ruiquan *The Confucian Bioethics*, National Central University Press, Taiwan, 2008, p 10.
- Kane, Brian M. *The Blessing of Life-A introduction to Catholic Bioethics*, Press: Lexington book: Laham, New York, UK, 2011, p16.
- Nie, Jing-Bao *Medical Ethics in China-A Transcultural Interpretation*, London, New York, Routledge, 2011, p 209.
- Qiu Renzong, *Bioethics: Asian Perspectives, Quest for Moral Diversity*, *Philosophy and Medicine* 80, Kluwer Academic Publishers, 2004, p5.
- President's Bioethics Commission, *the Final Report on Stem Cell Research*, Sep 2012.
- Wang, Yanguang. Research on the Views of Beauchamp and Childress' Common Morality, *Medicine and Philosophy* 37 (2 A), 2016)

The Retraction Watch retraction: how bad advice became worse advice for scientists and academics

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Abstract

In 2015, the Retraction Watch leadership, Adam Marcus and Ivan Oransky, retracted an article that they had written for *The Lab Times* in 2013. According to Marcus and Oransky, in the 2013 piece, they had offered "bad advice" to academics. In the 2013 piece, Marcus and Oransky suggested that when an error, actual or potential, was detected in a published paper, that they should first contact – by name or anonymously – the editor, then the author, and finally the research institute, following Committee on Publication Ethics (COPE) guidelines. They also recommended readers to copy Retraction Watch on their communications – most likely so that Retraction Watch could gather a scoop – suggesting even that by mentioning or copying Retraction Watch would twist the arm of the editor, and perhaps speed up – or influence – the journal's action, or decision. Offering such bad, flawed and unscholarly advice, claiming boldly, without any citations "that cronyism can protect obvious fraud", the 2013 *Lab Times* piece was a clear act of anti-science advice. Clearly recognizing their own bad advice, and flawed and misleading logic, but taking considerable time to do so, Adam Marcus and Ivan Oransky retracted their 2013 article in December of 2015, but replaced it with a substitute offering even

worse advice, indicating to concerned academics to scrap their 2013 advice of contacting authors, editors and academic institutes, and opting instead for a potentially biased anonymous option, using a whistle-blower website, PubPeer. Marcus and Oransky failed to indicate any financial or other conflicts of interest in their *Lab Times* piece. This is important, because, as we now know, the marriage between these watchdogs has been in the pipe-line for years now, reaching public prominence in early 2016 during a meeting in UC Berkeley, and culminating in generous financial backing – in the hundreds of thousands of US\$ – by the Laura and John Arnold Foundation, to both Retraction Watch and PubPeer. This commentary examines how the retraction of one badly written journalistic piece for lack of professionalism led to the emergence of an even worse article full of biases. Perspectives on how this could be interpreted, and what should happen, are provided.

Bad advice offered to academics, including scientists, by Retraction Watch

In January of 2013, Adam Marcus and Ivan Oransky, the co-founders of Retraction Watch³, a scientist-shaming blog, wrote an article for *The Lab Times*, an online "news magazine for the European life sciences", in 2013 (Marcus and Oransky, 2013). Very unexpectedly, almost three years later, they retracted their flawed article claiming that they had offered bad advice to academics and scientists, opting to publish a new set of advice to the same academics that they had ill-advised about three years earlier. In their new article, also in *The Lab Times*, published in December of 2015, Marcus and Oransky stated "we want to retract one of the suggestions we made" (Marcus and Oransky, 2015). There are many problems with the original 2013 article, and also the 2015 article, both offering bad and worse advice, respectively. This commentary dissects both articles to better understand what may have gone wrong, to try and assess the hidden information gaps. It also shows that both pieces were not only badly and superficially written, they were unsupported by any evidence, literature or references, a sign of very poor academic behavior. Finally, no conflicts of interest (COIs) were declared, but were in fact hidden from the public.

