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Item Type	Article
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Publisher	Eubios Ethics Institute
Rights	With permission of the license/copyright holder
Download date	2026-11-11 12:24:52
Link to Item	http://hdl.handle.net/20.500.12424/178407

Eubios Journal of Asian and International Bioethics

EJAIB Vol. 21 (4) July 2011

www.eubios.info ISSN 1173-2571

Official Journal of the Asian Bioethics Association (ABA)
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Contents page
Editorial: Revisiting Nuclear Ethics
The current impact of radioactive leakages on Japanese food
- Hiroko Obata
First Reflections on the Nuclear Environmental Problem in Japan
- Kayo Uejima
Ethical Language Usage in Pandemic Plans: A Study of Pandemic Plans of Some South Asian Countries
- Chhanda Chakraborti and Rhyddhi Chakraborty
Unethical Practices of Medical Practitioners: Role of Pharmaceutical Industry
- Atif Mahmood and Salina Mukhtiar
Japanese healthcare workers' attitudes towards administering futile treatments: A preliminary interview-based study
- Yasuhiro Kadooka, A. Asai, K. Aizawa, S. Bito
End-of-Life Ethical Dilemmas and Intensive Care Unit Professionals
- Gracilene Ferreira dos Santos, Maria das Graças Cunha, Carlos Augusto Almeida Correa, Luzitano Brandão Ferreira
Framing Post- Diagnostic Abortion in Medico Legal Language: Alternative visions in Dialogue
- Suhita Chopra Chatterjee
Human Evolution – New Finds and New Problems
- Rashmi Saxena and K. K. Verma
The Important Role of Evolutionary Medicine in Asian Bioethics
- Arthur Saniotis
ABA News and membership

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Editorial: Revisiting Nuclear Ethics

There are several reasons for the early publication of the July 2011 issue, in April 2011. However one of them is the dramatic issues emerging out of the recent disaster that is still unfolding in Japan as the radiation leaks from the nuclear reactors in Fukushima prefecture. A century ago it would have been a dream to have a reactor core that just would not stop generating heat without external inputs, with the potential to create heat for years from now also. However, unfortunately the radioactivity continues to leak from the reactors, and they are probably not being harnessed for electricity anymore, and unless they are constantly cooled with water, a meltdown will occur which would release much more toxic radiation than that being released now.

As said in the accompanying May 2011 issue (*EJAIB* 21: 73-77; printed at the same time), Hans Martin Sass, discusses the bioethics of the Earth as a living being, developing an approach based on the bioethical imperative of a biocentric approach in the tradition of Fritz Jahr. This issue starts with two update reports by Japanese colleagues on the situation in Japan, including the concerns over food. A scientific approach should alleviate some of the concerns, as we can distinguish between food that may pose safety risks, and other food which appears safe. Of course there have also been some people dying in Japan since the tsunami from hunger and cold, as the scale of the disaster exceeded for some days even the capacity of Japan to deal with. The recovery will take years and involve persons from around the world. As of 6 April Japan has introduced the first radiation safety standards for fish, being similar to vegetables, and because of radiation detected in fish. On the same day IAEA reported that the crack that allowed leakage of highly contaminated water into the sea may have been sealed.

One of the underlying principles of bioethics is empowerment of citizens, and informed choices. Unfortunately there has been some information censorship, that will come back to haunt those responsible. For example, just at the time people wanted

to see the daily details of where the wind will take the radiation, the meteorological data was not all revealed to the Japanese public. Although those who have electricity to access Internet can see the detailed maps from Germany and other countries of the wind dispersal of radioactivity, many citizens in Japan who want to make their own risk calculations of which days to hang their washing out or go walking in the spring, do not access such websites. There have of course been many active NGO websites and live broadcasts in Japan, offering various information.

Even some of the engineers who constructed the plants affected, have spoken out. Dr. Masashi Goto[1] was a designer of the containment vessel for Toshiba, and Mitsuhiko Tanaka[2] left Hitachi after concealing a design flaw in one of the reactors. These and some others who left TepCo (Tokyo Electrical Power Company) and thus have not been welcomed back to the site to offer technical advice, as active in informing the public and media of the details. The information age is assisting in information sharing, but still there are misunderstandings of risk. The Ethics and Climate Change in Asia and Pacific (ECCAP) project will hold its next meeting on Ethics of Nuclear Technology (WG12) in Manila on 29 April, 2011 (the past one was in Bangkok in January 2011). There will obviously be some revisions to the risk calculations in light of what is learnt in Japan, but for a broader perspective refer to the on-line draft.[3]

As some lamented, the risks of death from the cold, snow, and hunger of tsunami survivors were greater than the dangers from radiation. However, now that the survivors are assured of stable food supply, radiation is another risk for them, and for tens of millions others in proximity who now have increased radioactivity in their water. We should also note that the main people at risk, around the nuclear power plants, were taking the risk to produce a benefit of electricity for the capital city, Tokyo, 250km away. The location of many nuclear plants away from where the electricity is used is another ethical issue.

One of the main dangers is psychological, and already those who have lost their homes, and many loved ones, are very fragile. We can also call for all the researchers to follow ethical guidelines for research on all aspects of the recovery.[4]

During the past few months, earthquakes were felt in all 3 Eubios places – Christchurch (New Zealand), Tsukuba (Japan), and even in Bangkok (Thailand, from an earthquake in Myanmar). Thailand is also suffering from a disaster from flooding. Christchurch is rebuilding buildings (though still in demolition phase). Many now look to 2012 as the predicted end of the world. Still disaster affect many countries every day, people are still to accept these challenges.

This issue also has an extensive review of ethics in pandemic preparedness plans from different countries, which is a health disaster. Two papers explore futility, in Japan and in Brazil; and two papers look at evolution and bioethics. There are papers on abortion, and on pharmaceutical industry. We will continue to publish the full range of bioethics articles.

In the May 2011 issue there is also an examination of the death penalty in Japan, and the ethics of information. There are interesting parallels in the way that those convicted on death row are not advised even of the date of their execution. Cynics could point out the similarity with the lack of information given to medical patients about the diagnosis and prognosis of their condition in many countries, and also even the public facing unknown risks from radioactive leaks. In another journal I edit, *Ethics in Science and Environmental Policies (ESEP)* a special issue will be issued on Ethics and Nuclear Technology and the responses to the Japanese disaster (deadline 31 May). We can also expect to see some conferences on Disaster and Community in the coming months, so please ensure that you are on the yahoo list serves such as asianbioethics@yahoogroups.com, where information will be shared. Of course readers of *EJAIB* are encouraged to send papers related to the bioethical issues.

-Darryl Macer (6 April, 2011)

The current impact of radioactive leakages on Japanese food

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1. Introduction

Since the leakages of radiation from the nuclear power plants in Fukushima, caused by the tsunami damage to the cooling systems triggered by the 9.0 scale earthquake in March, there are growing concerns about the impact of the radioactivity on the safety of farmers, fisherfolk, and consumers. This brief report considers what is safe food and introduces some websites for information, and makes some comments. As of the time of writing, 5 April 2011, there are starting to be discharges of radioactive water into the ocean, to supplement the atmospheric releases, so the situation is still evolving.

2. Food in most of Japan is not influenced by diffusion of radioactive substances

The Ministry of Education, Culture, Sports, Science and Technology are now providing of time series data of environmental radioactivity levels by the 47 prefectures of Japan since 17 March.[5] However, the check points

[1] http://the-diplomat.com/tokyo-notes/2011/03/14/radiation-threat-for-tokyo/
[2] http://search.japantimes.co.jp/cgi-bin/nn20110324n3.html
[3] http://www.unescobkk.org/en/rushsap/
[4] See Working Group on Disaster Research & Ethics, **Statement on Ethical Issues in Disaster-Related Research -- A Developing World Perspective**, *EJAIB* May 17 (2007), 82. (on www.eubios.info)
[5] http://www.mext.go.jp/ (English version http://www.mext.go.jp/english/radioactivity_level/index.htm)

appear to be just one point from each prefecture, mainly prefectural capitals. There is almost no change in data for most of Japan, except for Miyagi, Yamagata, Fukushima, Ibaraki, Tochigi, Gunma, Saitama, Chiba, Tokyo and Kanagawa prefectures. Although it might be necessary to increase check points in each prefectures, especially ones relatively closer to Fukushima, but at least, it could be said that it is safe to have agricultural products from those prefectures whose sequential data haven't changed since the accident occurred. In addition, there has been no report of agricultural products from these other 37 prefectures which exceeded the regal limits of radiation set by government. There of course is debate over the safety of consumption of food substances from the 10 affected prefectures.

3. Food restricted to be consumed or distributed by government

As of 23 March, there were 4 prefectures (Fukushima, Ibaraki, Tochigi, Gunma) which the Ministry of Health, Labour and Welfare ordered to restrict to consume or distribute some of or many of their vegetables and raw milk.

Details are as follows:[6]

Fukushima: Restriction on consuming: non-head type leafy vegetables: all (e.g. spinach, kakina, komatsuna, mizuna(potherb mustard), red leaf lettuce, syungiku (garland chrysanthemum), watercress, roquette, etc); head type leafy vegetables: all (e.g. cabbage, Chinese cabbage, lettuce, etc); flowered brassicas: broccoli and cauliflower.

Restriction on distributing (other than the vegetables listed above): raw milk; root vegetables: turnip.

Ibaraki: Restriction on consuming: nothing; Restriction on distributing: raw milk, non-head type leafy vegetables: spinach and kakina, herbs: parsley

Tochigi: Restriction on consuming: nothing; Restriction on distributing: non-head type leafy vegetables: spinach and kakina.

Gunma: Restriction on consuming: nothing; Restriction on distributing: non-head type leafy vegetables: spinach and kakina.

It is listed what kind of food is not safe, and consequently can we assume that food not listed is safe food? This is what the Japanese government might want to announce to its people. It is quite easy to understand that, so far, all kind of food is safe from prefectures except for the above mentioned four prefectures. However when it comes to the four prefectures, it is quite difficult to understand clearly what kind is safe, especially in the case of Fukushima because the list are written in technical terms and some of them are very technical names, and in addition there is a reference site for detailed vegetable categorization [7] without which it is impossible to understand what vegetables the list indicates. For example, flowered brassicas except for broccoli and cauliflower are safe food, but this is all what we can know from the list, and interestingly only broccoli and cauliflower are listed in the reference vegetable categorization. There is no safe food in this category. After all, safe food in Fukushima according to the list and the reference are root vegetables except for turnip, such as carrot and potato, herbs except for parsley such as laurel leaf, Japanese parsley, honewort, and beefsteak plant, allium genus such as long onion, leek, green onion, green garlic, and chive, gourd family such as cucumber and pumpkin, solanaceae family such as tomato, egg plant, and green pepper, green pea family such as soybean, string bean, and field pea, and stem vegetables such as celery, asparagus, and Japanese horse radish. What about other food categories other than vegetables? Raw milk is not a safe food, which is all the list mentions.

There is a food categorization as an appendix on pp.33- 35 in a manual entitled *A Manual How to Measure Radiation Levels of Food in Emergency*[8]. With the help of the categorization, it is understood that grains, beans, fruits, mushrooms, seaweed, seafood, meat, egg are safe food. Safe food of other 3 prefectures can be grasped in the same way. People will start to have some doubts about sea food with the radiation leaks into the ocean, though this listing may be soon changed to reflect that.

4. Food restricted to be consumed or distributed by prefectural government

On the area basis, 6 kinds of leaf vegetables, syungiku, parsley, leaf lettuce, celery, bok choy, and spinach, from 2 of the southeast areas in Chiba areas (Tako town and Asahi city) exceeded the limits and the Chiba prefectural government restricted these areas to distribute the vegetables.[9] Komatsuna in a west area in Tokyo exceeded the limit but they are grown on an experimental farm of the Ministry of Agriculture, Forestry and Fisheries, so there is no chance to be distributed to consumers.[10] Saitama prefectural government analyzed spinach from 5 areas in the prefecture and found that spinach from a north area was just below exceeding the limit.[11]

Summing up, all agricultural products from Chiba except for Tako town and Asahi city are considered safe, but when it comes to screening safe food from these 2 areas, it seems quite a lot of work because on a prefectural level there is no whole list of what kind of products are grown in these areas. Consequently, it is necessary to refer to the detailed vegetable categorization offered by the Ministry of Health, Labour and Welfare mentioned above.

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[6] http://www.mhlw.go.jp/stf/houdou/2r98520000016xcn.html (English version is not available)

[7] http://www.mhlw.go.jp/stf/houdou/2r98520000016xfz.html (English version is not available)

[8] http://www.mhlw.go.jp/stf/houdou/2r9852000001558e-img/2r98520000015cfn.pdf (English version is not available)

[9] r31 http://mainichi.jp/select/weathernews/news/20110326k0000m040119000c.html?inb=yt (a Japanese article of the Mainichi Daily News)

[10] http://www.jiji.com/jc/zc?k=201103/2011032500020 (a Japanese article of the Jiji Press)

[11] http://www.jiji.com/jc/zc?k=201103/2011032100309&rel=y&g=soc (a Japanese article of the Jiji Press)

5. Food restricted to be imported by several countries

Referring to the measurements of other countries regarding import restrictions on food from Japan, the Republic of Korea has stopped to import vegetables from the 4 prefectures which the Japanese government restricts to consume or distribute. China and Taiwan have also stopped to import vegetables and dairy products (seafood and processed food as well) from the 4 prefectures and Chiba. Singapore has stopped to import vegetables from the 4 prefectures and vegetables and fruits from Chiba, Tokyo, Saitama, Kanagawa and also from Ehime (well away from the contamination) because it detected slight radiation on their vegetables (e.g long onion from Tokyo and cabbage from Kanagawa) (NHK news, 24-27 March 2011). Australia has stopped to import vegetables, fruits, dairy products, and seafood from the 4 prefectures, and USA and Hong Kong have stopped to import agricultural products from Fukushima (NHK news, 24 March 2011).

6.Detailed analysis of radiation levels of food by areas, by items, and by days in suspicious prefectures.

After the accident at the Fukushima nuclear plant, on 17 March, the Ministry of Health, Labour and Welfare requested Fukushima prefecture and local governments around Fukushima to measure radiation levels of food and to prevent those from eating and drinking if exceed the limits indicated by the Nuclear Safety Commission of Japan.[12] Detailed limits are listed on a web page by radioactive substances and by food categories.[13] For example, the limit of radioactive iodine 131 for drinking water and milk is 300 becquerel per kilogram and for vegetables except for root vegetables and potatoes is 2000 bequerel per kilogram. Since then local governments (Fukushima, Ibaraki, Tochigi, Gunma, Chiba, Saitama, Tokyo, Kanagawa, Miyagi, Yamagata, Niigata, Nagano, Ehime) has been reporting the daily results.[14] This site is quite complicated and in addition each report by each prefecture is only available in pdf format. The ministry seems to regularly add up those daily data into a pdf file[15] and for this report I used the data with 593 samples collected between 15-29 March downloaded on 30 March.

6.1. By areas

As the raw data was not well organized for analysis, Table 1 offers some summary with the first spinach picked up and classified on the prefectural basis into xls format and then sorted by levels (see Table 1). Spinach was the first vegetable reported to be highly contaminated with radioactive substances after the accident occurred. The spinach data is intended to analyze how much, how far and which area in particular the radioactive substances influenced.

Fukushima is the prefecture where the affected Fukushima nuclear power plants are located in almost in the middle of the eastern coast line of the prefecture. With 11 samples, 7 were over the limit with the highest 19,000 (Bq/kg) and lowest 2,100 (Bq/kg), and 4 were under the limit with the highest 2,000 (Bq/kg) and the lowest 24 (Bq/kg). Although all non-head type leafy vegetables are restricted to be consumed and distributed from this prefecture, there was a wide range in levels. For example in a 80 km radius distance from the No.1 plant, all southwestern areas were over the limit, whereas the western and northwestern areas were not.

Ibaraki is one of the three prefectures, along with Tochigi and Gunma, sharing its north border with Fukushima and is the easternmost prefecture of the three. With 25 samples, 20 were over the limit with the highest 54,100 (Bq/kg) and the lowest 2,100 (Bq/kg), and 5 were under the limit with the highest 1,900 (Bq/kg) and the lowest ND. This prefecture is located in the south-southwest and southwest of the nuclear plant and all areas seem to be more or less influenced by radioactive substances and the influence strengthens according to the proximity.

Tochigi is the middle prefecture of the above mentioned three prefectures. With 8 samples, all were over the limit with the highest 5,700 (Bq/kg) and the lowest 3,200 (Bq/kg). This prefecture is located in the southwest of the nuclear plant. However the range of the data is narrower than that of Ibaraki exceeded the limit.

Gunma is the westernmost prefecture of the above mentioned three prefectures. With 10 samples, 2 were over the limit with the highest 2,630 (Bq/kg) and the lowest 2,080 (Bq/kg) and 8 were under the limit with the highest 1,440 (Bq/kg) and the lowest 71 (Bq/kg). This prefecture is located in the southwest and west-southwest of the nuclear plant, and is the least influenced prefecture of the four prefectures to which government took measurements on restriction on a prefectural scale. West-southwestern areas seem to be relatively less contaminated.

Chiba is sharing its north border with Ibaraki and facing the Pacific Ocean on its east, and this prefecture does not adjoin Fukushima. Most of its areas are located more than 200 km from the plant. With 4 samples, 1 was over the limit with 3,500 (Bq/kg) and 3 were under the limit with the highest 1,410 (Bq/kg) and the lowest 420 (Bq/kg). This prefecture is also located in the south-southwest and southwest of the plant. The area whose spinach exceeded the limit is located in south-southwest, and about 190 km away from the nuclear plant. However, comparing the data with that of Ibaraki, less influence is observed. To a layman point of view, it is difficult to understand the reason why Gunma is restricted to distribute spinach whose data looks quite similar to that of Chiba's.

Saitama is sharing its north border with Chiba, Ibaraki, Tochigi, and Gunma, and this prefecture also does not adjoin Fukushima. Most of its areas are also located more than 200 km from the plant. With 9 samples, all was under the limit with the highest 1,900 (Bq/kg) and the lowest 380 (Bq/kg). For the reference, the area whose contamination level of its spinach was closer to the limit is located in 200 km southwest of the plant.

[12] http://www.mhlw.go.jp/stf/houdou/2r9852000001558e.html
[13] http://www.mhlw.go.jp/stf/houdou/2r98520000016nd7-img/2r98520000016x2k.pdf (English versions are not available)
[14] http://www.mhlw.go.jp/stf/houdou/2r985200000162id.html (partly English versions are available)
[15] http://www.mhlw.go.jp/stf/houdou/2r98520000016nd7-img/2r98520000017246.pdf (English version is not available)

Table 1: Level of radioactive contaminants in Spinach (Bq/kg) by food origin

Fukushima Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
236	Fukushima	Tamura-shi	Spinach	2011/3/21	**19,000**	20,000	20,000
242	Fukushima	Hirata-mura	Spinach	2011/3/21	**16,000**	1,000	1,100
221	Fukushima	Ono-cho	Spinach	2011/3/21	**8,600**	4,200	4,200
238	Fukushima	Nakajima-mura	Spinach	2011/3/21	**6,100**	3,300	3,300
218	Fukushima	Izumizaki-mura	Spinach	2011/3/21	**4,600**	3,300	3,200
241	Fukushima	Hanawa-machi	Spinach	2011/3/21	**3,200**	1,500	1,600
248	Fukushima	Yabuki-machi	Spinach	2011/3/21	**2,100**	650	640
240	Fukushima	Nihonmatsu-shi	Spinach	2011/3/21	2,000	77	82
119	Fukushima	Yabuki-machi	Spinach		70	50	50
457	Fukushima	Aizumisato-cho	Spinach	2011/3/24	62	ND	ND
454	Fukushima	Nishiaizu-machi	Spinach	2011/3/24	24	ND	ND

Ibaraki Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
29	Ibaraki	Hitachi-shi	Spinach	2011/3/18	**54,100**	1,931	1,931
30	Ibaraki	Nitachi-shi	Spinach	2011/3/18	**25,200**	1,105	1,105
16	Ibaraki	Kitaibaraki-shi	Spinach	2011/3/18	**24,000**	690	
31	Ibaraki	Hitachioota-shi	Spinach	2011/3/18	**19,200**	1,040	1,040
32	Ibaraki	Hitachioota-shi	Spinach	2011/3/18	**17,800**	908	908
33	Ibaraki	Naka-shi	Spinach	2011/3/18	**16,100**	911	911
5	Ibaraki	Takahagi-shi	Spinach	2011/3/18	**15,020**	524	524
7	Ibaraki	Hitachi-shi	Spinach	2011/3/18	**14,500**	359	359
34	Ibaraki	Naka-shi	Spinach	2011/3/18	**13,500**	966	966
85	Ibaraki	Takahagi-shi	Spinach	2011/3/19	**11,000**	586	586
13	Ibaraki	Tokai-mura	Spinach	2011/3/18	**9,840**	233	233
9	Ibaraki	Hitachioota-shi	Spinach	2011/3/18	**8,830**	374	374
15	Ibaraki	Hitachinaka-shi	Spinach	2011/3/18	**8,420**	140	140
35	Ibaraki	Hokota-shi	Spinach	2011/3/18	**7,710**	407	407
11	Ibaraki	Daigo-machi	Spinach	2011/3/18	**6,100**	478	478
42	Ibaraki	Koga-shi	Spinach	2011/3/18	**4,200**	270	270
154	Ibaraki	Hokota-shi	Spinach	2011/3/19	**4,100**	46	46
157	Ibaraki	Ibaraki-machi	Spinach	2011/3/20	**4,100**	96	96
162	Ibaraki	Tsukuba-shi	Spinach	2011/3/20	**2,300**	105	105
37	Ibaraki	Miriya-shi	Spinach	2011/3/18	**2,100**	121	121
92	Ibaraki	Hokota-shi	Spinach	2011/3/19	1,900	71	71
164	Ibaraki	Yachiyo-machi	Spinach	2011/3/20	1,600	125	125
153	Ibaraki	Hokota-shi	Spinach	2011/3/19	1,500	26	26
38	Ibaraki	Miriya-shi	Spinach	2011/3/18	26	ND	ND
39	Ibaraki	Miriya-shi	Spinach	2011/3/18	ND	ND	ND

Table 1: Level of radioactive contaminants in Spinach (Bq/kg) by food origin (Continued)

Tochigi Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
110	Tochigi	Mibu-machi	Spinach	#######	**5,700**	770	770
368	Tochigi	Kaminokawa-machi	Spinach	#######	**5,230**	652	652
109	Tochigi	Mibu-machi	Spinach	#######	**5,000**	790	790
106	Tochigi	Kaminokawa-machi	Spinach	#######	**4,600**	740	740
108	Tochigi	Shimotsuke-shi	Spinach	#######	**3,900**	510	510
105	Tochigi	Kaminokawa-machi	Spinach	#######	**3,600**	500	500
104	Tochigi	Utsunomiya-shi	Spinach	#######	**3,500**	570	570
107	Tochigi	Shimotsuke-shi	Spinach	#######	**3,200**	460	460

Gunma Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
131	Gunma	Isesaki-shi	Spinach	2011/3/19	**2,630**	310	310
132	Gunma	Isesaki-shi	Spinach	2011/3/19	**2,080**	268	268
403	Gunma	Isesaki-shi	Spinach	2011/3/24	1,440	230	230
282	Gunma	Ota-shi	Spinach	2011/3/22	973	114	114
491	Gunma	Showa-mura	Spinach	2011/3/25	644	163	163
283	Gunma	Numata-shi	Spinach	2011/3/22	414	45	45
573	Gunma	Maebashi-shi	Spinach	2011/3/28	330	380	380
581	Gunma	Annakashi	Spinach	2011/3/28	310	330	330
576	Gunma	Takasaki-shi	Spinach	2011/3/28	140	151	151
577	Gunma	Takasaki-shi	Spinach	2011/3/28	71	11.3	11.3

Chiba Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
426	Chiba	Tako-machi	Spinach	2011/3/24	**3,500**	46	46
155	Chiba	Noda-shi	Spinach	2011/3/20	1,410	196	196
424	Chiba	Tateyama-shi	Spinach	2011/3/24	1,100	128	128
425	Chiba	Sodegaura-shi	Spinach	2011/3/24	420	ND	ND

Saitama Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
181	Saitama	Kumagaya-shi	Spinach	2011/3/20	1,900	84	89
182	Saitama	Kumagaya-shi	Spinach	2011/3/20	1,300	47	61
183	Saitama	Fukaya-shi	Spinach	2011/3/20	1,300	73	66
393	Saitama	Tokorozawa-shi	Spinach	2011/3/24	1,100	18	21
395	Saitama	Honjo-shi	Spinach	2011/3/24	950	12	14
185	Saitama	Honjo-shi	Spinach	2011/3/20	900	25	30
394	Saitama	Honjo-shi	Spinach	2011/3/24	710	54	48
184	Saitama	Honjo-shi	Spinach	2011/3/20	570	27	23
385	Saitama		Spinach	2011/3/24	380	95	95

Table 1: Level of radioactive contaminants in Spinach (Bq/kg) by food origin (continued)

Tokyo Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
351	Tokyo	Tachikawa-shi	Spinach	2011/3/24	1,300	108	108

Kanagawa Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
188	Kanagawa	Hiratsuka-shi	Spinach	2011/3/21	1,700	230	230
371	Kanagawa	Sagamihara-shi	Spinach	2011/3/23	1,300	185	185
187	Kanagawa	Ebina-shi	Spinach	2011/3/21	670	152	152
370	Kanagawa	Fujisawa-shi	Spinach	2011/3/23	600	47	47

Niigata Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
21	Niigata		Spinach	2011/3/18	ND	ND	ND
96	Niigata		Spinach	2011/3/19	ND	ND	ND
171	Niigata		Spinach	2011/3/20	ND	ND	ND
209	Niigata		Spinach	2011/3/21	ND	ND	ND
328	Niigata		Spinach	2011/3/23	ND	ND	ND
378	Niigata		Spinach	2011/3/24	ND	ND	ND
379	Niigata		Spinach	2011/3/24	ND	ND	ND
477	Niigata		Spinach	2011/3/25	ND	ND	ND
562	Niigata		Spinach	2011/3/28	ND	ND	ND

Nagano Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
342	Nagano	Ueda-shi	Spinach	2011/3/24	120	ND	ND
343	Nagano	Chikuma-shi	Spinach	2011/3/24	58	82	82
585	Nagano	Nagano-shi	Spinach	2011/3/27	ND	ND	ND
586	Nagano	Azumino-shi	Spinach	2011/3/27	ND	ND	ND
587	Nagano	Ina-shi	Spinach	2011/3/27	ND	ND	ND

Ehime Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
389	Ehime	Ikata-machi	Spinach	2011/3/25	ND	ND	ND

Miyagi Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
555	Miyagi	Kawasaki-machi	Spinach	2011/3/25	294	5	5
556	Miyagi	Wakuya-cho	Spinach	2011/3/25	77	4	4

Yamagata Spinach

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
337	Yamagata	Shirataka-machi	Spinach	2011/3/24	120	4	4

Table 2: Level of radioactive contaminants in selected vgetables (Bq/kg) in Fukushima Prefecture

Long Onion

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
440	Fukushima	Iwaki-shi	Strawberry	2011/3/24	1400	110	110
445	Fukushima	Tamura-shi	Strawberry	2011/3/24	36	ND	ND
448	Fukushima	Koori-machi	Strawberry	2011/3/24	18	ND	ND
452	Fukushima	Kagamiishi-machi	Strawberry	2011/3/24	18	ND	ND
437	Fukushima	Fukushima-shi	Strawberry	2011/3/24	11	ND	ND
451	Fukushima	Otama-mura	Strawberry	2011/3/24	9.8	ND	ND
463	Fukushima	Yamatsuri-machi	Strawberry	2011/3/24	8.6	ND	ND
471	Fukushima	Miharu-cho	Strawberry	2011/3/24	8.3	ND	ND
462	Fukushima	Tanagura-machi	Strawberry	2011/3/24	7.4	ND	ND
464	Fukushima	Hanawa-machi	Strawberry	2011/3/24	5.4	ND	ND
438	Fukushima	Aizuwakamatsu-shi	Strawberry	2011/3/24	4	ND	ND

Cucumber

444	Fukshima	Nihonmatsu-shi	Cucumber	2011/3/24	36	12	15
459	Fukshima	Izumizaki-mura	Cucumber	2011/3/24	14	9.7	ND
469	Fukshima	Asakawa-cho	Cucumber	2011/3/24	14	ND	ND
442	Fukshima	Sukagawa-shi	Cucumber	2011/3/24	9.4	ND	ND

Shitake mushroom

509	Fukushima	Fukushima-shi	Shiitake	2011/3/26	69	ND	ND
512	Fukushima	Iwaki-shi	Shiitake	2011/3/25	68	33	33
520	Fukushima	Hirata-mura	Shiitake	2011/3/25	58	ND	ND
521	Fukushima	Motomiya-shi	Shiitake	2011/3/26	26	ND	ND
517	Fukushima	Makajima-mura	Shiitake	2011/3/26	23	ND	4.9
514	Fukushima	Nihonmatsu-shi	Shiitake	2011/3/26	21	ND	7
510	Fukushima	Koriyama-shi	Shiitake	2011/3/25	18	7.4	5.9
522	Fukushima	Hanawa-machi	Shiitake	2011/3/26	18	ND	4.8
519	Fukushima	Ishikawa-cho	Shiitake	2011/3/25	17	ND	ND
513	Fukushima	Shirakawa-shi	Shiitake	2011/3/26	10	ND	ND
511	Fukushima	Koriyama-shi	Shiitake	2011/3/25	ND	ND	ND
515	Fukushima	Minamiaizu-machi	Shiitake	2011/3/26	ND	ND	ND
516	Fukushima	Nishiaizu-mashi	Shiitake	2011/3/25	ND	ND	ND
518	Fukushima	Yamatsuri-machi	Shiitake	2011/3/26	ND	ND	ND

Strawberry

NO	Prefecture	Area	Food tested	Sampling date	Iodine-131	Cesium-134	Cesium-137
440	Fukushima	Iwaki-shi	Strawberry	2011/3/24	1400	110	110
445	Fukushima	Tamura-shi	Strawberry	2011/3/24	36	ND	ND
448	Fukushima	Koori-machi	Strawberry	2011/3/24	18	ND	ND
452	Fukushima	Kagamiishi-machi	Strawberry	2011/3/24	18	ND	ND
437	Fukushima	Fukushima-shi	Strawberry	2011/3/24	11	ND	ND
451	Fukushima	Otama-mura	Strawberry	2011/3/24	9.8	ND	ND
463	Fukushima	Yamatsuri-machi	Strawberry	2011/3/24	8.6	ND	ND
471	Fukushima	Miharu-cho	Strawberry	2011/3/24	8.3	ND	ND
462	Fukushima	Tanagura-machi	Strawberry	2011/3/24	7.4	ND	ND
464	Fukushima	Hanawa-machi	Strawberry	2011/3/24	5.4	ND	ND
438	Fukushima	Aizuwakamatsu-shi	Strawberry	2011/3/24	4	ND	ND

Tokyo is the furthest area from the plant, along with Kanagawa. There is only 1 sample, which was under the limit with 1,300 (Bq/kg). This prefecture is well known for its local vegetable, komatsuna, which is categorized in non-head type leafy vegetables, and there were more samples than spinach. With 6 samples, all were under the limit with the highest 1,700 (Bq/kg) and the lowest 230 (Bq/kg). For the reference, the area whose contamination level of its spinach was relatively higher within the limit is located in 240 km southwest of the plant, and that of komatsuna is located in 220 km southwest.

Kanagawa is sharing its north border with Tokyo. With 4 samples, all was under the limit with the highest 1,700 (Bq/kg) and the lowest 600 (Bq/kg). Although, the areas are more than 250 km southwest of the plant, the influence of radioactive substances was observed.

Niigata is sharing its east border with Fukushima and its areas are located in the west-southwest to northwest of the plant. All of the 9 samples were under the limit and were not detected any radioactive substances.

Nagano is sharing its east border with Niigata, Gunma, and Saitama. With 5 samples, 2 were under the limit with relatively low contamination levels of 120 and 58 (Bq/kg)., and 3 were not detected. These 2 areas slightly contaminated are located nearly 300 km southwest of the plant but still a slight influence was observed.

Ehime is a prefecture where 1 sample of spinach was collected from the area about 900 km away from the plant. No radioactive substance was detected.

Miyagi is sharing its south border with Fukushima and facing the Pacific Ocean on its east. 2 samples are collected and both of them were slightly contaminated with 294 (Bq/kg) and 77 (Bq/kg) at areas 90 km north-northwest and 130 km north-northwest of the plant, respectively. Those levels are much lower than that of southwestern areas at the same distances from the plant, reflecting the way the wind blows.

Yamagata is sharing its south border with Fukushima and facing the Sea of Japan on its west. 1 sample was collected from an area located in 120 km northwest of the plant and it was also slightly contaminated with 120 (Bq/kg).

6.2 By items

This section will look at the radiation levels of several kinds of food by areas in Fukushima. Spinach, cabbage, broccoli, long onion, cucumber, shiitake mushroom, and strawberry are chosen for this analysis (see Table 2)

Spinach is grown outdoors and known as a winter green leaf vegetable. The result is already introduced in section 6.2. The vegetables in this category show relatively higher contamination levels over than that of in other categories.

Cabbage is grown outdoors and its best season is in autumn and spring. With 4 samples, 1 was over the limit with 5,200 (Bq/kg), and 2 were under the limit (900, and 280 (Bq/kg)), and 1 was not detected. Interestingly, there are many samples where no radioactive iodine was detected. Although Fukushima cabbage needs further investigation for screening on area basis, it could be said that cabbage in other prefectures is as safe as cabbage in prefectures out of the area.

Broccoli is grown outdoors and known as a winter green vegetable. With 7 samples, 3 were over the limit with the highest 17,000 (Bq/kg) and the lowest 3,300 (Bq/kg), and 4 were under the limit with the highest 1,400 (Bq/kg) and the lowest 380 (Bq/kg). Broccoli is the second highest vegetable contaminated with radioactive iodine after spinach. On the prefectural basis, there are only 2 samples available, one is from Gunma with 160 (Bq/kg) and the other is from Saitama with 130 (Bq/kg). More samples from each prefecture are necessary.

Long onion is a popular winter vegetable in Japan, which is grown outdoors. Half of the vegetable grows underground and the half grows above the ground and both parts are edible. Only 1 sample is collected from Fukushima with 22 (Bq/kg). Interestingly the area from where the long onion collected is located in only 40 km south of the plant. More samples should be collected in Fukushima because on prefectural basis long onion is ranked third among the chosen vegetables with the highest 1,400 (Bq/kg) from a sample in Tochigi and the average seems to be higher than that of cabbage, cucumber, shiitake mushroom, and strawberry's although the vegetable could be safe on yes or no basis.

Cucumber is nowadays an indispensable vegetable for the Japanese diet. In summer, it is grown outdoors and in other seasons, it is grown indoors. All of the 4 samples were under the limit with the highest 36 (Bq/kg). Cucumber grown in this season seems to be a safe food.

Shiitake mushroom is generally grown indoors or forest like circumstances to avoid direct sunlight. However, under what condition the mushrooms are grown is uncertain. All of the 14 samples were under the limit, and 4 out of the 14 did not detect any radioactive substances, and among the rest that were somewhat contaminated the highest was 69 (Bq/kg). Judging only from these data, shiitake mushroom is a safe food but on 3 April it was reported that 1 out of 23 shiitake mushroom sample exceeded the limit, which was grown in an open field.[16] Condition could be the key for the safety of this food.

Strawberry is a very popular fruit in Japan, which is in season from winter to early summer, and generally grown under glass or veneer houses. However, like shiitake mushroom, the data does not refer to the condition in which these strawberries were grown. All of the 11 samples were under the limit. 1,400 (Bq/kg) were the highest detected from strawberry from an area 40km south-southwest of the plant. The rest of the samples could be said to be slightly contaminated because the highest was 36 (Bq/kg). As the samples were taken from different distances and different areas evenly, strawberry is a safe food to be distributed from Fukushima. In fact, there is no restriction on this fruit to this prefecture. However, consumers tend to avoid Fukushima strawberries because of the negative image of Fukushima food created by the series of restriction.[17]

[16] http://www.jiji.com/jc/c?g=soc_30&k=2011040300207&m=rss (a Japanese article of the Jiji Press)

[17] http://www.kahoku.co.jp/news/2011/04/20110402t62010.htm (a Japanese article of The Kahoku Shimpo)

6.4 By days (a few areas with time sequential data)

Soon after the highly contaminated raw milk and spinach were detected in Fukushima, the Ministry of Health, Labour and Welfare opened a special information site to offer daily food monitoring reports from suspicious prefectures.[18] This report wished to make sequential data of several food collected at the same place on daily basis. However, this site offers only 5 daily reports[19],[20],[21],[22],[23] on Fukushima vegetables, and at the most, 2 days of comparison was possible.

On 21 March, spinach collected from a southwest area had 16,000 (Bq/kg) of radioactive iodine, and on 28th 5,300 (Bq/kg). On 21 March, cabbage collected from a north area had 5,200 (Bq/kg) of radioactive iodine, and on 28th 140 (Bq/kg).On 21 March, broccoli collected from a northwest area measured 17,000 (Bq/kg) of radioactive iodine, and on 28th it was 4,400 (Bq/kg). On 21 March, long onion collected from a north area had 22 (Bq/kg) of radioactive iodine, and on 28th 13 (Bq/kg). On March 24th, cucumber collected from a northwest area had 36 (Bq/kg) of radioactive iodine, and on 31st 21 (Bq/kg). On 24 March, strawberry collected from a south area had 1,400 (Bq/kg) of radioactive iodine, and on 31st 300 (Bq/kg). Data of shitake mushroom was not available for the day comparison.

7. Consideration about the safe food in the suspicious prefectures in terms of production area, farming condition, time span, etc.