Flaws with the 2013 article

The Marcus and Oransky (2013) article has, as the author sees it, multiple flaws. Firstly, many facts are stated, but none are substantiated by sources, references, or citations. A fact that is not supported by a supporting source is an "alternative truth". In science publishing, there are severe penalties when

³ <http://retractionwatch.com/>

scientists report facts in published papers without supporting sources, and in extreme cases, these may even result in retractions. So, the example set by Marcus and Oransky is poor, both academically, and ethically. Starting off their discussion, Marcus and Oransky, referring to the now-shuttered Paul S. Brookes⁴ site (www.science-fraud.org), misled the public and readers by stating “some saw the six-month-old site as a vital way to report alleged scientific misconduct.” In fact, this is not correct. The site was shut down by a DCMA notice because Brookes had misled scientists and the public by automatically associating every paper and scientist that had been profiled on his site, as fraud, or fraudulent. So, apparent libel is what caused the Brookes site to be shut down by legal threats. Even minuscules such as the precise day of the shut-down are confusing, with the Marcus and Oransky (2013) article indicating that “closed down the *Science Fraud* website late last year”, referring to the end of December 2012, whereas a report by Oransky at Retraction Watch (Oransky, 2013), published on January 3, 2013, indicates that “the whistleblower site Science Fraud, which went dark yesterday in response to legal threats”, referring to January 2, 2013. Thus, Marcus and Oransky reporting can be inaccurate, undermining accurate, trustworthy and reliable science journalism (Bubela et al., 2009).

This background indicates that the Retraction Watch leadership enjoys dabbling in “alternative facts”⁵, even before this term was informally coined by President Trump’s Counselor, Kellyanne Conway, on January 22, 2017, just after the inauguration of Donald J. Trump as the 45th US President. The use of inaccurate and misleading journalism poses a risk to society, and to science (Teixeira da Silva, 2017a). Alternative facts, which are equivalent to mis- or disinformation, lies, or false propaganda, which are basic elements of tabloid journalism (Popović and Popović, 2014), is a dangerous example being set by these science-trolling journalists to academia. Oransky (2014) was clearly inspired by a Brookes interview in *Science*⁶ promoting PubPeer for the anonymous critique of scientific papers. So much so that the Brookes experience may have inspired Marcus and Oransky to dump, via a retraction, their 2013 article, to set a PubPeer-supporting stance in their 2015 *Lab Times* article.

So, to counter the failed fraud-accusing policy that had been imposed by Brookes, Marcus and Oransky (2013) stated: “we wanted to offer some thoughts on how readers can best call attention to potential

problems in the literature.” Marcus and Oransky, acknowledging that anonymous complaints “may be wielded as vendettas or used to cripple competition”, offered a few ways to achieve this in a non-anonymous manner: a) contact a journal editor with a suspected problem in a paper; b) contact the authors; c) contact the authors’ research institute or an office of research integrity when contact with editors or authors yielded no response, using the “electronic trail” used to attempt to correct the literature as the evidence that editors and authors were uncooperative to correcting the literature. Marcus and Oransky based their advice heavily on the advice offered by the Committee on Publication Ethics (COPE), which they defined inaccurately as the Committee for [sic] Publication Ethics, further cementing the sloppy and lax nature of the science journalism by this pair. Claiming that COPE is “not hostile to anonymous complaints,” even embracing anonymous complaints, the next advice offered by Marcus and Oransky was “to resist the temptation to take out your frustrations in personal attacks against the editors or authors with whom you’re corresponding”, noting that such an approach could reduce the responsiveness of editors to future complaints. Readers are drawn to the discussion of the pros and cons of anonymity in the context of the post-publication peer review process (Teixeira da Silva and Blatt, 2016). In fact, until this point of their 2013 article, the suggestions made by Marcus and Oransky were reasonable, fair, and realistic, to face problematic authors, journals, editors or publishers head-on, directly, by name, or, where there may exist a fear of retaliation, anonymously. However, this is the point in the Marcus and Oransky (2013) article that destroys the entire and core academic basis of their argument, simply showing that this is an egotistical narcissistic pair of science journalists that are seeking only to draw attention to their blog rather than dealing with the fundamental ills that plague science. They stated: “Readers should also feel free to copy us on correspondence, although we would prefer it if you somehow made it clear you’re not acting on our behalf.” In other words, Marcus and Oransky want to be associated in some way with the credit for blowing the whistle, but they don’t want any responsibility associated with the claim, disguising their argument as “journalistic independence”. The nail in this coffin of bad advice comes with this statement, “knowing a well-read website is aware of the allegations can prompt quicker action, although we make no promises.” Here, too, Marcus and Oransky sought recognition for Retraction Watch, through its “fame factor”, while washing their hands free of any liability or association with the anonymous complainant or whistle-blower. A legally smart defense, no doubt. Finally, Marcus and