7.1 Safe food in terms of location from the nuclear plant.

In response to the accident at the Fukushima No.1 and No. 2 nuclear power plants, the government directed the Fukushima residents who live within 30 km from the No.1 plant to evacuate. Some experts questioned this direction of the government because they think the evacuation areas should be decided considering the direction of the wind from the plant and the topographic characteristics of the areas. The same thing seems to be applied to distinguish safe food and not safe food in this nuclear plant crisis. As the spinach analysis shows, it is clear that even in the same prefecture there is a range in radiation levels, and direction and distance from the nuclear plant seem to be the key factors to distinguish safe food and not safe food. In the current situation, as an extreme example, Fukushima spinach grown 80 km northwest of the plant with 24 (Bq/kg) of radiation level is restricted to be consumed and distributed, whereas Saitama spinach grown in 200 km southwest of the plant with 1,900 (Bq/kg) of radiation level is consumed and distributed without any restriction.

7.2 Safe foods in terms of category and farming condition

The brief analysis of radiation levels of several kinds of food suggests another good factor in distinguishing safe food. So far, it is inferred that cabbage, cucumber, long onion, shiitake mushroom, and strawberry are less influenced by radioactive substances than spinach and broccoli, and consequently, the food categories to which these belong will be less influenced food belongs to. Further investigation is necessary to support this hypothesis and to explain clearly or scientifically why there are vegetables which are highly influenced by radioactive substances, whereas others are less. Another good factor is about the farming condition. It seems that vegetables grown in glass or veneer houses are less influenced by radioactive substances. However, the data does not mention about this condition. Further investigation is also necessary to support this hypothesis.

7.3 Safe food in terms of passage of time

Because of the lack of sufficient data, the analysis in section 6.4 became too simple. However, the tendency was observed that the level of contamination weakens as days passed. The food once restricted to be consumed or distributed will become safe food someday, which must be a very encouraging factor, especially for the Japanese farmers.

8. What farmers can do in this radiation nightmare

Farmers, those who farm in the suspicious prefectures, are suffering from the sudden influence of radioactive substances on their farmland. The ambiguous and seemingly not so correct measurement by the government seems to be making this situation worse. To those farmers whose agricultural products are restricted to be consumed or distributed because of radioactive substances over the limit were detected, it is suggested to keenly monitor the level of radiation so as to be able to restart distributing soon after the level becomes under the level. In order to do so, it is necessary to work on the government to lift the restrictions smoothly. To those farmers whose agricultural products are restricted to be consumed or distributed because of the restriction on a prefectural basis even though their products are under the limits, since nowadays the government is considering to order the restriction on an area basis[24], it is suggested to lobby the government strongly to lift the restriction as soon as possible.

To those farmers whose agricultural products are under the limits but are avoided by customers, it is suggested to explain to the customers the safety of their products in detail from the aspects of location, distance, food category, farming condition, and so on, not only safe

[18] http://www.mhlw.go.jp/stf/houdou/2r985200000162id.html (partly English versions are available)

[19] http://www.mhlw.go.jp/stf/houdou/2r98520000015txf-att/2r98520000015uxn.pdf (English http://www.mhlw.go.jp/stf/houdou/2r98520000015txf-att/2r98520000017eh2.pdf)

[20] http://www.mhlw.go.jp/stf/houdou/2r98520000016gms-att/2r98520000016gsb.pdf (English http://www.mhlw.go.jp/stf/houdou/2r98520000016gms-att/2r98520000017ep1.pdf)

[21] http://www.mhlw.go.jp/stf/houdou/2r9852000001771x-att/2r985200000178bg.pdf (English http://www.mhlw.go.jp/stf/houdou/2r9852000001771x-att/2r98520000017fcl.pdf)

[22] http://www.mhlw.go.jp/stf/houdou/2r98520000017pjt-att/2r98520000017pov.pdf (English pdf is not available)

[23] http://www.mhlw.go.jp/stf/houdou/2r98520000017sys-att/2r98520000017t43.pdf (English pdf is not available)

[24] http://www.jiji.com/jc/c?g=soc_30&k=2011040400574 (a Japanese article of the Jiji Press)

or not like the government keeps saying to its people. This is all this report can suggest.

9. Conclusions

Food safety has long been a serious issue in Japan. The accident at the Fukushima No.1 and No.2 nuclear plants triggered by the earthquake and tsunami consequently brought the Japanese people an unfamiliar issue on food safety. In addition, the situation changes quickly day by day. Many have criticized the government for not informing the accurate and correct information to its people about all things related to the accident, including food safety. For better decision making on purchasing food in this situation, citizens require a wide range of real information as much as possible so that the farmers can sell and the customers buy food with confidence. I hope that this analysis will contribute to provide some ways to distinguish safe food in the middle of a nuclear power plants accident.

First Reflections on the Nuclear Environmental Problem in Japan

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1. Spread of radioactivity

Fukushima nuclear power plant in Fukushima prefecture, Japan, was badly damaged in the devastating earthquake and tsunami at 11 March 2011. Subsequently public officials ordered a full-scale evacuation of Japanese people outside of 20km around Fukushima nuclear plant, and the people need to stay in rooms outside of that area. Three weeks later four of six Fukushima nuclear reactors from the nuclear power plants (NPP) keep on leaking radiation.

Some governments except of Japanese government ordered a full scale evacuation to an area out of 80km for their citizens living in Japan, and many embassies have moved out of Tokyo which is 250 km south. A number of consulates moved to Osaka, Hiroshima and Fukuoka. Most foreign students from Tokyo northwards have gone home.

Tokyo Electronic Power Company (Tepco) reported official measurement with dosage meter from 14 March to 6 April 2011. At 14 March 2011, part of the reactor fuel had been exposed. The highest data was 167SV per hour that was suitable to a hundred thousand times higher than data of normal operation. By the Tepco report, Yomiuri newspaper reported that they estimated damage of nuclear fuel of 70%in Number 1 NPP, damage of nuclear of 30% in Number 2 and damage of 25% in Number 3, as of 6 April 2011.[25]

Especially, after the hydrogen detonation at 11 March at Number 1, a bigger hydrogen detonation occured at Number 3 on 14 March 2011.

Though Tepco published detection of neutrons of 0.02μSv per hour as a result of 15 March 2011, on 16 March 2011, the government and Tepco didn't report fact that Dai3 NPP used MOX fuel including Plutonium. The detection of neutron means leakage of various kinds of radiations including Plutonium. Actually speaking, Tepco and the Nuclear and Industrial Safety Agency (NISA) that is the Japanese nuclear regulatory and oversight branch in Ministry of Economy Trade and Industry, published that they didn't determine Plutonium as of 27 March 2011. However, after criticism by a lot of people, Tepco published detection of 0.18Bq/Kg – 0.54Bq/Kb as radio isotope concerning Pu-238,Pu-239, Pu-240 inside soil of the reading point #5 of 21 and 22 March in Fukushima NPP at 28 March 2011. Then, Tepco detected Pu-238,Pu-239, Pu-240 inside the soil of point 5 of 25 and 28 March in Fukushima NPP. In spite of the limited information disclosure concerning the limited measuring some radioactivity including Pu, government and Tokyo Electronic Power keep on reporting that there will not be a bad influence to people because it is only a little plutonium.

Most of the Japanese people near Fukushima nuclear power plants in the East side Japan feel fear not only from the aftershocks of the earthquake but also exposure by radiation. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) publishes reading of environmental radioactivity level by prefecture, with a time series data at every day.

For example, MEXT reported in the case of environmental radioactivity of 3 April, the Reading Point (#83) about 20km North West of the reactors climbed to the highest point of 65.2μSv per hour, with no rain. Reading Point (#32) about 30km North West climbed to the highest point of 32.7μSv per hour with no rain. Especially, in the case of 16 March, the Reading Point (#83) about 20km North West climbed to the highest point of 330μSv per hour in no rain after the hydrogen detonation of number 3 reactor on 15 March. In the case of normal condition, 0.05μSv per hour in no rain had been detected at this reading point. The difference between 300μSv per hour of 16 March and 0.05μSv per hour of normal condition is 3 thousand fold.

For ordinary people in daily life the total exposure is 2400μSv per year. Therefore, we can understand that radioactivity is high, and that is why some foreign countries have suggested evacuation to further distances than the initial 20km, and subsequent 30km exclusion zone now applied by the Japanese government.

In the case of the sea on 3 April, Sampling Point (#5) near Fukushima reactors climbed to the highest point of I-131 of 12.0(Bq/L) and Cs-137 of 15.7(Bq/L) as the Radioactivity Concentration (outer layer).

In the case of drinking water at 1 April, Fukushima city climbed to the highest point of I-131 of 171(Bq/kg), I-131 of 274(Bq/kg), Cs-134 of 25(Bq/kg) , Cs-137 of 33(Bq/kg) in no rain.

Especially, I-131, Cs-134, Cs-137 were detected in drinking water of Tokyo, the capital city of Japan, as well as Kanagawa prefecture, Saitama, Chiba, Ibaragi,

[25] Yomiuri news paper: http://www.yomiuri.co.jp/science/news/20110406-OYT1T00589.htm

Tochigi, Gunma and Niigata which are located about 200km~250km away from the reactors (Table 1).

Table 1:Readings of radioactivity level in drinking water by prefecture (collected on 2 April 2011, in Bq/kg)

Prefecture (City)	I-131	Cs-134,Cs-137
Ibaraki (Hitachinaka City)	4.6	Not Detectable
Tochigi (Utsunomiya City)	12.0	6.7
Gunma (Maebashi City)	2.2	0.31
Saitama (Saitama City)	4.9	0.49
Chiba (Ichihara City)	0.97	0.53
Tokyo (Shinjuku Ward)	2.0	0.45
Kanagawa (Chigasaki City)	3.3	Not Detectable
Niigata (Niigata City)	1.4	Not Detectable

*These figures are estimated as 1Bq/liter = 1Bq/kg. *The table was made by MEXT, based on the reports from prefectures. *"Emergency Preparedness for Nuclear Facilities（The Nuclear Safety Commission of Japan）", The index of drinking water based on the indicator about the restriction of food intake, I－131：More than 300Bq/kg, Cs－137：More than 200Bq/kg

Reference [*1]MEXT, （English version） Readings at Monitoring Post out of 20 Km Zone of Fukushima Dai-ichi NPP, http://www.mext.go.jp/english/radioactivity_level/detail/1304082.htm

The government keeps on publishing the amount of radiation everyday.

2. The problem of information disclosure

There have been a number of issues of information disclosure by the Tepco, and by the government. The government often used exposure level by roentgen for public explanation by actual measure in TV. We can observe radiation of each level in diagram of Radiation in daily life that MEXT published in Home page of MEXT. The exposure level by roentgen as well as level of reading point shows daily levels. The government suddenly changed the standard level of exposure to environment, food and beverage on 17 March 2011.

The government suddenly changed the standard level of exposure to environment, food and beverage on 17 March 2011. See the following *"Handling of food contaminated by radioactivity"* that Ministry of Health, Labour and Welfare (MHLW) reported to All Prefectural Governors All Mayors in cities with Public Health Centers All Mayors of Special Wards on 17 March 2011.

"On March 11, 2011, the Prime Minister issued a declaration of a nuclear state of emergency relating for the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant.

Therefore, from the perspective of the Food Sanitation Act, which aims to prevent sanitation hazards resulting from eating and drinking, and thereby protect citizen's good health, the "indices relating to limits on food and drink ingestion" indicated by the Nuclear Safety Commission of Japan shall be adopted for the time being as provisional regulation values, and foods which exceed these levels shall be deemed to be regulated by Article 6, Item 2 of the Food Sanitation Act. We would like you to take adequate measures in terms of sales and other areas, to ensure that such foods are not supplied to the public to eat. Inspections shall be conducted by referring to the office memo "Manual for Measuring Radioactivity of Foods in Case of Emergency" dated May 9, 2002.."

People feel fear about internal and external exposure influences of radioactivity for long period. Some links to youtube videos and interviews with people can be viewed, to get an idea of the ideas people have.[26] There is widespread distrust of the government, and a number of suspicions of how information is given to people in Japan. You may get more information from external websites. The government in Japan has claimed it will not panic the population, but access to information is a basic ethical principle for modern society.

3. Nuclear energy production in Japan

Japan depends on nuclear energy for one quarter of its electricity generation, as reviewed in ECCAP WG12 report.[27] Before the earthquake and tsunami on 11 March 2011, Japan had 54 operating nuclear reactors with a total installed generating capacity of around 49 GW. The Japanese government planned to increase nuclear's share of total electricity generation from 27% in 2009 to 40% by 2017 and to 50% by 2030. This may be revised, once we see the overall results of what has happened.

4.Scientific disputes about creation of standards and guidelines concerning radiation exposure

At now, scientists in Japan seriously are opposed to each other for the differing opinions about radiation exposure. The difference of each opposition links to safety or damage and risk concerning illness and damage by radiation exposure, including the future as well as damage for the present. This concept of safety or damage and risk links to not only compensation for damage and information disclosure, but also economic

[26] For example see discussions on:
http://www.youtube.com/watch?v=mgLUTKxItt4&feature=related
http://www.youtube.com/watch?v=pJeiwVtRaQ8&feature=related
http://www.youtube.com/watch?v=92fP58sMYus&feature=youtu.be

[27] Refer to ECCAP WG12 draft report, "Ethics of Nuclear Energy Technology" available on http://www.unescobkk.org/fileadmin/user_upload/shs/Energyethics/ECCAPWG12rpt4.pdf The Report and ethics of risk will be revised after the Japanese incidents.

policy and energy policy in Japan. Fukushima NPP is located a distance of 250km from the capital city that it provides electricity to. There is a possibility that the leak of radiation by reactors of Fukushima NPP remains for a long period. This raises a possibility that comprehensive spread and serious pollution of radiation influences Japanese social system and communities.

The differences of opposing views by scientists about radiation exposure is summarized the following *Nature* news. The difference of opposing views by scientists in USA in Nature news at 6 April 2011 is similar to those among Japanese experts. And in comment by ECRR that author shows after introduction of *Nature* news, we can find that scientists of Europe have the same condition.

In *Nature* news at 6 April 2011, Gwyneth Dickey Zakaib(2011) reported "US radiation study sparks debate Researchers divided on how best to probe any possible link to cancer at the below. This news shows very important scientific and ethical problems:[28]

"Last year, long before the crisis in Japan, the US Nuclear Regulatory Commission (NRC) asked the National Academy of Sciences (NAS) to examine this cancer question, prompted in part by long-standing public unease.

--- According to the NRC, less than 1% of a person's total annual background-radiation exposure comes from living near nuclear power plants.--- Even so, "there are recurrent concerns among the public about increased cancer risks", says Terry Brock, the NRC's project manager for the Analysis of Cancer Risk in Populations Near Nuclear Facilities study. "We want the most current and most scientifically valid information to respond." The last US-wide study, which found no evidence of a problem, was published by the National Cancer Institute in 1990. Now the NRC aims to update this effort by taking advantage of two decades of improvements in data and technology. For example, whereas the 1990 study considered only cancer deaths, better record-keeping means that researchers can now look for suspect patterns in cancer diagnoses. The previous study also lumped people by county, regardless of their actual distance from a nuclear plant. Global positioning systems, which can pinpoint where people live in relation to a reactor, should now help provide more meaningful results. A further step would be including estimates of radiation doses and looking for correlations with cancer incidence.

But Edward Maher, president of the US-based Health Physics Society, says that even if the study takes all of those factors into account, its statistical power will be too low.

We feel that those studies don't have a lot of value," says Maher.

"They may make the public feel better, but they're not going to see very low-dose effects." The money would be better spent on more laboratory research, he adds, where confounding factors such as the presence of other carcinogens can be effectively controlled.

Other experts say that the NAS should build on and improve a 2008 German study which found a roughly 1.5-fold increase in cancers in children younger than 5 living within 5 kilometres of nuclear power plants. The authors concluded that plant emissions were too low to explain the effect, and similar studies done later in France and Britain failed to show any cancer increase, but some researchers have challenged their interpretation of the data. Nevertheless, Steve Wing, an epidemiologist from the University of North Carolina at Chapel Hill, says that if there is an effect, it will be easiest to see in children and fetuses. Their rapidly dividing cells make them more sensitive to radiation than adults, and they haven't been exposed to as many possible carcinogens. Wing and his colleagues wrote an article on how best to design the NAS study in the 1 April issue of Environmental Health Perspectives . Among other things, they emphasize the need to obtain radiation-dose estimates for the populations under study. In the upcoming April meetings, the NAS committee will discuss nuclear power plant emission monitoring and hear study design suggestions.

Antone Brooks, a radiation toxicologist at Washington State University Tri-cities in Richland, says that DNA repair mechanisms and selective suicide of damaged cells are adequate to handle DNA damage below a certain dose threshold.

"We've lived in a sea of radiation throughout evolution," says Brooks.

"The body knows how to handle low doses."

Others believe that the risk never vanishes.

DNA repair mechanisms don't work perfectly 100% of the time, and even small amounts of radiation confer some risk, says Bill Morgan, the director of radiation biology and biophysics at Pacific Northwest National Laboratory in Richland.

"It's a tremendous debate," he says.

Some will argue that if no effect is found, there isn't a problem, says David Brenner, director of the Center for Radiological Research at Columbia University in New York.

"But the fact that you can't measure a risk in an epidemiological study doesn't mean that the risk isn't there.""

Meanwhile, in the home page, ECRR (2011) published the following new framework.

"Specifically, ICRP has applied the results of external acute radiation exposure to internal chronic exposures from point sources and has relied mainly on physical models for radiation action to support this. However, these are averaging models and cannot apply to the probabilistic exposures which occur at the cell level. A cell is either hit or not hit; minimum impact is that of a hit and impact increases in multiples of this mimimum impact, spread over time. Thus the committee concludes that the epidemiological evidence of internal exposures must take precedence over mechanistic theory-based models in assessing radiation risk from internal sources.--------The committee has developed a model which extends that of the ICRP by the inclusion of two new weighting factors in the calculation of effective dose. These are biological and biophysical weighting factors and they address the problem of ionisation density or fractionation in time and space at the cell level arising from internal point sources.----- The committee reviews sources of radiation exposure and recommends caution

[28] http://www.nature.com/news/2011/110406/full/472015a.html

in attempting to gauge the effects of novel exposures by comparison with exposures to natural radiation. Novel exposures include internal exposures to artificial isotopes like Strontium-90 and Plutonium-239 but also include micrometer range aggregates of isotopes (hot particles) which may consist of entirely man-made isotopes (e.g. plutonium) or altered forms of natural isotopes (e.g. depleted uranium). Such comparisons are presently made on the basis of the ICRP concept of 'absorbed dose' which does not accurately assess the consequence for harm at the cell level. Comparisons between external and internal radiation exposures may also result in underestimates of risk since the effects at the cell level may be quantitatively very different."[29]

In other words, ICRP focuses on external exposure by high radiation dosage. Meanwhile, ECRR focuses on internal exposure concerning high influence to cell by low radiation dosage in chronic exposure by various radiations. ICRP (2011) indicated the important ethical viewpoint at the below:

"3. The committee examines the ethical basis of principles implicit in the ICRP models and hence in legislation based on them.

The committee concludes that the ICRP justifications are based on outmoded philosophical reasoning, specifically the averaging cost-benefit calculations of utilitarianism.

Utilitarianism has long been discarded as a foundation for ethical justification of practice owing to its inability to distinguish between just and unjust societies and conditions.

It may, for example, be used to underpin a slave society, since it is only the overall benefit which is calculated, and not individual benefit.