⁴ <https://www.urmc.rochester.edu/people/23781238-paul-brookes>

⁵ https://en.wikipedia.org/wiki/Alternative_facts

⁶ <http://www.sciencemag.org/careers/2014/03/paul-brookes-surviving-outed-whistleblower>

Oransky claim that “cronyism can protect obvious fraud,” but offer no examples or citations to support their claim. For the record, a clear example is the Serbian *Archives of Biological Sciences* (Teixeira da Silva, 2015).

The most glaring problem with that 2013 article by Marcus and Oransky is the failure to provide any concrete affiliation, other than their association with Retraction Watch. It is now known that both authors held and hold multiple positions.

Flaws with the 2015 article

Marcus and Oransky must surely have felt guilty, or it is possible that their funders (see hidden COI later) or partner COPE may have called them out. Whatever the truth is, the public will never truly know, because Oransky and his Retraction Watch are extremely opaque with the public regarding their own practices, and with scientists who have seen through their journalistic farce. The new 2015 article starts with an “alternative fact”, by stating “Better *not* contact the authors first.” This is odd, because the advice to contact authors in their 2013 article was indicated as the second step of contacts, after contacting the editors. So, not only do Marcus and Oransky try to correct a false and misleading fact, they continue to display poor attention to detail, thereby fortifying the notion that their science journalism is of poor quality (see more evidence later in this commentary). They then state “we want to retract one of the suggestions we made.” This retraction in itself is very odd. Why would a simple correction not have sufficed, or an updated article indicating that their views had changed, and evolved, which seem to be reasonable solutions to their 2013 opinion article. Instead, what drove this science watchdog pair to bow their head in apparent shame and retract a fairly hollow opinion piece? In a liberal and pathetic apologetic culture, Marcus and Oransky weep, clearly with crocodile tears, wailing loudly “we’ve realised that we were wrong” and “we offer apologies to the scientific community”. Apology accepted, but was it truly necessary? Using the excuse that by alerting authors ahead of time “only serves to give unethical scientists time to hide their tracks”, Marcus and Oransky fail to understand that their bad advice in 2013, and even worse advice in 2015, does not take into consideration that most likely most scientists are not guilty of misconduct, but may have simply made errors that require fixing. In essence, Marcus and Oransky collectively clump together honest (likely the majority) and dishonest (likely the minority) scientists, as if they are all escaping the truth commissions set up by libelous and masked fraud-accusing whistle-blowers like Paul S. Brookes on anonymous accusation sites like PubPeer. To their credit, Marcus and Oransky state correctly

that “there are still too many [editors; Jaime] who rebuff efforts to correct the literature”, but they shoot down the option to first contact the editors, indicating that it is best practice to contact research integrity officers instead. The problem is that most developing countries most likely do not have offices of research integrity in their research institutes, making their advice unrealistic, and thus silly.

In the last section of their 2015 article, Marcus and Oransky propose a silver bullet to correcting science’s erroneous literature: PubPeer. The most glaring problem with the 2015 article by Marcus and Oransky was their failure to indicate a very important COI, namely that the parent organization for Retraction Watch, The Center for Science Integrity Inc. (CSI⁷), a business-turned-charity based in New York and in Oransky’s apartment, receives generous funding by the Laura and John Arnold Foundation⁸, the MacArthur Foundation⁹, and the Leona M. and Harry B. Helmsley Charitable Trust¹⁰. A second hidden COI, but directly relevant to the 2013 article, maybe explaining their passionate defense of COPE, was that Elizabeth Wager, a former COPE Chair from 2009-2012, serves as a director of the CSI¹¹. So, these currently hidden COIs show that there is a revolving door between power and ethics, and, thrown into the mix, money and funding from philanthropic organizations.

As we entered 2017, academia learned that the PubPeer Foundation, PubPeer’s parent charitable organization, has received over US\$ 400,000 from the same philanthropic organization as Retraction Watch’s parent organization, the CSI, namely the Laura and John Arnold Foundation. This, in itself, is astonishing because it places the relationship between Retraction Watch and PubPeer as the most prominent financial COI in the science watchdog and post-publication peer review movements. At the end of their 2015 article, Marcus and Oransky state “We’re glad to have the chance to retract some of our previous advice and update it, as new evidence comes to light. That’s what self-correction is all about, right?” If these science watchdogs (Teixeira da Silva, 2016) truly believe what they stated at the end of 2015, then they must go back to their 2015 *Lab Times* article, and retract it for the reasons listed above, or issue a mega-correction that adds suitable references to support factual information, and state the highly important and relevant missing

⁷ <http://retractionwatch.com/the-center-for-scientific-integrity/>

⁸ <http://www.arnoldfoundation.org/>

⁹ <https://www.macfound.org/>

¹⁰ <http://www.helmsleytrust.org/>

¹¹ <http://retractionwatch.com/the-center-for-scientific-integrity/board-of-directors/>

COIs, which continue to be missing.

Cynthia McKelvey, in a blog article entitled "Science watchdog blog retracts its own article"¹², makes an extremely pertinent statement: "We're not sure if the retraction will be included in Retraction Watch's upcoming database, but it seems likely." A search of that database¹³ indicates, in fact, that the retracted 2013 article by Marcus and Oransky is still not listed, making *Retraction Watch*, its leadership and its directors blatantly dangerous hypocrites.

Ethical issues

There are multiple ethics-related aspects to this case. Adam Marcus and Ivan Oransky are trying to be legitimized as ethicists, but they are not. They are science journalists with a medical background that have smartly surrounded themselves by hand-picked allies, such as COPE, that give them a fake aura of ethical legitimacy. In turn, organizations that continue to invite Oransky to serve as guest speaker or moderator at ethics-related events also contribute to his rise as pseudo-ethicist.

Paul S. Brookes used at least one fake, anonymous or pseudonymous identity to smear academics' reputations, and referred widely to their errors as fraud. Marcus and Oransky of Retraction Watch offered support to and defense of Brookes' actions in their 2013 *Lab Times* article, which they then retracted. It can be argued that the Retraction Watch team sought to promote whistle-blowing not in the interests of academia, but rather as a self-serving interest (Ahmad et al., 2014) as an effective and strategic way to reap highly profitable funding from US philanthropic organizations. Whistle-blowing does play a corrective role in publishing (Malek, 2010), but its skewed encouragement by Marcus and Oransky, without respect for the rank and file present in the publishing process, i.e., the call to fly over the editor and publisher, claiming cronyism as their reason to subvert the standard processing of error, opting instead to encourage informants to release their discoveries on PubPeer. This fortifies that the call by the Retraction Watch leadership to use whistle-blowing carries with it an element of malice.

The lack of information sources to support a claim constitutes a violation of journalistic ethics¹⁴. The Marcus and Oransky 2013 and 2015 *Lab Times* articles are replete with information that is not supported by any citation to sources. In publishing, such writing practice is not only unprofessional, it is unethical, because it is the appropriation of ideas

that are not one's own but without disclosing the relevant source, i.e., a classical case of plagiarism.

The most striking ethical issue with the 2013 and 2015 *Lab Times* articles is the distinct absence of a COI statement. The most glaringly absent COI is that between Retraction Watch and PubPeer, which now share a financial COI, namely the receipt of funding from the same philanthropic association, the Laura and John Arnold Foundation. Even if, at the time of publication of those articles, funding had not yet been received, this post-publication fact remains omitted, even in the retract-and-replaced article. The omission of important facts and COIs constitutes serious misconduct (Thornton, 2017).