The committee suggests that rights-based philosophies such as Rawls Theory of Justice or considerations based on the UN Declaration of Human Rights should be applied to the question of avoidable radiation exposures to members of the public resulting from practice.

The committee concludes that releases of radioactivity without consent can not be justified ethically since the smallest dose has a finite, if small, probability of fatal harm.

In the event that such exposures are permitted, the committee emphasises that the calculation of 'collective dose' should be employed for all practices and time scales of interest so that overall harm may be integrated over the populations."[30]

5. Conclusions

People feel fear about internal and external exposure influence of radioactivity for long period. Some links to youtube videos and interviews with people can be viewed, to get an idea of the ideas people have[2].[31] There is widespread distrust of the government, and a number of suspicions of how information is given to people in Japan. As the situation develops I will update information to readers. You may get more information from external websites. The government in Japan has claimed it will not panic the population, but access to information is a basic ethical principle for modern society.

[29] http://www.euradcom.org/2003/execsumm.htm

[30] http://www.euradcom.org/2003/execsumm.htm

[31] You-tube for watching hydrogen detonation of Dai3 NPP : http://www.youtube.com/watch?v=9Q11MavEV3w&NR=1

[2] For example see discussions on:
http://www.youtube.com/watch?v=mgLUTKxItt4&feature=related
http://www.youtube.com/watch?v=pJeiwVtRaQ8&feature=related
http://www.youtube.com/watch?v=92fP58sMYus&feature=youtu.be

Ethical Language Usage in Pandemic Plans: A Study of Pandemic Plans of Some South Asian Countries

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Introduction

Increasingly, literature on pandemic influenza planning and responses indicates that emergency responses during public health crises such as a pandemic should be directed not just by medical and military logistical expertise; but also by certain ethical values and considerations[32]. In general, in post-SARS period, there is a growing realization that pandemic planning response has an ethical dimension too. Lessons learnt from the earlier pandemics[33] and the more recent SARS[34] are cited to show why and how inclusion of ethical considerations in our pandemic strategies and policies could have made and can still make significant difference in addressing the wide range of ethical challenges that a pandemic situation may raise. Apparent benefits of inclusion of ethical values in a pandemic influenza action and response plan are claimed to be many, from mitigation of the mortality rate[35] to raising the level of public trust and cooperation[36]. Consequently, the

[32] Kotalik, J. 2005. Preparing for an influenza pandemic: ethical issues. *Bioethics*, 19: 422-31. Also, Tracy SC, Upshur R, Daar A. 2005.Avian influenza and pandemics. *N Engl J Med* ,352:1928

[33] See for example, Kotalik, J. 2006. *Ethics for planning for and responding to pandemic influenza*. Bern: Swiss National Advisory Commission on Bioethics, 9-15.

[34] Hsueh, Po-Ren, Y. Pan-Chyr. 2003. Severe Acute Respiratory Syndrome epidemic in Taiwan, *J Microbiol Immunol Infect.,* 38: 84. Also, Wenzel, RP, B. Gonzalo, MB. Edmond. 2005 .Lessons from Severe Acute Respiratory Syndrome (SARS): Implications for Infection Control. *Archives of Medical Research,* 36: 610-16. Also, Singer, PA, SR. Benatar, M .Bernstein. et al. 2003. *Ethics and SARS: Lessons from Toronto*. BMJ, 327 (7427): 1342-1344.

[35] For example, Thompson, Allison K, et al. 2006.Pandemic influenza preparedness: An Ethical Framework to Guide Decision-making. *BMC Medical Ethics*, 7:12doi:10.1186/1472-6939-7-12.

[36] Berstein M, Hawryluck L. 2003.Challenging Beliefs and Ethical Concepts: The Collateral Damage of SARS. *Critical Care*, 7:269-271

concept of ethical planning has found a place in the discourses on public health policy and pandemic planning[37].

Researchers[38] have argued that there are identifiable ethical issues in practically every aspect of pandemic planning; from healthcare resource allocation to priority setting in the distribution of services, from settling conflicts between the rights of a private citizen and that of the community, and between professional duties of a healthcare worker and the duties towards one's own family, between obligations of healthcare providers and the constraints that a medical facility may face in stressful times. In their analysis of more than 200 SARS cases, Singer *et al* [39] identified 5 most important ethical issues and recommended 10 key ethical values as a decision-tool to guide us in dealing with these issues and also to build public trust. Several others[40] also have proposed ethical values that should guide pandemic planning and preparedness. Among them, UTJCB 2005, a seminal study on the topic, proposed 15 interdependent ethical values important for any democratic society (UTJCB 2005, p.6). Apart from these, in their study on ethical language usage in US federal and state pandemic plans, Thomas *et al*[41] used a set of ethical terms obtained from the US Public Health code of Ethics. Acknowledging the importance of inclusion of ethical considerations in pandemic planning, World Health Organization[42] (WHO) too has brought out a separate guidance document entitled 'Ethical considerations in developing a public health response to pandemic influenza' [43] to assist its member states to incorporate ethical values and considerations.

Studies [44] show that in spite of WHO 2005 recommendation[45], the level of pandemic preparedness varies widely among countries. Some countries do not have a national pandemic influenza preparedness plan yet[46], whereas many have recently started developing and implementing preparedness plans. On inclusion of ethical values and considerations in pandemic planning too, the response has been varied among the countries. As shown in Table 1, some countries have made significant visible efforts to incorporate principles guided by ethical values in their pandemic plans and policies; others are relatively behind on this task. The present authors observe that in many countries which actually have managed to put together a national pandemic influenza preparedness plan or draft, the use of ethical language and the process of inclusion of ethical values or considerations in their pandemic plans and policies are still at a nascent stage; and this is particularly true about the developing and emerging countries in South Asia.

Table 1 presents 49 salient and explicitly mentioned ethical terms and expressions proposed as pertinent for inclusion in a pandemic preparedness plan in the post-SARS research. Table 1 mentions some of the countries (not in South Asia) and organizations which have actually used these terms, and have utilized the considerations based on these, in their national pandemic plan or policy. The ethical terms in Table 1 will be used as a benchmark in this study to gauge the level of inclusion of ethical terms and considerations in the language of existing pandemic plans of certain south Asian countries; namely, India, Nepal, Bangladesh, and Sri Lanka. The goal is to assess the ethical preparedness of these south Asian plans.

Table 1 is not meant to be exhaustive, but it covers the salient ethical values and considerations mentioned in the literature. The present study assumes that the extent of use of appropriate ethical terms and expressions in the language of a pandemic preparedness plan is an indicator of an awareness about the ethical dimension of the plan. Developing the ability to identify ethical issues and to give more active consideration to the task of inclusion of ethical values and considerations in pandemic planning is a core capacity building also, which, if properly implemented, may go a long way to avoid many undesirable outcome and regrettable decisions in pandemic actions and responses.

The Scope of the Study

India is a major, extremely populous, south Asian country, where apart from endemic infectious diseases, the occurrences of AH1N1 and AH5N1 are well-

[37] See for example Last JM.. Ethics and public health policy. In: Last JM and Wallace RB, (eds.) *Public Health & Preventive Medicine*, East Norwalk, Connecticut, USA: Appleton and Lange; 1992:1187-1196.

[38] For example, Torda, A. 2006. Ethical Issues in Pandemic Planning. *MJA,* Vol. 185 No. 10 (November):s73-76.

[39] Singer, PA, et al. 2003, op.cit.

[40] Torda, A. 2006, op.cit.
World Health Organization (WHO).2007. *Ethical Considerations in Developing a Public Health Response to PandemicInfluenza*.Availableat: http://www.who.int/csr/resources/publications/WHO_CDS_EPR_GIP_2007_2c.pdf) [Accessed on 16Aug 2010].
University of Toronto Joint Center for Bioethics Pandemic Influenza Working Group. 2005. *Stand on Guard for Thee: Ethical Considerations in preparedness planning for pandemic influenza.* University of Toronto. Henceforth referred to as UTJCB 2005.
Upshur, Ross E G r; Karen Faith; Jennifer L Gibson; Alison K Thompson; C.Shawn Tracy, Kumanan Wilson, and Peter Singer. 2007. Ethics in an Epidemic: Ethical Considerations in Preparedness Planning for Pandemic Influenza. *Health Law Review,* 16, 1: 33-39.And also, Kotalik. 2006, op.cit.

[41] Thomas, JC, N.Dasgupta, A, Martinot. 2007. Ethics in a pandemic: A Survey of State Pandemic Influenza Plans. *Am J. of Pub Health.* Supplement 1, 97 (S1): S26.

[42] WHO.2009.*Pandemic Influenza Preparedness And Response*, *A WHO Guidance Document*. Geneva: WHO. p.15. Available at http://www.who.int/csr/disease/influenza/pipguidance2009/en/index.html [Accessed on 16 Aug. 2010]

[43] WHO, 2007, op.cit.

[44] Oshitani, H, K. Taro, S. Akira. 2008.Major Issues and Challenges of Influenza Pandemic Preparedness in Developing Countries. *Emerging Infectious Diseases,* June; 14 (6):875.

[45] WHO.2005.*Checklist for influenza epidemic preparedness*. World Health Organization. Available at: http://www.who.int/csr/resources/publications/influenza/FluCheck6web.pdf [Accessed on 28 Jul 2010].

[46] See for example, Eduardo, Azziz-Baumgartner; Nicole. Smith; Raquel. González-Alvarez et al.2009. National pandemic influenza preparedness planning. *Influenza Resp Viruses*, 3(4):189-196. Blackwell publishing.

documented. WHO[47] considers it as currently (August 2010) the most active area of pandemic influenza virus transmission. It is also one of the developing and emerging countries which even before the 2009 *A H1N1* spread actually had a pandemic plan or 'draft' entitled '*Influenza Pandemic Preparedness and Response Plan*'[48] (henceforth referred to as PIPR) for all the six phases of a pandemic response indicated by WHO[49]. With the advent of 2009 *A H1N1*, however, a new and more detailed pandemic plan has been recently[50] prepared entitled '*Action Plan Pandemic Preparedness and Response for Managing Novel Influenza (AH1N1***)'** [51] (henceforth referred to as PPRM**)** intended *only* for the level 5 and 6 of pandemic response[52] to widespread human transmission.

Nepal, Bangladesh, Sri Lanka also constitute a densely populated south Asian region which has seen outbreaks of Avian and AH1N1 influenza. The region is potentially highly vulnerable for a very quick human-to-human spread. Density of population in Bangladesh, for instance, is supposed to be around 979 per km^2 ,the highest in the world[53]. Poverty in this region is very high; for example, in Nepal per capita GDP of the country is estimated to be less than US$300 and more than 40% of the people live below the poverty line[54]. However, the state-subsidized, affordable, public health systems in this region are not strong enough to effectively respond to a full-blown pandemic[55]. The overall clinical infrastructure in the region also is not adequate to deal with a widespread pandemic. Like India, each of these three countries has a national pandemic influenza preparedness plan. Sri Lanka has two plans, developed in 2005[56] and 2006[57] respectively, available from its ministry of health website. Similarly, Bangladesh has come up with two plans , 2006-2008[58]. and a more recent 2009-2011[59] plan.. Nepal's plan, operational between 2008-2011[60], and Bangladesh's 2006-2008 plan have been obtained through the United Nations Office for the coordination of Humanitarian Affairs (OCHA) website.

The study could not include the pandemic plans of Bhutan, and Pakistan, which are also geographical south-Asian neighbours of India. For, (a) Bhutan currently has only a framework for pandemic preparedness; namely National Influenza Pandemic Preparedness Plan (NIPPP 2007) drafted by its Ministry of Health and Ministry of Agriculture. However, the plan is still far from being completed, although efforts are on to bring out policies and to undertake political decisions for the multi-sectorial implementation of the plan[61]. (b) Ministry of Health, Pakistan only has a 'guideline' and a 'FAQ'

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[47] WHO. Pandemic *(H1N1) 2009 - update 112.* Available at: http://www.who.int/csr/don/2010_08_06/en/index.html [Accessed on 9 Aug 2010].

[48] Directorate General of Health Services (DGHS), Ministry of Health and Family Welfare (MoHFW), Govt. of India. *Influenza Pandemic Preparedness and Response Plan.* [Internet]. Nirman Bhavan, New Delhi: DGHS, Ministry of Health & Family Welfare, Government of India [Cited 2010 May 10]. Available from: http://www.mohfw.nic.in/Influenza%20Pandemic%20Preparednness%20Plan.pdf . However, no date is mentioned in the document. [Accessed on 10 May 2010].

[49] WHO has a six-phase approach to gauge the seriousness of the outbreak and for issuing pandemic alert, of which phase 6 is the highest level pandemic alert. In 2009 the definitions and groupings of the phases has been revised by WHO. WHO. *Pandemic Influenza Preparedness and Response* [Internet].Geneva: WHO; April 2009 [Cited 2010 May 10], p.11. Available from: http://www.who.int/csr/disease/influenza/PIPRuidance2009/en/print.html.

[50] From indirect references in the document (see Introduction, Section 1.3), one may surmise that the document was prepared around May-June, 2009. NDMA, however, claims that the plan was released in May 2009 by MoHFW in consultation with NDMA.

[51] Directorate General of Health Services (DGHS), Ministry of Health and Family Welfare (MoHFW), Govt. of India .. *Action Plan Pandemic Preparedness and Response for Managing Novel Influenza (AH1N1).* [Internet]. New Delhi: Ministry of Health & Family Welfare, Government of India [Cited 2010 May 10]. Available from: http://mohfw-h1n1.nic.in/PandemicPlan.html. [Accessed on 10 May 2010]

[52] PIPR, p.11.

[53] Directorate General of Health Services. *Management Information System.2009*.Govt.of People's Republic of Bangladesh, Ministry of Health and Family Welfare, Health Bulletin 2009. Available at http://www.dghs.gov.bd/App_Pages/Client/File_Upload_Show.aspx?val=1 [Accessed on 11 Aug 2010]

[54] National Planning Commission. 2003. *Tenth five year Plan*. Kathmandu, Nepal: National Planning commission. [Accessed on 16 August 2010]

[55] WHO. Regional Office for South-east Asia, New Delhi. 2006. Regional *Influenza pandemic preparedness plan:* 2006-2008. P.3. Available at: http://www.searo.who.int/LinkFiles/Avian_Flu_SEA-CD-148_A4.pdf. [Accessed on 10 May 2010]

[56] Ministry Of Health Care & Nutrition, Colombo.2005.*Influenza Pandemic Preparedness And Response, National Influenza Pandemic Preparedness Plan, Sri Lanka*. Available at: http://www.epid.gov.lk/pdf/Binder4.pdf [Accessed on 13 Aug 2010].

[57] Ministry of Health, Epidemiology Unit 2006.Colombo, Sri Lanka. *National Influenza Pandemic Preparedness Plan (NIPPP)*, Colombo, Sri Lanka. Available at: http://www.epid.gov.lk/pdf/National_Influenza_update-sept_20.pdf [Accessed on13 Aug 2010]

[58] Republic of Bangladesh. 2006. National *Avian Influenza and Human Pandemic Influenza Preparedness and Response Plan, Bangladesh 2006 – 2008.* http://ochaonline.un.org/roap/WhatWeDo/PandemicPreparedness/PreventionandControloftheNextPandemic/NationalPlansofCountriesinAsiaPacific/tabid/4308/language/en-US/Default.aspx# [Accessed on: 13 Aug 2010]

[59] Directorate General of Health Services. Government of the People's Republic of Bangladesh.2009. *2nd National Avian Influenza and Pandemic Influenza Preparedness and Response Plan, Bangladesh. 2009-2011*. Available at: www.mohfw.gov.bd/index.php/download/doc_download/21-budget *[Accessed on13 Aug, 2010]*

[60] Government of Nepal. 2006. *National Avian Influenza And Influenza Pandemic Preparedness And Response Plan, Operational Plan (2007/08 – 2010/11).*Kathmandu. Available at: http://www.un.org.np/reports/UNO/2009/2009-01-29-Operation-plan-WB.pdf [Accessed on13 Aug 2010]

[61] UNjobs. 2010. *Pandemic Preparedness Specialist, Thimpu, Bhutan*.Unjobs Association of Geneva, Switzerland. Available at http://unjobs.org/vacancies/1279986279107 [Accessed on 10 Aug 2010].

document which are more of a public communication about pandemic influenza (A H1N1)[62]. It is neither a comprehensive pandemic preparedness and response plan, nor does it cover steps such as risk assessment, capacity assessment of various sectors, discussion of strategies, activities and multi-sectoral cooperation mechanism, etc as recommended by WHO[63]

Method

As mentioned earlier, the language of the south Asian pandemic plans have been searched for explicit mention of the terms mentioned in Table 1. A search for the use of ethical language was conducted by Thomas *et al*[64] among the US federal and state pandemic plans using selected ethical terms obtained from the US public health code. Table 1 includes not only these terms but also many other ethical values, as explained earlier, that have been proposed as important and relevant by the post-SARS literature on ethical pandemic planning.

Lines, where the terms in question have occurred, have been extracted first. They have been further examined for whether or not the terms have been used with ethical connotation in their respective contexts. That is, in addition to a mechanical key term search, the usage of the terms has been further subjected to a semantic examination of whether it has ethical significance or not in its given context. When no such significance is found, that also is mentioned in the report. For example, Nepal plan uses *duty* in the expression *heavy duty garbage bags* (Nepal plan, p.178), but it has not been considered as an ethical usage of *duty*. In Bangladesh 2010 plan, *open* occurs in the sense of open or uncovered space, and not in the ethical sense of being a feature of transparent or communal decision-making. These have been noted in the report, but have not been included in the Table 2 and 3.

Partial occurrences of terms in different words are also excluded from the study. For example, the term *harm* occurring in *pharmaceuticals*, *pharmacies*, *Sharma* etc. and *open* in *propensity* have been excluded from the study. Extracted terms have been judged for their ethical connotations and for further analysis. The result of the search is reported in Table 2 and Table 3 along with the frequency of the term used.

Results

Our search shows that out of the 49 ethical terms mentioned in Table 1, 14 appear in the Nepal plan, 10 in the two Bangladesh Plans, 9 in the two plans of Sri Lanka, (Table 3), and only 5 are found in the Indian plans (Table 2). The usage of ethical language in the plans is low. None of the plans has a separate section on ethical considerations; whatever ethical terms have been found are used as part of the content of the plan in general.

The ethical terms that are common among the plans and are used with a relatively high frequency are: *communication,* and *collaboration*. *Communication* as the most frequently used ethical term (127 times in Nepal plan). *Trust* is a common term too among the plans, but frequency of its usage is low: Mostly it appears just once, but in Nepal plan its frequency is 5.

The role of effective communication in the preparedness plan is quite important for prevention, containment, strategy and mobilization. Perhaps in acquiescence to this, the use of *communication* without exception refers to dissemination of risk or outbreak information in all the plans. Sri Lanka 2006 plan uses it just once, exclusively to refer to strategic communication during a pandemic (p.3). The rest of the plans use the term to also refer to few other aspects, such as maintaining effective communication with various stakeholders, to sensitize people, dissemination of accurate information, increased community acceptance by various key stakeholders. The Bangladesh 2010 plan notably mentions two other important kinds: communication between scientists and health officials (p.3, p.35), and networking between laboratories and epidemiology unit (p.116). Nepal and Bangladesh 2010 plan refer to *behaviour change communication* as well as a strategic communication tool in a pandemic influenza situation.