Finally, the fact that Marcus and Oransky have not yet archived their own retraction in the Retraction Watch database can be minimally described as hypocrisy.

Conclusions

Several important conclusions can be drawn.

1) Bad advice was given by Retraction Watch's senior leadership to global academia, via a public online channel, on at least two occasions. Even though the Retraction Watch co-founders are cognizant of their bad academic advice, which could have caused real damage to scientists that may have followed that advice in the intermittent three years, their apology lacks sincerity, is too jovial, and does not go far enough to cleaning up the continued bad advice offered in their follow-up 2015 article.

2) Science journalism operates with values and communication morals that are inferior to those embraced by science. Unsupported claims, lack of references, and the lack of a COI statement, Retraction Watch's Adam Marcus and Ivan Oransky serve as a bad ethical example, in these articles, for academics, including scientists.

3) Marcus and Oransky are frequently invited and interviewed and what they say, how they say it and what advice they may be offering the public, academia and scientists has to be very carefully analyzed. How frequently is misappropriation of information (i.e., the use of facts without attributing the source, or a form of plagiarism) taking place, and is this a standard writing form that Retraction Watch is trying to impose upon academics? Are hidden COIs a standard that they wish academics to follow, while ignoring COPE guidelines?

4) Post-publication peer review does not exist simply for the sustained existence of Retraction Watch, PubPeer and their anti-science supporters, but is also a tool that exists to scrutinize Retraction Watch and PubPeer, and what their leadership have stated in public, so that their stances can be closely scrutinized so that one day in the future, these organizations and their leadership may be held accountable for the damage that they have caused.

¹² <https://www.dailydot.com/parsec/retraction-watch-retracts-own-article/>

¹³ <http://retractiondatabase.org/RetractionSearch.aspx>

¹⁴ <https://www.spj.org/ethicscode.asp>

5) Retraction Watch and its leadership have already several documented problems: a) poor editorial and journalistic standards (Teixeira da Silva, 2016b); b) bias, opacity and lack of reciprocity (Teixeira da Silva, 2016c); c) an apparent interest in issues unrelated to retractions (Teixeira da Silva, 2016d), as also evidenced by hidden COIs; d) the use of slang and profanity (Teixeira da Silva, 2017b); e) hiding facts about Oransky's professional publishing history (Teixeira da Silva, 2017c); f) undisclosed acknowledgment by PubPeer of Retraction Watch as media/press (Teixeira da Silva, 2017d). These documented characteristics begin to paint a picture of an organization that is not truly interested in the integrity of science, in retractions, or in the best interests of science and scientists. Instead, these documented qualities show that we are dealing with a very powerful, strongly conflicted, well financed anti-science movement that is losing trust, even as it builds incredible power. While scientists focus one eye on their science, they would also do well to focus their other eye on Retraction Watch and its long-term objectives, and on the modus operandi in place to achieve its goals, including its suspect association with PubPeer and COPE.

Disclaimer and conflicts of interest

The author is not associated with any academic institute, blog or web-site. The author was profiled by Retraction Watch, often with issues unrelated to retractions. The author has also been profiled by PubPeer. The author has commented on Retraction Watch and used PubPeer, as a signed commentator, and anonymously.