'*Collaboration*' signifies working together. However, the term is used in the Indian Plans only to mention collaboration with leading *international* agencies on sharing virological data. Sri Lanka Plan (2005) (p.19), and the two plans of Bangladesh include international *collaboration* for information-sharing, but they also mention other *multi-level collaborations* required within the country, as in local level, district level, state level and national level. In the plans of Nepal, and Sri Lanka the term is mostly used for multi-level and multi-departmental cooperation within the government for technical assistance, coordinated emergency response. The Bangladesh 2006-2008 plan uses the term to go beyond the governmental level to also refer to forging partnerships with different sections of the society, such as non-governmental organizations, civil society, and religious bodies, to ensure effective public response (p. 24). Bangladesh 2010 plan uses *collaboration* to talk about developing multi-sectorial approach (p.1), and collaboration between national and international laboratories (p.56).

The use of *trust* as a common term by all the plans, though Nepal plan uses it more than any other plan. However, each plan exhibits a common awareness about the importance of building *public trust* or confidence as a pillar of effective pandemic response. A similar concern for public safety and security is arguably also discernible in the usage of the expression *minimizing the risk*, which occurs in the plans of all four countries.

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[62] Ministry of Health,Govt of Pakistan. No dates available. *Guidelines pandemic influenza (H1N1).* http://202.83.164.26/wps/wcm/connect/3be31f004f6187578a03de89f7b43daf/Guidelines+Pandemic+Influenza+%28H1N1%29.doc?MOD=AJPERES&CACHEID=3be31f004f6187578a03de89f7b43daf&CACHEID=3be31f004f6187578a03de89f7b43daf&CACHEID=3be31f004f6187578a03de89f7b43daf&CACHEID=3be31f004f6187578a03de89f7b43daf&CACHEID=3be31f004f6187578a03de89f7b43daf&CACHEID=3be31f004f6187578a03de89f7b43daf. [Accessed on 10Aug 2010]

[63] WHO. Regional Office for South East Asia.2005.*Preparing Influenza Pandemic Preparedness Plans: A Step-by-Step Approach:* p.2. Available at http://www.searo.who.int/LinkFiles/Avian_Flu_Preparing_influenza_pandemic_plans_Step_by_step_approach.pdf [Accessed on 10 August 2010]

[64] Thomas et al. 2007, op.cit.

Table 1: Ethical values and expressions in salient post-SARS literature

Sl No	Ethical value term and expression	Sources	National pandemic plans of countries other than South Asian countries and related documents of national organizations which have explicitly used the term
1	Accountability/Accountable	Thomas et al. (2007)[1], WHO (2007)[1], Thompson et al. (2006) [1] , Kotalik (2005)[1]	New Zealand (2010)[1], UK (2007)[1], Canada (2006)[1], UTJCB (2005)[1]
2	Autonomy	Thomas et al. (2007), WHO (2007), Kotalik (2006)[1]	Canada (2006)
3	Collaboration	Thomas et al. (2007)	New Zealand (2010), Australia (2008)[1] UK (2007), State of California Plan (Thomas et al.2007), Canada (2006)
4	Communicating to the public • Risk communication • Outbreak /evolution of pandemic communication • About vaccine • About the nature of restrictions	WHO (2007)	New Zealand (2010, 2007[1]), UK (2007), UTJCB (2005) • Canada (2006) • Canada (2006) • Canada (2006) • New Zealand (2007)
5	Competence	Thomas et al. (2007)	New Zealand Plan (2010), Canada (2006)
6	Community interests	Kinlaw et al./ CDC (2007)[1]	-
7	Confidentiality	WHO (2007), Thomas et al.(2007), Kotalik (2006), Torda (2006)[1]	Australia[1] (2008), Canada (2006)
8	Consent	Thomas et al. (2007)	US State Plans (as mentioned in Thomas et al 2007), Canada (2006)
9	Disparity	Thomas et al (2007)	State of Texas Plan (Thomas et al.2007)
10	Diversity	Thomas et al. (2007), Kinlaw et al. (2007)	New Zealand (2007,2010) Canada (2006)
11	Duty • Duty to provide care to the sufferers by the health care workers • Duty of Care • Duty to treat • Duty to protect those who are on the frontlines	Selgelid (2009) [1] , Thomas et al. (2007), WHO (2007), Kinlaw et al./ CDC (2007), Thompson et al. (2006), Torda (2006), Kotalik (2006), Singer et al (2003) [1]	US Federal and State Plan (as mentioned in Thomas et al. (2007), UK (2007) • New Zealand (2007), UTJCB (2005) • New Zealand (2007), Canada 2006), Ontario (Singer et al.2003) • New Zealand (2007) • Canada (2006)
12	Ethic/s	Thomas et al. (2007), WHO (2007)	Australia (2008), New Zealand (2007, 2010), State of Vermont, State of Florida Plan, (Thomas et al. (2007), Canada (2006)
13	Egalitarian	Thomas et al. (2007) (mentioned in text as a chosen ethical term but not included in their list)	State of California Plan (Thomas et al.2007)
14	Equality	Thomas et al. (2007)	UK (2007)
15	Equity/Equitable	Selgelid (2009), WHO (2007), Thomas et al (2007), Torda (2006), Thompson et al. (2006), Singer et al. (2003),	Australia (2008), State of Tennessee Plan Thomas et al.2007), UK (2007), New Zealand (2007), Canada (2006), UTJCB (2005)
16	Fair/Fairness • Fair scrutiny and use of the resources • Fair balance between treatment of influenza and other serious conditions • Fair Process/fair procedure (Procedural Justice) • Fair and equitable sharing of benefits in support of public health • Fair compensation	Thomas et al (2007), Kinlaw et al. CDC (2007) WHO (2007), Kotalik (2006)	Many US state Plans (as mentioned by Thomas et al. (2007), UK (2007), • Canada (2006) • New Zealand (2010,2007), Canada (2006) • Canada (2006)
17	Freedom of movement Individual freedom	Selgelid (2009), WHO (2007)	New Zealand (2010,2007) Australia (2008), UK (2007), Canada (2006)
18	Global Justice	WHO (2007)	-
19	Human Rights	WHO (2007)	New Zealand (2010,2007), UK 2007), UTJCB (2005)
20	Inclusiveness/Inclusive	Thomas et al (2007), WHO (2007), Thompson et al. (2006)	New Zealand (2010,2007), UK (2007), Canada (2006), UTJCB (2005)
21	Justice	Selgelid (2009), WHO (2007)	New Zealand (2010), State of California plan, State of New Mexico Plan, Plans of Alabama, District of Columbia, Florida, Okhlahoma (Thomas et al.2007), UK (2007), Canada (2006)
22	Liberty	WHO (2007), Thomas et al. (2007), Kinlaw et al. CDC (2007), Torda (2006), Thompson et al. (2006)	Australia (2008), US Federal and State Plan (as mentioned in Thomas et al 2007), UTJCB (2005)
23	Minimizing harm /risk/ negative impact / social disruption /economic impact • Protecting one another • limiting social harm as far as possible • keeping harm at lowest possible level	Thomas et al.(2007), Kotalik (2006)	UK (2007), UTJCB (2005) • New Zealand (2010,2007) • Canada (2006)
24	Moral	Thomas et al. (2007), WHO (2007)	New Zealand (2010), State of New Mexico Plan (Thomas et al. (2007), Canada (2006)
25	Neighbourliness	NEAC 2007	New Zealand (2010, 2007)
26	Nondiscriminatory/Non discrimination	WHO (2007)	-
27	Obligation • to minimize the burden of disease on individuals and communities • of health care workers • of the countries to help one another • to respond to major emergencies • to avoid infecting others • to reduce stigmatization	Selgelid (2009), Thomas et al. (2007), WHO (2007), Kotalik (2005)	Canada (2006) • UTJCB (2005) • UTJCB (2005) • New Zealand (2010)

	• to respond to major emergencies		
28	Open / Openness	WHO (2007), Thompson et al. (2006)	New Zealand (2010,2007), UK (2007) Canada (2006), UTJCB (2005)
29	Participation	Thomas et al. (2007)	State of Montana Plan (Thomas et al.2007), New Zealand (2007), Canada (2006)
30	Privacy	Thomas et al. (2007), Kotalik (2006), Thompson et al. (2006), Singer et. al. (2003)	Australia (2008), New Zealand (2007), Canada (2006), UTJCB (2005)
31	Proportional/ Proportionality	Kinlaw et al. CDC (2007), WHO (2007), Torda (2006), Thompson et al. (2006), Selgelid (2009), Singer et al (2003),	Australia (2008), UK (2007), New Zealand (2007), UTJCB (2005)
32	Protection • of the communities from undue stigmatization • of healthcare workers • of the public from harm • of people with diminished autonomy • of public health • of vulnerable or minorities • of the employment of the workers who comply with social-distancing measures against the wishes of their employers	WHO (2007), Kinlaw et al. CDC (2007), Torda (2006), Kotalik (2006), Thompson et al. (2006), Singer et al (2003),	• UK (2007), Canada (2006), UTJCB (2005) • UK (2007), UTJCB (2005) • New Zealand (2010), Australia (2008) • New Zealand (2007) • New Zealand (2007)
33	Reasonableness/Reasonable	WHO (2007), Thompson et al. (2006)	New Zealand (2010,2007), UK (2007), Canada (2006), UTJCB (2005)
34	Reciprocity	Selgelid (2009), WHO (2007), Torda (2006), Thompson et al. (2006), Kotalik (2005), Singer et al (2003)	New Zealand (2010,2007), Australia (2008), US State of Tennessee Plan (Thomas et al.2007) UTJCB (2005), UK (2007)
35	Representation	Thomas et al. (2007)	UK (2007), Canada (2006)
36	Respect • For the individual rights • For the inherent dignity of all persons	WHO (2007)	CDC (2007), UK (2007) • New Zealand (2010,2007) • Canada (2006)
37	Responsibility/Responsible	Thomas et al. (2007), (mentioned in text as one of the ethical terms but not on their published list)	New Zealand (2010, 2007), UK (2007), Canada (2006), UTJCB (2005)
38	Responsive/Responsiveness	WHO (2007), Thomas et al. (2007), Thompson et al. (2006), Torda (2006)	New Zealand (2010,2007), UK (2007), UTJCB (2005)
39	Right /Rights • To liberties/freedom of movement • To privacy • To protect public from serious harm • To appeal	Selgelid (2009), Thomas et al. (2007), WHO (2007)	State of North Carolina, Delaware (Thomas et al 2007) • New Zealand (2007) • UTJCB (2005) • UTJCB (2005) • UTJCB (2005)
40	Social Justice	WHO (2007)	
41	Solidarity	Selgelid (2009), WHO (2007), Torda (2006), Kotalik (2006), Thompson et al (2006), Singer et al (2003)	New Zealand (2007), UTJCB (2005)
42	Stewardship	Torda (2006), Thompson et al (2006)	Australia (2008), US State of Tennessee Plan (Thomas et al.2007), New Zealand (2007), UTJCB (2005)
43	Transparency/Transparent	Kinlaw et al./ CDC (2007), WHO (2007), Thomas et al.(2007), Thompson et al. (2006), Kotalik (2006, 2005), Singer et al (2003)	New Zealand (2010,2007), UK (2007), State of Montana (Thomas et al. (2007), Canada (2006), UTJCB (2005)
44	Trust	Selgelid (2009), WHO (2007), Thomas et al. (2007), Torda (2006), Thompson et al (2006), Kotalik (2006)	Australia (2008), US State of Minnesota Plan (Thomas et al.2007), UK (2007), New Zealand (2007), Canada (2006), UTJCB (2005)
45	Unity	NEAC (2007)	New Zealand (2010,2007)
46	Utilitarian	Thomas et al. (2007)	California plan (Thomas et al.2007), Thomas et al mention it as an ethical term searched for in their article, but it is not included in their published list of values
47	Utility/efficiency	WHO (2007)	New Zealand (2010), UK (2007)

The mitigation strategies are discussed in all the plans. Except for India, plans of the three other countries mention the aim *to minimize social disruption* also, as may be caused by a devastating pandemic. The plans of Nepal, Bangladesh and Sri Lanka also suggest a greater awareness about the probable psycho-social and economic impact of a high consequence pandemic. For example, the Nepal plan specifically mentions the aim of *minimization of public fear* (p.16), whereas the Bangladesh plans mentions numerous times the aim of *minimization of negative socio-economic impact* (2006, p.25; 2010, p.1, 43, 55,60). A cognate term *protection* appears in almost similar frequency in both the Bangladesh plans (8 and 6 times) and in Sri Lanka 2005 plan (5 times). The term does not appear even once in the plans of India and Nepal. Bangladesh 2006 and 2010 plans particularly mention *protection of healthcare workers* and *of other vulnerable groups* (p.8, 2006; p.45, 46, 2010), and that *of wildlife* (p.12, 2006; p.16, 2010).

Participation, *responsive* and *transparency* are terms used by Nepal, Bangladesh and Sri Lanka plans to describe the process and the organized activity needed for evoking multi-sectoral multi-stakeholder response; notably, however, the terms do not appear even once in the Indian plans. On the other hand, the Indian plan PIPR uses *representation* to denote inclusive participation from all regions; but this term does not appear even once in any other plan.

The Nepal plan is the only plan to use the cluster of ethical terms *accountability, ethics, equity, human rights,* and *moral* while discussing the need for an ethically guided policy framework within which extraordinary public

health measures for containment and prevention might be necessary to adopt during a pandemic. However, the Nepalese plan uses them just once, whereas the other country plans have not used these even once. Thus, the group of basic ethical terms on the whole remain absent in the plans. The Nepal plan appears to recognize a *moral* element once in its used expression *moral hazard* (p.18) in the decision-making regarding paying the fair compensation to the poultry farmers; but that recognition is not sustained as the term *moral* is not used elsewhere. Nepal has used *fair* also, but in a rather limited sense in the specific context of paying the appropriate compensation for birds culled (p.17). It does not mention, for example, fairness issues involved in balancing the treatment of pandemic influenza patients and patients with other serious conditions, in ensuring access and affordability of public health system benefits during an emergency. The Bangladesh plan is the only plan which mentions *rights* in its proclamation of health as a basic right of every citizen (p. 26); no other plan mentions it.

Table 2: Frequency of Ethical Terms in Indian Pandemic Plans

Sl. No.	Ethical terms / expressions	Total no. of mentions In PIPR	Total no. of mentions in PPRM	Supporting quotations IN PIPR	Supporting quotations in PPRM
1	Collaboration	4	1	1.2.3. "Ensure rapid virological characterization in collaboration with WHO / lead international agencies."(p.18, 22, 26) 4. "Collaborate with international agencies to determine pathogenecity to humans."(p.22)	1. "The material prepared by MOHFW in collaboration with WHO and UNICEF would be translated into vernacular languages and given to the State Governments."(p.26)
2	Communication • Risk • Outbreak /evolution of pandemic • About vaccine • About the nature of restrictions	8	26	Some selected examples: 1. "Establish effective communication with community, health care providers and the media." (p.6) 2. "Establish an effective channel of communication with key response stake holders in government, non-Govt. Public and Media."(p.11) 3. "Communication-To achieve public acceptance of the event."(p. 33)	Some selected examples: 1."Risk Communication would be the most important non-pharmaceutical intervention."(p.12) 2. "Public would be made aware of the need to self quarantine through well managed risk communication strategy using print and visual media."(p. 23) 3. "…the objective of the communication would be to create wide scale public awareness and sensitize communities to appropriate behaviors before pandemic."(p. 26) 4. " interpersonal communication training module and aids on pandemic influenza will be developed for all grass root health workers with partners / UNICEF /WHO"(p.27)
3	Minimizing harm /risk/ negative impact / social disruption/ economic impact	2	2	1."To minimize the risk of human infection from contact with infected animals."(p.14) 2. "To minimize the risk of human infection from contact with infected animals." (p.15)	1. **"**All technical procedures should be performed in a way that minimizes the formation of aerosols and droplets."(p.110) 2. "Early implementation of infection control precautions to minimize nosocomical / household spread of disease."(p.118)
4	Representation	1	-	1. "Include new institutions in the network to have representation of all zones."(p.9)	
5	Trust	-	1		1. "This will help in building public trust…"(p.27)

The term *duty* occurs in the Indian plans, but in a very limited sense of externally assigned administrative and professional roles and responsibilities, and not in the sense of a voluntary, moral obligation. For example, Indian PIPR mentions "recalling health personnel for duty/cancellation of leave etc."(p.28, 31), or "duty nurse would put the face mask on suspect ill traveler" (p.44). In the Bangladesh 2010 plan and Sri Lanka 2005 plan, *duty* is not used even once. *Responsible* is used in the plans with relatively high frequency; but mostly in the limited sense of role obligation. Consider for example, "the Forest department (FD) is *responsible* for all activities concerning wildlife" (Bangladesh plan 2010, p.16), or "In phase 6, the District Disaster Management Authority would be *responsible* for all actions for sectors other than health" (PPRM, India, p.17). The PPRM uses *responsible* only in this restricted sense.