References

- Ahmad, S.A., Yunos, R.M., Ahmad, R.A.R., Sanusi, Z.M. (2014) Whistleblowing behaviour: the influence of ethical climates theory. *Procedia - Social & Behavioral Sciences* 164: 445-450. DOI: 10.1016/j.sbspro.2014.11.101
- Bubela, T., Nisbet, M.C., Borchelt, R., Brunger, F., Critchley, C., Einsiedel, E., Geller, G., Gupta, A., Hampel, J., Hyde-Lay, R., Jandciu, E.W., Jones, S.A., Kolopack, P., Lane, S., Lougheed, T., Nerlich, B., Ogbogu, U., O'Riordan, K., Ouellette, C., Spear, M., Strauss, S., Thavaratnam, T., Willemse, L., Caulfield, T. (2009) Science communication reconsidered. *Nature Biotechnology* 27(6): 514-518. DOI: 10.1038/nbt0609-514
- Malek, J. (2010) To tell or not to tell? The ethical dilemma of the would-be whistleblower, *Accountability in Research* 17(3): 115-129. DOI: 10.1080/08989621003791929
- Marcus, A., Oransky, I. (2013) How to report alleged scientific misconduct - some advice from the co-founders of *Retraction Watch*. http://www.labtimes.org/labtimes/ranking/dont/2013_01.lasso (last accessed: 25 September, 2017)
- Marcus, A., Oransky, I. (2015) A retraction: we gave bad advice. http://www.labtimes.org/labtimes/ranking/dont/2015_06.lasso (last accessed: 25 September, 2017)
- Oransky, I. (2013) Owner of Science Fraud site, suspended for legal threats, identifies himself, talks about next steps. <http://retractionwatch.com/2013/01/03/owner-of-science-fraud-site-suspended-for-legal-threats-identifies-himself-talks-about-next-steps/> (last accessed: 25 September, 2017)
- Oransky, I. (2014) So what happened after Paul Brookes was forced to shut down Science-Fraud.org? <http://retractionwatch.com/2014/03/11/so-what-happened-after-paul-brookes-was-forced-to-shut-down-science-fraud-org/> (last accessed: 25 September, 2017)
- Popović, V., Popović, P. (2014) The twenty-first century, the reign of tabloid journalism. *Procedia - Social and Behavioral Sciences* 163: 12-18. DOI: 10.1016/j.sbspro.2014.12.280
- Teixeira da Silva, J.A. (2015) Archives of Biological Sciences: from falling star to glimmer of hope. *Self-published* 8 pages. <https://www.researchgate.net/publication/282366831>
- Teixeira da Silva, J.A. (2016a) Science watchdogs. *Academic Journal of Interdisciplinary Studies* 5(3): 13-15. DOI: 10.5901/ajis.2016.v5n3p13
- Teixeira da Silva, J.A. (2016b) The blasé nature of Retraction Watch's editorial policies and the risk to sinking journalistic standards. *Mediterranean Journal of Social Sciences* 7(6): 11-14. DOI: 10.5901/mjss.2016.v7n6p11
- Teixeira da Silva, J.A. (2016c) Evidence of bias, opacity and lack of reciprocity by Retraction Watch. *KOME* 4(2): 82-85. DOI: 10.17646/KOME.2016.27
- Teixeira da Silva, J.A. (2016d) Retraction Watch is apparently not interested in retractions. *The Experiment* 38(3): 2306-2309.
- Teixeira da Silva, J.A. (2017a) The false Donald J. Trump article and the ethics of misleading journalism. *Journal of the Association for Information Science and Technology* 68(4): 1061-1063. DOI: 10.1002/jasist.23828
- Teixeira da Silva, J.A. (2017b) Slang and profanity: poor moderation and journalistic / editorial standards by Retraction Watch. *Bangladesh Journal of Medical Science* 16(1): 5-9. DOI: 10.3329/bjms.v16i1.31124
- Teixeira da Silva, J.A. (2017c) Ivan Oransky: the 2004-2006 digital undertaker for Elsevier's The Lancet. *Acta Medica International* 4(1): 120-123. DOI: 10.5530/ami.2017.4.21
- Teixeira da Silva, J.A. (2017d) Why does PubPeer not acknowledge Retraction Watch as a media source? *Journal of Advocacy, Research and Education* 4(1): 5-8.
- Teixeira da Silva, J.A., Blatt, M.R. (2016) Does the anonymous voice have a place in scholarly publishing? *Plant Physiology* 170(4): 1899-1902. DOI: 10.1104/pp.15.01939
- Thornton, J.P. (2017) Conflict of interest and legal issues for investigators and authors. *Journal of the American Medical Association* 317(17): 1761-1762. DOI: 10.1001/jama.2017.4235

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