Table 3: Frequency of Ethical terms in Pandemic Plans of Nepal, Bangladesh, Sri Lanka

Sl. No.	Ethical term / expression	Nepal plan[1] (2007/08 – 2010/11)	Bangladesh plan[1] (2006-2008)	Bangladesh plan[1] (2009-2011)	Sri Lanka Plan (2005)[1]	Sri Lanka Plan (2006)[1]
1	Accountability	1 1. "ensuring a two-way flow of information and accountability." (p.46)	-	-	-	
2.	Collaboration	3 Some selected examples 1. 1. The DLSO will in collaboration with the District Local Development Office, train in one day workshops (p.14) 2. "…with collaboration from regional, district and local level sub-committees." (p.53)	18 Some selected example 1. "So multi-sectoral collaboration and coordination are of paramount importance…" (p.24)	8 Some selected example 1."Ensure essential services; and to strengthen bilateral, regional and international collaboration."(p.1)	14 Some selected example 1"…all organisations including the government, private sector and community require close collaboration and synergy."(p.7)	3 Some selected example 1. "… in collaboration with the Estate Infrastructure and Livestock Department."(p.1)
3	Communication	127 Some selected example 1."…improving the capacity for risk communication."(p.47) 2. The Plan proposes a national communication strategy…(p.47) 3. the failure of a communication response in Nepal during a pandemic could result in major Panic (p.48)	39 Some selected example 1. "To establish and ensure an integrated communication strategy responsive to public concerns."(p.28)	72 Some selected examples 1."Official communication during outbreak, response and control activities"(p.3) 2. "Scientific communication among scientists and officials through training, workshop and meeting"(p.3)	26 Some selected examples 1."…risk communication are critical steps of preparedness."(p.3) 2. "Establish communication networking among all stakeholders."(p.36)	1 1."Risk Communication-Communication Strategic Plan was developed by the UNICEF in collaboration with the Epidemiology Unit, Health Education Bureau and other stakeholders" (p.3)
4	Ethic/s	1 1 "…abide by the national and international accepted ethical standards." (p.33)	-	-	-	-
5.	Equity	1 1. " ... they are within an equity and human rights perspective …" (p.33)	-	-	-	-
6	Fair/Fairness	2 1."If the backyard poultry farmers are paid a fair compensation to cover the value of the birds destroyed"(p.17) 2. "Rs.100 per bird and for all birds culled from his flock, is a fair rate of compensation." (p.17)	-	-	-	-
7	Human Rights	1 1 "… they are within an equity and human rights perspective…"p.33)	-	-	-	-
8.	Minimizing harm /risk/ negative impact / social disruption/economic impact	4 1. "…minimize public fear and facilitate public protection...." (p.16) 2. "The plan is developed to minimize the risks…"(p.48) 3. "…minimize the social disruption…" (p.52)	7.Some selected examples 1.2.3 "…to minimize the risk of human pandemic influenza."(p. 6,6, 25) 4. "...minimize the negative socio-economic impact…"(p.25) 6."…minimize social disruption and economic burden."(p.26)	8.Some selected ex: 1)"to minimize socio-economic & environmental impact." (p.1,43) 2)"minimize negative socioeconomic and environmental impact during pandemic" (p.33) 3)"to minimize concern, social disruption, stigmatization and correct misinformation (p.61)	2 Some selected examples 1. "To reduce the impact of the pandemic virus on morbidity and mortality and minimize social disruption minimize social disruption" (p.16)	
9	Moral	1 1 "…bring in an element of moral hazard in compensation payments to organized poultry	-	-	-	-

		farms".(p.18)				
10	Participation	11 Some selected examples 1 "…with the participation of the Regional Directorates of Livestock Services and Regional Health Directorates and other governmental and non-governmental concerned organizations."p.4, 5)	1 1."with participation from relevant government, NGOs, private sectors…"(p.25)	5 Some selected example 1. "…multi-sectoral approach with community participation and collaboration with International organizations."(p.1)	4 Some selected examples 1. "Full mobilization of health services and strict enforcement of epidemic law during pandemic will only be successful on the basis of full participation of decentralized levels.." (p. 21,23)	
11	Protection	-	8 Some selected examples 1. " protection of healthcare workers and other vulnerable groups."(p.8) 3.4. "...the protection and conservation of wildlife."(p.12, 12)	6 Some selected example 2. "Strengthening safe clinical care with protection of health Personnel"(p.45)	5 1. "This includes specific approaches including protection of cullers and health care workers."(p.4)	
12	Reasonable/ Reasonableness	1 1.Reasonable care necessary (p.172)	-	-	-	
13	Responsibility/ Responsible/	38 Some selected examples 1. "…ensuring responsible outbreak reporting to avoid panic ..."(p.1) 2. "…responsible media reporting on avian influenza." (p.53)	2/27 Some selected examples 1."…pandemic preparedness is the responsibility of all …"(p.6)	59 Some selected examples 1. "The Forest Department (FD) is responsible for all activities concerning wildlife"(p.16)	5 Some selected examples 1. "Pandemic preparedness is the responsibility of all…"(p.7) 3. "…some agencies will bear the primary responsibility while the others will also be active…"(p.15)	
14	Responsive/Respo nsiveness	-	1 1. "To establish and ensure an integrated communication strategy responsive to public concerns."(p.28)	-	1 1. "To establish and ensure an integrated communication strategy responsive to public concerns."(p.17)	
15	Right/Rights		1 1. "The constitution of the Peoples Republic of Bangladesh assures "health is the basic right of every citizen of the republic"'(p.26)	1 1."The constitution of the People's Republic of Bangladesh assures "health is the basic right of every citizen of the republic". (p.37)	-	
16	Transparency/ Transparent	4 Some selected example **1.** "…transparent and proactive public information strategy related to avian influenza and other epidemics." (p. 53)	1 1. "Transparency is a key strategy to gain the public's trust in the government and other stakeholders and is critical to disaster management." (p. 8)	-	1 1. "Transparency is a key strategy to gain public trust in the government which is critical to disaster management."(p.4)	
17	Trust	5 Some selective examples 1. "…communication failure by governmental officials could create panic among the public: undermine public trust / confidence …"(p.16). 2. "…maintain and restore trust."(p.49)	1 1. "Transparency is a key strategy to gain the public's trust in the government and other stakeholders and is critical to disaster management."(p.8)	-	1 1. "Transparency is a key strategy to gain public trust in the government which is critical to disaster management."(p.4)	

Table 4. Common and frequently used terms in all 4 south Asian national plans

Term in question	Nepal	Bangladesh plan (2006-2008)	Bangladesh plan (2009-2011)	Sri Lanka Plan (2005)	Sri Lanka Plan (2006)	India PIPR	India PPRM
Communication	127 times	39 times	72 times	26 times	1 time	8 times	26 times
Collaboration	3 times	18 times	8 times	14 times	3 times	4 times	1 time
Minimizing harm	4 times	7 times	8 times	2 times	-	2 times	2 times
Trust	5 times	1 time	-	1 time	-	-	1 time
Term in question	**Nepal**	**Bangladesh plan (2006-2008)**	**Bangladesh plan (2009-2011)**	**Sri Lanka Plan (2005)**	**Sri Lanka Plan (2006)**	**India PIPR**	**India PPRM**
Communication	127 times	39 times	72 times	26 times	1 time	8 times	26 times
Collaboration	3 times	18 times	8 times	14 times	3 times	4 times	1 time
Minimizing harm	4 times	7 times	8 times	2 times	-	2 times	2 times
Trust	5 times	1 time	-	1 time	-	-	1 time

It must be noted that the terms *justice, consent, privacy, liberty, freedom, autonomy* occur nowhere in any of the plans, though the plans discuss ethically significant and occasionally contentious issues such as stakeholder management, logistics, preventive public health measures such as isolation, and mobilization of citizens and communities. Similarly, none of the plans uses *prioritization*, though they discuss vaccination policies.

Discussion

There is no doubt that with respect to the ethical terms in Table 1, the use of ethical terms in the available plans of the mentioned four countries on the whole is meager. The usage does not exhibit a desirable level of presence of ethical terms, considerations and issues in the language of the plans. If the terms collected in Table 1 together represent a collective concern, then by the sheer number the usage of ethical terms in all the south Asian countries do not appear adequately prepared to address that concern. Comparatively, Nepal and Bangladesh plans appear to use more ethical terms in comparison to Sri Lanka and India, and thus may seem to be ethically more sensitive. However, the fact remains that each of the four countries needs to make increased effort to improve their usage of ethical language in the national pandemic plan; starting with the inclusion of more ethical terms to explicit infusion of expressed ethical considerations in every important aspect of pandemic planning and response.

There are some obvious omissions which may be given immediate attention. None of the plans, for example, has explicitly mentioned, or has implicitly suggested, the need of any ethical framework, or values, as guiding principles for ethical decision-making as part of the pandemic plan. Also, there is neither any overt attempt nor any evidence of awareness to identify probable major ethical issues related to any of the pandemic responses, such as fair distribution of medicines, managing access to limited number of ICUs. Consequently, there is no special effort visible in any of the plans to indicate procedural guidelines about *how* to ensure that decision-making throughout the pandemic planning and response is ethically sound.

For example, none of the plans mention the need to bring in ethicists or bioethicists into the decision-making body, though for the effective implementation of already decided measures some of the plans speak of seeking participation from the wider sections of the society.

The ability to identify ethical issues in pandemic responses, or to comprehend and express the ethical implications of a pandemic strategy is an acquired skill, which requires training, practice and expertise. The plans of the four countries appear to be unaware of that. The preparedness exercise for a pandemic has many facets, and training healthcare workers being adequately prepared for resolving potential ethical conflicts and issues is an important one among them. There is no indication in the plans of the four countries about the need for this exercise. It might be relevant here to mention that as part of their preparedness exercise, certain country plans have gone to the extent of going through simulation exercises on anticipated scenarios and in identifying ethical dilemmas and decisions therein. For example, in its prepared document "Getting Through Together: Ethical values for a pandemic", National Ethics Advisory Committee (NEAC), an independent advisory body to the Ministry of Health, Govt. of New Zealand, has included a separate section entitled 'Hypothetical cases'[65] . With imaginary scenarios in urban setting and in a hospital, this section helps one to identify the potential ethical issues and the shared, action-guiding values embedded in the situation to guide deliberations on the action plan appropriate for the situation. The aim of course is to train people to be better adept in difficult decision-making *before* a pandemic so that they are able to address similar issues *during* a pandemic.

Table 2 and 3 may suggest to some that there are, though barely, allusions to various ethical concepts such as *fairness* in the south-Asian plans. That suggestion, however, in itself does not warrant ethical awareness. First of all, unless there is a sustained conscious process behind them, sporadic and scarce ethical language usage comes across more fortuitous than as indicator of ethical awareness and commitment. Second, in some cases an ethical term has been used, but the usage does

[65] National Ethics Advisory Committee (NEAC). MoH, Govt of New Zealand.2007. *Getting Through Together: Ethical Values for a Pandemic*. Wellington: Ministry of Health:, NZ: 9-22.. Available at: http://www.neac.health.govt.nz/moh.nsf/pagescm/1090/$File/ethical-values-pandemic-insert.pdf [Accessed on: 2 Jun 2010].

not appear as thought through well. Thus, the usage appears rather perfunctory, and its allusion to ethical concept, if any, seems more an accident than the outcome of a conscious choice. For example, in the plans *collaboration* is mentioned with a relatively high frequency for international and internal *collaboration*. However, none of the plans mentions about the importance of *collaboration* on data-sharing with the immediate south Asian neighbor countries across the borders, when past experiences with Avian influenza has often brought this issue in the forefront. Similarly, *communication*, though frequently used, does not cover communication to the public about the public health measures, particularly the restrictive ones, which may conflict with individual civic liberties. The plans use *transparent*, but make no effort to make it transparent who should make the pandemic-related decisions and on what capacity. Similarly, *participation* of the stakeholders is mentioned (though not in the Indian plans), but there is no further discussion in any of the plans on how to ensure that in a diverse society at various levels of decision-making. It is also noteworthy that none of the plans uses the ethical term *inclusiveness*, when the population of the region is strikingly diverse with distinctly different religious, cultural and political beliefs. Apart from having a large population living below poverty line, most of these countries in question also have significant marginal populations; namely, minorities, tribes, nomads. There should have been better efforts to indicate how the vulnerability of the marginal people will be protected during a pandemic.

We may contrast the situation with some of the more advanced efforts to include ethical values, principles and considerations by other countries. For example, from 2006 Canada has clearly identified the following ethical principles for guidance in its pandemic influenza plan[66]:

1. Protect and promote the public's health
2. Ensure equity and distributive justice
3. Respect the inherent dignity of all persons
4. Use the least restrictive means
5. Optimize the risk/benefit ratio
6. Work with transparency and accountability

Australia too has clearly identified 9 ethical, action guiding principles in its pandemic plan[67] New Zealand 2010 plan has included a separate section on relevant ethical issues[68]. In the earlier 2007 New Zealand plan, the NEAC has not only identified a set of pertinent ethical values, but also has mentioned how the practice of each value can be translated into action to ease the adaptation of the value by policymakers and administrators,. For example, the document explains that the practice and endorsement of ethical value of *inclusiveness* in decision-making may be exhibited in actions by a wide range action such as :

- "including those who will be affected by the decision
- including people from all cultures and communities
- taking everyone's contribution seriously
- striving for acceptance of an agreed decision-making process, even by those who might not agree with the particular decision made" [69].

Conclusion

National pandemic preparedness plans of four south-Asian neighbor countries have been examined for the presence of certain ethical terms, and with respect to those terms the usage has been found to be comparatively low. The plans can certainly benefit from better and more aware usage of ethical language. In crisis hours of a pandemic, people need some reassurance that the responsible parties will engage in value-laden decision-making on behalf of all the stakeholders in a crisis hour. The properly articulated ethical language in a pandemic preparedness plan is a positive step towards that direction. As Thompson puts it,

> *"…using ethical frameworks to help guide decisions can offer greater assurance that the values instantiated within them, such as accountability, transparency and trust, will be carefully thought about in decision-making and when reviewing decisions with stakeholders"*[70].

Before we conclude, it must be mentioned here that the content of the plans was further searched for the usage of any other ethical term, which does not feature in Table 1, and more specifically for any special local considerations in the plan. Unfortunately, however, our search has not yielded anything worth-mentioning so far.

Table 5: Value terms found in Country Plans

1	Cooperation	Australia (2008), New Zealand (2007), UK (2007), Canada (2006)
2	Distributive Justice	Canada (2006)
3	Inclusiveness	New Zealand (2007)
4	Flexibility	UK (2007)
5	Working together	UK (2007)

In crisis hours of a pandemic, people need some reassurance that the responsible parties will engage in value-laden decision-making on behalf of all the stakeholders in a crisis hour. The properly articulated ethical language in a pandemic preparedness plan is a

[66] Public Health Agency of Canada.2006. *The Canadian Pandemic Influenza Plan for the Health Sector*. Public Health Agency of Canada: Canada. Section 2 'Background', subsection 6: Ethics and Pandemic Planning, pp14-16. Available at: http://www.phac-aspc.gc.ca/cpip-pclcpi/pdf-e/cpip-eng.pdf [Accessed on 2 June 2010]

[67] Department of Health and Ageing, .Govt.of Australia.2008. *Australian Health Management Plan for Pandemic Influenza*. Subsection B4: Ethical planning.. Commonwealth of Australia pp. 26-.27. Available at http://www.flupandemic.gov.au/internet/panflu/publishing.nsf/Content/ahmppi-1.[Accessed on 2 Jun 2010].

[68] Ministry of Health, New Zealand. 2010. Part A: Setting the scene. Ethical Issues in pandemic planning, p.15. Wellington: Ministry of Health. ISBN number: 978-0-478-35907-7 (Online) Available at http://www.moh.govt.nz/moh.nsf/indexmh/nzipap-framework-for-action [Accessed on 3 Jun 2010]

[69] National Ethics Advisory Committee (NEAC). MoH, Govt of New Zealand.2007, op.cit.

[70] Thompson, AK, K.Faith, JL. Gibson and RE.Upshur. 2006, op.cit.

positive step towards that direction. As Thompson et al (2006) puts it, *"…using ethical frameworks to help guide decisions can offer greater assurance that the values instantiated within them, such as accountability, transparency and trust, will be carefully thought about in decision-making and when reviewing decisions with stakeholders"*[1].

Unethical Practices of Medical Practitioners: Role of Pharmaceutical Industry

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Before discussing unethical practices, it is very important to understand what an ethical practice or behavior means. An ethical behavior is characterized by honesty, fairness and equity in interpersonal, professional and academic relationships and in research and scholarly activities. Ethical behavior respects the dignity, diversity and rights of individuals and groups of people [1]. A deviation from this behavior can be termed as unethical. The distinction between ethical and unethical becomes particularly important in context of health care providers especially medical practitioners as their decisions have direct implications on their patients and their families.

The medical profession was considered the noblest profession, but this is now seemingly being more of a myth then a reality. Nowadays, medical practitioners are involved in many practices that do not conform to accepted standards of social or professional ethical behavior. What leads to this diversion from the actual ethical practices by doctors is surely something to be thought upon.

The diverse non-conforming actions by the doctors can be grouped together under several heads, which not only includes accepting precious gifts that are personal, as well as for families, from the drug manufacturing companies; accepting international sponsorships; getting clinic renovations; but also include deception with patients by prescribing unnecessary medications, injections and performing needless avoidable or fake surgeries. The latest act of bribing is payment of fellowship fees of Postgraduate students. These are just a few examples of how the pharmaceutical industry *bribes* these doctors to prescribe specific products belonging to a certain company. The irony of the whole situation is that these practices are not only common but also ignored and even considered justified by medical practitioners as well as by the pharmaceutical industry. They do not realize the effects it has on our lives as patients. General practitioners or consultants; all are equally involved in these practices.

Fortunately, there is still a small group of doctors who have not only kept up to their dignity and ethical aspect of their work, but are also trying their level best to keep their colleagues away from such practices by creating awareness. These doctors are concerned about the growing influence of medical device manufacturers and pharmaceutical companies on healthcare industry.

A variety of opinions arise when it comes to the debate of deciding on what is ethical and what is unethical. Off course, there are different schools of thought and it is very difficult to build a consensus on any given scenario. Even doctors belonging to the same school of thought appears to have confronting thoughts regarding certain issues involving ethical dilemmas.

Physician-pharmaceutical interaction is the center of most bioethical discussions all over the world until now. There has been a long and ongoing debate to stop the doctors, if possible, from direct interactions with the drug industry and, if not, then the least that can be done is to try to make them realize the slippery slope nature of these interactions. It has now become a common understanding of all those utilizing the platform of bioethics to stop and prevent one to one interaction between the doctors and pharmaceutical industry. The seriousness of the situation alarms the need to create awareness in doctors who apparently are not aware of the sensitivity of the issue. This article hopes to highlight some of the reasons given by doctors in justification for these unethical practices and will help address these reasons on any platform where creating awareness among doctors will be the main agenda.

In the health sector of Pakistan, private sector dominates the public sector because of variety of reasons. In private sector, the local GP's are playing a very important and major role in providing the primary health care services to majority of the population. One reason for larger patient turnover at a GP's clinic as compared to a private hospital or consultant's clinic is their unaffordable high consultation charges limiting the access to common people. Longer waiting periods is the other common reason for people to avoid these hospitals. Because of greater number of patients coming over at a GP clinic, many General Practitioners are enjoying a lifestyle equal to consultants of the country. Because of this reason also, General Practitioners are a more vulnerable, fertile and potential market for the Pharmaceutical companies to target. Those on the other extremity are, however, barely able to survive making them potentially vulnerable too but for an entirely different reason.

It is a noted fact that sometime ago the pharmaceutical industry targeted consultants for lavish incentives for earning good business from these doctors. However, in the current times, the General Practitioners are being targeted more and with huge incentives that ranges from local entertainments to sponsoring foreign trips and many more. The GP's, therefore, are willing to write any prescription for such incentives. Another dilemma is that most of the doctors rely on the information provided by the medical representatives of pharmaceutical companies about a particular drug and its dosage forms. The main purpose of these detailed aids is

to offer a reminder to the doctors rather than being a replacement of books or research journals. However, doctors are currently relying on these literatures and product folders to provide them current updates on medical knowledge. One of the reasons presented frequently for this practice is that doctors do not have time to go-through books or journals all the time. No matter what the reason is, the reality is that pharmaceutical representatives serve as the sole piece of information regarding any newly launched drug and treatment of common non-communicable diseases for general practitioners (GPs) in Pakistan [2,3]. Most of them never try to find out the validity and reliability of this information too. The pharmaceutical representatives boast of added advantages of the drug and cheap prices of the company's product that serves as other justifications for doctors to prescribe these medications.

For highly qualified and skilled doctors, financial incentives do not always serve the purpose. Pharmaceutical companies are very tactfully providing extra benefit to these them. The companies, apart from arranging fully funded foreign trips or cruise trips in Dubai or any other part of the world, are also in the process of arranging CME's and seminars in exotic places all around the globe. The idea behind this kind of activity is to arrange a seminar of one week's duration in which the academic session lasts for only two days and thus ample time is provided to these doctors to shop around on company expenses. These sorts of trips are becoming more of the status symbol among such doctors. Many of these doctors take real pride in describing the details of their recent tours and the hotels in which they stayed and the shopping they did without spending a penny from their own pocket. These sorts of programs create a prestige issue for doctors and they demand benefits like travelling only in business class simply because another company has provided their counterpart a business class seat while traveling. This sort of competition amongst the doctors actually acts like a slippery slope that pushes them to demand more and more favors from the pharmaceuticals companies and allowing them to go to any extent they possibly can. Not surprisingly, their demands are being fulfilled too. The company personnel know very well that these doctors have the capability of doubling or even tripling their investment, the amount company has invested on them, by prescribing their drugs highlighting the conflict of interest that many of these doctors have.

A recent shift in the area of interest of the pharmaceutical companies is towards the resident medical officers, which are completing their requirement for their postgraduate programs. These residents are in charge of the ward in evening hours and often running the OPD's as well. Pharmaceutical companies have identified their potential as they have more exposure to patients in the ER and the OPD's as compared to consultants who see only a selective number of patients. Moreover, these junior doctors have relatively lesser demands as compared to consultants. Keeping these facts in mind, these junior doctors are becoming a major target of pharmaceutical companies. Financial incentives can be a strong but not the only reason for companies to target these doctors. The residents as well as the house officers are approached with the offers to get medical books and payment of exam fee in exchange for writing certain number of prescriptions. Expensive stethoscopes, free lunches and doctor's aprons etc. are some of the other incentives given to them in exchange of prescribing certain medicines.

After having a brief look into some of the more common reasons, the most important thing to be noted and necessary to acknowledge is the fact that one shoe does not fit all. Not all the doctors are involved in such practices and there are still doctors who not only realize this as unethical but also condemn this practice strongly.

Yet the other group who neither realizes nor accepts that accepting any such gifts or incentives from pharmaceutical representatives is unethical. However, highlighting the negativity of such practice has often resulted in a positive outcome. It has been witnessed that these doctors do correct their practices to greater extent once provided with the ethical argument and reasoning.

The biggest resistance comes from the doctors who are well aware of their practices and think that these gifts and luxurious items is a result of their hard work and a pay off to years of struggle that they have gone through. They consider this as their right and argue that when pharmaceutical companies are getting business because of their prescriptions so why not enjoy these privileges provided to them in return. Another argument given frequently in support by these doctors is that they are well aware of what they are prescribing and that they know what is good for their patients. According to them, they will never do anything that carries the risk of potential harm to their patients. An unacceptable or unethical norm to them is only when they prescribe a drug, which poses potential harm to the patient and is not serving the purpose. Nevertheless, rather than accepting defeat, it is important to keep the hope alive. Involving these doctors in discussions and ethical debates may play a part in making them understand the underlying problem and making them realize the hazards associated with it.

Correction is not required only at the doctors' end. It is also the responsibility of the government to realize that under-payment of the medical professionals is resulting in indulgence of doctors into unethical practices. If doctors are paid according to their worth, it can definitely put an end to these practices which can be considered as acts of "greediness". The pharmaceutical industry has also been approached viz many platforms and have worked hard to develop certain guidelines for the physician pharmaceutical interaction but in vain. As far as my knowledge is concerned, neither is there any law in Pakistan Penal Code to enforce such guidelines nor there is any obligation on any doctor who takes Hippocratic Oath to follow these guidelines except the moral obligation that still need to be sensitized. The best possible way is to teach medical students medical ethics, which is now being taught at the basic level in some medical schools in Pakistan. Pakistan Medical and Dental Council (PM&DC) should make biomedical ethics a compulsory course in the medical education to make our future doctors are not only well aware of the situation but also well equipped to handle it.

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Japanese healthcare workers' attitudes towards administering futile treatments: A preliminary interview-based study

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Abstract

In Japan, few studies and ethical debates have addressed medical futility, but articles suggesting the practice of such treatment exist. The present study aimed to explore attitudes about this by examining personal practical experiences of those who have been involved in judging treatments as futile. We employed a qualitative descriptive design with content analysis of semi-structured and focus group interviews with 11 Japanese physicians and 9 nurses of a university hospital in Japan. The interviews mined their practical experience to identify why they provided treatment that was regarded futile, factors for determining futility, and attitudes toward foregoing futile treatments. All participants had provided treatments judged as futile for various reasons, such as patient request, inadequate decision-making processes, request from another physician, and the lack of standards with which to judge futility, among others. In addition to medical science factors (e.g., patient's physical condition, objective medical findings), participants also considered non-medical science factors (e.g., patient QOL, psychological burden, cost and benefit analysis) to determine if a treatment was futile. Almost all participants agreed that futility should be defined and that such treatments should be foregone, but they did not take a proactive stance towards this due to factors related to the healthcare worker's situation or the patient.

Although the implications of the present study are somewhat limited, our results indicate that futile treatments are provided at multiple treatment departments. Health-care workers employ a variety of factors to determine futility, including non-medical science factors. As provision of such treatment is not always performed for reasons of patient autonomy, diverse approaches should be employed to cope with situations regarding futile treatments.

Background

The debate concerning medical futility has spanned more than 20 years. The issue is the resolution of cases in which patients and their families request treatments that healthcare workers consider to be futile. The ethical debates have been conducted from a variety of perspectives, including the definition of medical futility, procedural approaches to resolution of such treatments, communication between healthcare workers and patients, decisional authority on the behalf of healthcare workers and patients, professional integrity of healthcare workers, and rationing of healthcare resources [1-4]. In addition, almost all of these debates have been based on theoretical assumptions with a paucity of empirical surveys [5]. Medical futility is a problem brought about by increased interest in respect for patient autonomy and advances in healthcare technology as represented by life-sustaining treatments [4, 6, 7]. Informed consent has already become widespread in Japan, and it is argued that respect for patient autonomy in the context of decision-making has increased [8]. In addition, a survey of physicians in Japan involved in cancer therapy showed that over half of the respondents had performed cardiopulmonary resuscitation on terminal stage cancer patients who had suffered cardiac arrest [9]. Such reports assume that the problem of futile treatment exists within Japanese healthcare settings.

There has been only one survey, published in 2006, regarding medical futility in Japan [5]. This survey showed that unilateral decisions made by healthcare workers regarding futile treatments are unacceptable, and discussed the necessity of public debate and policymaking. From a macroscopic perspective, this issue relates to problems concerning our healthcare system, aging population, and life-sustaining treatments. However, this survey only targeted specialists in bioethics, and the number surveyed was small. Although the authors of the survey regarded medical futility as a newly emerging problem for Japanese healthcare [5], no surveys on this topic have subsequently been carried out. In addition, no empirical surveys of healthcare workers regarding futile treatments have been conducted in Japan.

While few discussions have emerged about this topic among the Japanese, we believe that it strongly influences healthcare in Japan, and we plan to examine how Japanese people feel about this topic. The present focus group interview is a preliminary study to prepare for the future large-scale empirical survey. We conducted in-depth interviews of Japanese healthcare workers. We aimed to interview participants about their practical and personal experiences of judging various treatments as futile, in order to explore why participants provided such treatments, what factors they employed to determine

futility, and their attitudes about foregoing such treatments.

Methods

We conducted semi-structured and group interviews, and analyzed data using qualitative content analysis. The study was approved by the ethics committee at Kumamoto University Graduate School of Medical Sciences in May 2008 (receipt No. 264).

All participants were healthcare workers at the Kumamoto University Hospital in Japan (the majority had practiced at several hospitals). One of the authors (Y. K.) identified eligible healthcare workers who were either co-workers of Y. K. or introduced by them. All were contacted and provided with information regarding the study. If they were willing to participate, an appointment was made for an interview. Prior to the interview, participants received written information about the study and provided written informed consent. The 20 healthcare workers that participated included 11 physicians and 9 nurses that we divided into four groups. Participant characteristics are shown in Table 1.

Before the interviews, we explained the theme of the study by presenting two famous foreign cases concerning medical futility to all participants: the cases of Mrs. Wanglie and Baby K [10]. Japan has not had any famous cases argued to be medically futile, although some cases may include this general theme. The two cases above were described in a Japanese medical textbook representing this theme, so we decided to adopt them. Some of the participants had already heard of these cases. We presented participants with these cases in written form to clarify the objective of the interviews. After a ten-minute presentation, we conducted semi-structured interviews according to the interview guide we developed based on our discussions. The interview guide was created in a way that would allow us to obtain descriptive data from participants' practical experiences with judging treatments as futile. It addressed the following four topics for each participant:

1. Participant's experiences of treatments regarded as futile (e.g., patient's condition, the reasons for providing futile treatment, etc.)
2. Participant's definition of futile treatment and criteria for judging futility
3. Participant's attitudes toward foregoing the treatment regarded as futile, and their perceived difficulty in foregoing such support
4. Participant's attitudes toward disagreement or conflict with the patient or their family about treatment regarded as futile

All interviews were conducted by one of the authors (Y. K.). Interviews took place between January and June 2009, lasted for 109-125 minutes (mean duration, 116 minutes), and were recorded on an IC recorder.

We analyzed the interviews using qualitative content analysis with the aim of identifying categories in the data [11]. The interviewer (Y. K.) transcribed interviews into verbatim texts. All authors read the texts thoroughly several times. Following the deletion of unnecessary words, texts were organized into meaning units comprising statements or words referring to the central meaning of the question. Each meaning unit was summarized or explicated into codes, which became the smallest unit for analysis. Finally, we grouped codes with similar content into categories. The category system was defined and revised until all codes were categorized and the categories were mutually exclusive.

Table 1: Characteristics of the participants

No.	Group	Occupation	Sex	Length of practice (year)	Specialty or Ward
1	1	Physician	Male	6	Thoracic surgery
2	1	Physician	Male	7	Neurosurgery
3	1	Physician	Male	6	Cardiology
4	1	Physician	male	9	Emergency medicine
5	1	Physician	Male	18	Cardiology
6	2	Physician	Male	18	Intensive care
7	2	Physician	Male	6	Pediatrics
8	2	Physician	Male	21	Gastroenterological surgery
9	2	Physician	Male	4	Respiratory medicine
10	2	Physician	Male	12	Respiratory medicine
11	2	Physician	Female	7	Pediatrics
12	3	Nurse	Female	11	Surgery
13	3	Nurse	Male	3	Surgery
14	3	Nurse	Female	2	Surgery
15	3	Nurse	Female	1	Surgery
16	3	Nurse	Female	4	Surgery
17	4	Nurse	Female	21	Intensive care
18	4	Nurse	Female	11	Respiratory medicine
19	4	Nurse	Female	19	Obstetrics
20	4	Nurse	Female	23	Oncology

Results

Situations in which treatments judged as futile were carried out

All participants had experience carrying out treatments judged as futile. A total of 33 cases were presented. As the majority of participants had practical experience at several medical facilities, presented cases came from many places. A summary of these cases (patient conditions and interventions) is presented in Table 2.

Reasons for carrying out treatments judged as futile

We asked the reasons for providing treatments that were judged as futile. We classified the reasons into 11 categories (Table 3). In some cases, there were multiple reasons. Comments from participants are shown below.

Nurse (12): There was a desire on the part of the patient's family to provide unlimited treatment and save the patient's life.

Thoracic surgeon (1): In the current state of Japanese society, I feel there is an unspoken rule to do whatever one can possibly do, and so I carried out the treatment. Refusing to provide treatment is not allowed.

Internist (5): I had to carry out the treatments that were judged futile due to the wishes of physicians in the departments that caused the treatment problems rather than the wishes of the family.

Pediatrician (7): This is a case that would not have been aggressively treated in America, for example. But in Japan there are no such standards, so I carried out treatments as I normally would for other patients.

Internist (9): The reasons I performed treatments judged to be futile were that the patient requested it, and that I had neither the time nor the energy to fight the request.

Nurse (18): The patient's condition was such that it would have been better to stop aggressive treatment, but the patient's feelings were directed only toward chemotherapy. It was awkward to talk to the patient about switching to palliative care, and a decision that should have been made was not. So I ended up performing the futile treatment.

Judgment and definition of medically futile treatment

We asked how participants themselves defined a futile treatment. However, none of the participants had a clear answer, and almost all responded that defining it was difficult. Therefore, we asked an open-ended inquiry about what factors the participants would use for judging futility, and categorized the answers (Table 4). These include both medical science (1 to 4 in the Table) and non-medical science (5 to 9 in the Table) factors. Below are some of the comments provided by participants.

Internist (10): Without improvements in the disease condition, activities of daily life, and prognosis of the patient, treatment should be considered as futile.

Internist (9): I evaluate futility by putting together evidence, examination guidelines, and what I learned from the preceptor.

Nurse (14): Whether the patient or family desires treatment is given top priority as a factor for judging futility.

Nurse (20): The patient's physical condition, test results, as well as QOL are added as factors for judging futility.

Neurosurgeon (2): If there is even the slightest notion of "feeling sorry for the patient," either by the party receiving treatment or giving treatment, it is considered futile.

Intensive care physician (6): When using an expensive drug considered rather ineffective, it's futile.

Emergency physician (4): Cost issues are huge and there is a relative balance. I weigh costs against benefits and decide whether a treatment is futile based on that.

We extracted seven categories of answers in response to the question, "If futility could be defined as a medical guideline, what effects would it bring about?" Six categories indicated positive effects, and one category was negative: (1) It will help in the decision-making process, (2) It will lower the harm and risk caused by treatment, (3) It will reduce the burden on healthcare workers, (4) It will protect healthcare workers from legal issues, (5) It will curb the waste of healthcare resources, (6) It will restrain the commercial aspects of healthcare, and (7) It will give rise to conflict with the patient.

Terminating and foregoing treatments judged as futile

In response to the query of whether a treatment the participant judges as futile should be foregone, 19 of the 20 participants agreed with foregoing treatment, but many of them responded that this was difficult to do in practice. None had experienced any disagreement or opposition with the patient over a treatment judged futile.

Nurse (16): The patient is the one who receives the treatment and its effects. So even if it is a treatment which the healthcare worker judges as futile, it should be continued if the patient desires it.

Pediatrician (11): A treatment which the family and healthcare workers have consented to forego should, of course, be terminated or foregone. But the family's intentions should not be ignored to forego a treatment.

Table 2: Summary of futile treatment cases

Patient disease state (number of patients)	Treatment provided
Debilitated by terminal cancer (8)	Chemotherapy or surgical procedure
Unlikely to survive due to severe postoperative complications (4)	All forms of life-saving treatment
Patients with persistent vegetative state due to suicide or cardiopulmonary resuscitation (3)	All forms of aggressive treatment
Brain-dead patients (3)	All forms of aggressive or life-saving treatment
Unlikely to survive due to multiple organ failure (3)	All forms of aggressive treatment
Neonates unlikely to survive due to severe chromosomal aberration (2)	All forms of aggressive treatment
Alcoholism with hepatic cirrhosis (1)	Repeated treatments for esophageal varices
Unlikely to survive due to severe head injury (1)	Craniotomy procedure
Acute myocardial infarction, unlikely to return to spontaneous circulation (1)	Coronary artery catheterization procedure
Common cold (1)	Antibiotic and intravenous hydration
Infertile patient guessed to be menopausal (1)	Fertility treatment
Repeated aspiration pneumonia combined with severe dementia (1)	Pneumonia treatment
Bedridden with advanced dementia, unable to take orally (1)	Endoscopic gastrostomy
State of shock, terminal stage of brain tumor (1)	Administration of vasopressor agent
Arrhythmia and severe dementia (1)	Pacemaker implantation
Incompetent elderly with cardiac disease with poor quality of life that cannot improve (1)	Cardiac surgery

In addition, there was the opinion that a treatment should not necessarily be foregone if carrying it out is not judged as futile for the family, even if it is judged futile for the patient.

Nurse (17): In the end, I think there is some meaning to not terminating a treatment because it gives the family some time to come to accept the patient's disease condition.

Pediatrician (11): When I listen to what the family says, in the end I feel in my heart that it was not all in vain.

We extracted seven categories of conditions that would make it possible to forego a futile treatment, which had been considered difficult (Table 5). We show some comments on these conditions below.

Nurse (19): It would be good to establish standards and definitions on futility, so that these would lead to the foregoing of futile treatments.

Internist (3): I am fine with foregoing treatment, if the patient/family and physician in charge consent to foregoing a futile treatment, and if we have a third party (an individual such as an ethics expert) judge the situation and he/she is OK with it.

Surgeon (1): Foregoing treatment is impossible without establishing laws.

Discussion

Although all participants in this survey comprised healthcare workers of multiple specialties, all 20 members belonged to only one facility. This is the main limitation of the survey. Our data, therefore, are not representative of the general perceptions and opinions of Japanese healthcare workers as a whole. The data were interpreted very carefully, but our findings may be limited. This survey is preliminary and explorative. In the near future, we will conduct a quantitative and large scale survey of a large number of Japanese people, including laypeople. Through this survey, we plan to examine the attitudes of Japanese people with regard to medical futility.

Our findings shed light on several issues, including the diversity of situations where futile treatments are provided, the diversity of factors used to determine futility, and reasons one might provide treatments judged as futile. Firstly, all participants of this survey presented 33 cases judged as futile. Truog outlined three conditions that stimulate the debate on this theme: persistent vegetative state, execution of cardiopulmonary resuscitation, and organ replacement therapy [12]. The cases experienced by the participants in the present study, however, included other conditions than those set forth by Truog. Treatments judged as futile by participants were provided at multiple treatment departments. Prendergast notes that "a judgment of futility should rest on an existing standard of care" [13]. The problem of medical futility should be evaluated as a combination between patient condition and the intervention provided. Some patient conditions are not physiological or disease-related, and in their judging futility, participants considered non-medical science factors including the lack of motivation for treatment or quality of life.

Secondly, we extracted nine categories from the open-ended inquiry about factors participants would use to determine futility (Table 3). These included categories independent of medical science. Like the oft-quoted definition by Schneiderman et al. [6], determination of medical futility involves two aspects: a quantitative aspect (i.e., the probability that an act will produce the desired physiological effect) and a qualitative aspect (i.e., the probability that the physiological effect will benefit the patient) [3]. It has been argued that futility is judged by including non-medical science factors as well. For example, these non-medical science factors include "value-laden judgment," "near the threshold of, or borderline between, what is considered useless or beneficial," and "physically, psychologically, and economically burdensome" [14]. In a survey of internists and surgeons in the United States, the definition of "futile" was to based on physiological factors, psychological factors, and QOL [15]. In two surveys conducted among ICU healthcare workers, not only medical aspects, but also patient QOL, suffering, and emotional/economic/other burdens were raised as criteria for judging futility [16, 17]. Although the present study did not identify any new categories of judgment factors, we noted that our participants also considered non-medical science factors in their assessments of medical futility. This contrasts with results from a survey of Japanese bioethicists, who claimed that healthcare workers should make futility judgments based on physiological futility alone [5].

Cost is another factor that was brought up, as it comprises not only healthcare expenses, but also includes resources such as healthcare personnel, medications, and medical equipment. These resources differ from the quantitative and qualitative aspects used to determine futility. Assertion of futility and the allocation of healthcare resources are regarded as separate problems, so some have argued that a debate on medical futility should not be used to control costs [1, 2]. However, the debate over futility is one regarding the correctness and propriety of treatments. Healthcare workers may determine that treatments are inappropriate if the benefits are considered disproportionate to the healthcare resources introduced. It is likely that the perspective of cost-benefit balance is one factor that affects judgments of futility.

In Japan, medical futility has not been defined at the social, medical community, or institutional levels. Though all participants of this survey had experienced providing a treatment they considered to be futile, no one was able to clearly define medical futility, and most claimed that this was very difficult. Factors used to determine medical futility are complex, so constructing a definition is also understandably difficult. Earlier debates focused on defining medical futility, but as these did not gain approval from society, negative opinions remain that regard the defining process as a failure [1, 2, 4]. However, the participants in our study anticipated that providing a definition of medical futility would yield almost all positive effects. The categories we obtained from their responses included those regarding the interests of not only healthcare workers, but those of the patient and society as well. Aspects of limiting requests for excessive treatments by patients did not stand out. If a definition can be established that is not disadvantageous to the patient and that leads to a societal consensus, then it may bring about these anticipated positive effects.

Thirdly, one problematic situation related to futile treatments is when patients request treatments that healthcare workers consider to be futile, as this brings up the issue of respect for patient autonomy. Almost all participants were in favour of foregoing treatments judged as futile, but when patients or families request these treatments, healthcare workers tend to be

significantly more psychologically reluctant to turn them down. Some commented that while a treatment may be futile for the individual patient, it may not be futile for the family. This is another important aspect that must be considered in this debate. In Japanese society, the wishes of those associated with the patient, the family, in particular strongly influence the decision-making process, as the patient tends to avoid conflict with those around them [18, 19].

Table 3: Reasons for carrying out treatments judged as futile

1	Request for treatment from the part of the patient
2	No refusal of treatment by the part of the patient
3	Inadequate decision-making process (Patient's inadequate understanding, healthcare worker's inadequate explanation, awkwardness to discuss stopping treatment, time/effort needed to persuade patients)
4	Inadequate relationship between the healthcare worker and patient (No trust or acceptance on the part of the patient, neither side wants to experience unpleasant feelings)
5	Instruction to give treatment from other physicians (senior physician, attending physician, primary care physician)
6	Feeling of guilt toward the patient (due to treatment complications)
7	No standards for judging futility
8	No standards, education, or regulations on foregoing treatments
9	Societal understanding that refusing requests from the part of the patient is not allowed
10	Inadequate ideas and education about perspectives on life and death
11	The facility is a public institution

Table 4: Factors for judging futility

1	Patient's physical condition
2	Objective medical information
3	Treatment effects
4	Treatment risks
5	Preferences of the part of the patient
6	QOL of the patient
7	Psychological burden on the part of the patient
8	Balance between costs and benefits
9	Societal norms

Several other reasons aside from patient request underlie the choice to carry out treatments judged as futile (Table 3). The surveys of ICU healthcare workers cited earlier found various reasons for carrying out such treatments, including fear of legal outcome, lack of communication, and lack of consensus among the treating team, and went on to state that "multiple factors, including social, professional, organizational, and personal issues may influence" this [16, 17]. Our results are similar, and patient request is not the only motivation for executing futile treatments in clinical settings; various situational factors related not only to the healthcare worker but also to the social system or circumstances are also important. It is clear that multiple approaches from perspectives other than that of simply respecting patient autonomy are required to solve this problem.

While almost all participants were in favor of foregoing treatments judged as futile, they admitted that actually foregoing such treatment was difficult and did not adopt a proactive stance towards this. We extracted seven categories of conditions considered necessary in order to forego such treatments (Table 4). There is no definition of medical futility in Japan, and procedures such as the Texas Advance Directives Act do not exist. Furthermore, there are some cases of paper sent to public prosecutor' office after removing ventilators from terminal patients in Japan. Socially, it is difficult to forego life-sustaining treatments, suggesting that the healthcare environment is inadequate with regard to resolving the issue of futile treatments.

Table 5: Conditions that would make it possible to forego futile treatments

1	Acceptance on the part of the patient
2	Definitions and criteria for futile treatment exist
3	Guidelines for foregoing exist
4	Foregoing is legally approved
5	Healthcare workers unanimously agree
6	Judgments of knowledgeable persons exist
7	Ethics committee approves

Qualitative surveys can appropriately explore new perspectives based on personal experiences, and interactions among members in focus group works better to facilitate deliberation and discussion. Therefore we chose to use the survey method to examine this topic, as it has not been debated much in Japan yet. However, the questions were challenging for the survey participants, and it may have been more difficult for them to openly provide information and their honest opinions while in the presence of coworkers. This may have been avoided if individual interviews had been conducted instead. Our results may have varied if we had performed individual interviews, and our arguments and conclusions may have been slightly different from those presented here.

Conclusions

All participants of the present study had experiences in which they provided treatments that they deemed futile, even though they considered the treatments inappropriate. We found that various factors influence how one determines futility, and that these include non-medical science factors. Provision of futile treatment is not always due to respect for patient autonomy, so diverse approaches are required in order to cope with such situations. Our preliminary survey revealed valuable information regarding the large-scale empirical study we plan to carry out in the future. This future study should clarify three factors in detail: important reasons for

providing futile treatment, differences in factors used to judge futility, and differences in attitudes towards such treatments between healthcare workers and the general public.

Author's contribution

YK planned this study, conducted all interviews, and wrote this paper. AA and KI contributed to analysis of the interviews and writing the paper. SB was a supervisor and assisted in planning the study.

Acknowledgements

The authors are grateful to all the participants that gave up their time for our interviews. This research is supported by "A Research Project to Develop Patient-Healthcare Professional Relationship for 'Health Care Thinking Together'," head investigator: Bito Seiji, Basic Research (A) #20249035, Grant-in-Aid for Scientific Research of Japan Society for the Promotion of Science, 2008-2010.

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End-of-Life Ethical Dilemmas and Intensive Care Unit Professionals

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Abstract

Technological development of biomedical sciences has led to a prolongation of life and in some cases, ethical conflicts. The aim of this study was to determine the position of health professionals in intensive care units (ICU) with respect to questions of end-of-ife. Semi-structured questionnaires with objective and subjective questions were applied to Intensive Care Unit professionals. It was found that the ethical issues related to end-of-life are common. Although these professionals recognize the importance of this issue are not held between the professionals, who often do not have adequate facilities for training. These professionals ralated no legal or psychological appropriate support, are against euthanasia and in favor of orthothanasia because they believe the patient should decide about their treatment. Legal and psychological assistance and stimulated discussion among professionals in the ICU should be priority factors for improving care for the terminally ill patients.

Key-words: Bioethics, euthanasia, end-of-life

Introduction

The great scientific and technological development of recent decades has led to a prolongation of life in human beings. The innovations have become so sophisticated that we can stave off death, delay it, postpone it, but we cannot make it go away, which sometimes leads to ethical conflicts, prolonging the process of dying (1).

In the past, the patient died surrounded by his family. Nowadays, death has often become a public, hospital affair, and consequently lonelier and more inhuman (2). In this context, there is an urgent need to humanize dying, so that death is no longer seen as an enemy to be fought, and becomes a part of the process of life (3). A

key point towards properly implementing such care relates to the organization of human resources that are qualified to deal both with patients who are in the process of dying and with their families (4).

The fact is that end-of-life issues are an increasing part of the everyday work of health-care professionals, especially those who are in intensive care units (ICUs). Thus, the complex problems related to health in later life call for further debate as well as more research in our country about the various aspects of terminal patient care (5). Due to the above, the aim of this study is to verify how health professionals in ICUs face the issues related to the end of life.

Methodology

This research is an observational descriptive transversal study. The methodology of the present study was based on the administration of a semi-structured questionnaire, developed specifically for this end. The participants of this study were health-care professionals (physicians, nurses, nurse technicians and physiotherapists) of both sexes who had been working in intensive care units (ICUs) of the Federal District, Brazil, for at least a year. This period was set to be part of professional study that had already experienced situations that could have raised ethical dilemmas. The number of professionals was not pre-determined and those who agreed to participate only once answered the questionnaire

A pilot study was conducted with five professional staff of ICUs in order to suit each of the questions that would be made to research participants. The questionnaire had two parts, with the objective and subjective questions. In the first part the questions sought to characterize the participants with information regarding sex, age, religion and occupation. The second part was composed of objective and subjective questions in order to verify problems and ethical dilemmas.

All participants signed an informed consent form and this study was approved by the Ethics Committee for Human Research of the Foundation for Teaching and Research in Health Sciences (CEP-FEPECS) of the Federal District, Brazil.

Results

We analyzed responses from 55 health professionals, of whom 36 (65.4%) were female and 19 (34.64%) were male. Of the total, 18 (32.7%) were physicians, 16 (29.1%) nurses, 4 (7.2%) physiotherapists and 17 (31.0%) nurse technicians. The average age was 28.8 years, ranging from 20 to 50 years.

Regarding the duration of their practice in health care, 6 (11%) had been in service for less than 5 years, 18 (33%) from 5 to 10 years and 24 (44%) more than 10 years.

Of these, 18 (33%) had less than 5 years in ICU, 18 (33%) between 5 to 10 years and 12 (22%) more than 10 years. Eight (14%) did not report the time of service. Fifty-one participants (93%) had a religion and 04 (7%) had no religion (Table 1).

Physicians and nurses said they face ethical dilemmas related to the end of life, respectively, on a daily basis (17% and 38%), weekly basis (56% and 31%) and other frequencies (28% and 31%).

All the physicians and nurses responded that it is important to have theoretical knowledge on the end of life, but the vast majority reported that they do not have the means to take courses on the subject (96% and 88%). The same professionals said it is important to have discussions about the end of life, but only a small fraction of these (12% and 6%) reported having such discussions. Only 6% of physicians, 12% of nurses and 6% of all professionals say that ethical decisions about the procedures to be adopted are discussed among the staff. The decision in cases where no discussion is held is left to the physicians (Table 2).

The vast majority of the professionals are against euthanasia, but 81% of physicians and 63% of nurses are in favor of orthothanasia and believe that the living will should exist in Brazil (100% and 80%). Regarding the patient's right to decide on their treatment, 77% of doctors, 87% of nurses and 80% of all the professionals said they were favorable. However, 41% of doctors, 69% of nurses and 68% of all professionals said that only God can decide when life ends.

Only 6% of doctors said they had adequate legal support in the face of ethical dilemmas regarding terminal life and 41% reported feeling helplessness and fear of being held accountable for the death of a patient beyond therapeutic means. Approximately half of the nurses (47%) said they thought about end-of-life ethical problems outside the workplace, but only 13% said they had adequate psychological support.

Discussion

Ethical issues relating to the end of life are commonplace among professionals in intensive care units (ICUs). It is essential that questions surrounding the life of the terminally ill in particular be discussed as well as the limits of intervention (6). All the doctors and nurses believe that knowledge about end-of-life issues is important, as well as debate on the subject. However, none of the physicians and only 13% of the nurses reported that they have the means to take courses on this subject and only a small number of professionals said that there is some form of debate (12% and 6%) and that these issues are established within the staff (6% and 12%).

The absence of debate, participation in decision making by nurses and the virtually isolated decision of physicians have also been observed in other studies (7,8). If on the one hand it is necessary that doctors abstain from acting in isolation, sometimes in an authoritarian manner, it is also necessary that other professionals stop having a passive, sometimes comfortable attitude, of evading the extremely important discussions taking place in the environment of an ICU. Although some patients and family members preferred that doctors decide on end-of-life issues (9), it is essential to look beyond traditional hierarchy and control models so as to enable all patients, family members and professionals to be part of decision-making at the end of life (1).

Approximately half of the physicians (41%) and most of the nurses (69%) believe in the sacredness of life, that it is a gift from God and that He alone can decide when it should stop. This factor can be explained by the fact that

Table 1 - Characteristics of health professionals. N: number of individuals and (percentages, %).

	Physicians	Nurses	Physiotherapists	Nurse Technicians	Total
	18 (32.7)	16 (29.1)	04 (07.2)	17 (31.0)	55 (100)
Sex					
Male	12 (66.7)	03 (18.8)	---	04 (23.6)	19 (34.6)
Female	06 (33.3)	13 (81.2)	04 (100)	13 (76.4)	36 (65.4)
Age					
20-30	02 (11.2)	05 (31.3)	---	05 (29.4)	12 (21.8)
31-40	05 (27.7)	07 (43.7)	03 (75.0)	05 (29.4)	20 (36.4)
41-50	03 (16.6)	02 (12.5)	01 (25.0)	04 (23.6)	10 (18.2)
51-60	02 (11.2)	---	---	---	02 (03.6)
Not defined	06 (33.3)	02 (12.5)	---	03 (17.6)	11 (20.0)
Ages of profession					
	01 (05.5)	03 (18.8)	---	02 (11.8)	06 (10.9)
< 5	04 (22.4)	05 (31.2)	02 (50.0)	07 (41.2)	18 (32.7)
5 -10	10 (55.5)	05 (31.2)	02 (50.0)	07 (41.2)	24 (43.7)
> 10	03 (16.6)	03 (18.8)	---	01 (05.8)	07 (12.7)
Not defined					
Years of ICU					
< 5	05 (27.8)	06 (37.5)	01 (25.0)	06 (33.4)	18 (32.1)
5 -10	05 (27.8)	03 (18.7)	02 (50.0)	08 (44.4)	18 (32.1)
> 10	06 (33.3)	03 (18.7)	01 (25.0)	02 (11.1)	12 (21.4)
Not defined	02 (11.1)	04 (25.1)	---	02 (11.1)	08 (14.4)
Religion					
Yes	16 (88.8)	14 (87.5)	04 (100)	17 (100)	51 (92.7)
No	02 (11.2)	02 (12.5)	---	---	04 (07.3)

Table 2 - Responses of physicians (n = 18), nurses (n = 16) and all professionals working in ICUs (n = 55) (%).

	Physicians					Nurses					Total				
	D	PD	NAD	PA	A	D	PD	NAD	PA	A	D	PD	NAD	PA	A
It is important to know about end of life	---	---	---	---	100,0	---	---	---	---	100.0	1.9	---	---	---	98.1
I'm easy to take courses	29.6	64.9	5.5	---	---	37.5	50.0	---	---	12.5	40.8	49.0	4.1	2.0	4.1
It is important to discuss end of life	---	---	---	17.7	82.3	---	---	---	13.3	86.7	5.9	---	1.9	13.8	78.4
End of life is discussed in the ICU	47.1	35.2	5.9	5.9	5.9	31.3	18.8	43.6	---	6.2	42.0	22.0	28.0	2.0	6.0
Ethical issues are decided in team	23.6	52.9	17.7	5.8	---	43.8	37.6	6.2	6.2	6.2	44.9	38.8	10.2	4.1	2.0
Patient has right to decide treatment	---	11.7	11.7	35.4	41.2	---	6.7	6.7	40.0	46.6	1.9	10.1	8.0	38.0	42.0
Only God can decide when life ends	41.2	17.6	---	17.6	23.6	12.5	6.3	12.5	25.0	43.7	20.0	8.0	4.0	22.0	46.0
Living will should exist in Brazil	---	---	---	35.3	64.7	20.0	---	---	26.7	53.3	19.1	4.2	2.1	23.4	51.2
I am in favor euthanasia	53,0	17.6	17.6	5.9	5.9	56.2	6.2	18.7	6.2	12.7	50.9	10.9	14.6	5.4	7.2
I am in favor orthothanasia	12.4	---	6.2	25.0	56.2	12.5	6.2	18.8	12.5	50.0	25.2	4.1	12.5	14.5	43.7
I have appropriate legal support	76.4	---	17.7	---	5.9	40.0	46.6	6.7	6.7	---	59.6	24.5	10.6	4.2	2.1
I think in the ethical question out of ICU	23.5	11.7	23.7	29.4	11.7	13.3	13.3	26.8	33.3	13.3	25.0	16.7	18.7	29.2	10.4
I have adequate psychological support	23.7	11.7	17.6	17.6	29.4	13.3	40.1	33.3	13.3	---	32,6	22,4	24,6	10,2	10.2

ICU: Intensive Care Unit; D: Disagree, PD: Partially disagree; NAD: Not Agree or Disagree, PA: Partially agree; A: Agree.

the vast majority of health professionals profess to have a faith (93%).

The vast majority of the professionals are opposed to euthanasia, is in favor of orthothanasia and believes that the patient has the right to decide about their treatment. All the physicians and 80% of the nurses believe that there should be a living will in Brazil. Like life, a dignified death is also a human right. And a dignified death is understood as a death without pain and anguish and in conformity with the will of the owner of the right to live and to die (10). The decision to stop treatment deemed futile is not always consensual among professionals in the same institution (11). Therefore, a living will could reduce end-of-life ethical dilemmas and allow the patient's decision about his own life (or death) to prevail.

The vast majority of the physicians (76%) and nurses (87%) said they have no legal support and about half of these professionals are afraid of being held responsible for the death of patients even when they are beyond treatment. Death is still viewed by many health professionals as a failure or incompetence, as they were trained to fight it (2). About half the doctors and nurses

feel powerless in the face of a patient without therapeutic chances, and think about end-of-life ethical problems outside the workplace; but 47% of the physicians and only 13% of the nurses said they have adequate psychological support. In this regard, it is worth noting that the care related to the end of life should continue even after the death of the patient and the development of programs to support families and the needs of clinical staff should be considered (12).

The present study found that although they acknowledge the importance of the topic, health-care professionals do not ordinarily hold staff discussions and find it hard to pursue specialized training. Some of these professionals work in fear of being held accountable and have no appropriate legal or psychological support. Although the majority is against euthanasia, they are in favour of orthothanasia and believe that the patient should decide about their treatment and that a living will would be of great help.

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Framing Post- Diagnostic Abortion in Medico Legal Language: Alternative visions in Dialogue

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Abstract

The deployment of prenatal diagnostic techniques (PNDT) raises complex ethical decisions which lie at the intersection of Technology, Law and Society. The paper examines socio-ethical dilemmas posed by a judgment delivered by the Mumbai High Court in 2008, denying a post-diagnostic abortion at twenty-four weeks of pregnancy. It examines the power relations and ideologies that underlie decision-making and contends that the judgment is framed in medical language without addressing moral ambiguities posed by technologies. Discourses dominated by medical language overlook both macro- level structural issues related to health care as well as subjective feelings and affects. The judgement also raises doubts about whether scientific foreknowledge by itself empowers women. Furthermore, in India with poor provision of genetic testing and treatment and lack of institutional support mechanisms, ethics of care needs to take precedence over autonomy and beneficence in resolving the debate. The paper makes a plea for a more dynamic, flexible and contextual decision-making based on ethics of care.

Keywords – Abortion, India, Scientific foreknowledge, Ethics of Care

Introduction

In 1972, with the implementation of the Medical Termination of Pregnancy (MTP) Act of 1971, India joined twenty-five other countries which had enacted legislation decriminalizing abortion and making it legally available. This law guarantees the right of women in India to terminate an unintended pregnancy when registered medical practitioners are of the opinion that "the continuance of the pregnancy would involve a risk to the life of the pregnant woman or is of grave injury to her physical or mental health", or when "there is a substantial risk that if the child were born, it would suffer from such physical or mental abnormalities as to be seriously handicapped" [1]. Indian women, can abort their babies up to twenty weeks in the pregnancy. An exception in the Act allows abortions to be performed beyond the twenty weeks limit in cases of grave health risks or disability detected in the unborn-baby.

Although eugenic considerations form one of the reasons for permitting abortion, it does not figure importantly in state programs. Despite renewed interest in enforcing the Pre-natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act enacted in 1994, two Prenatal Diagnostic Techniques (PNDT) -

amniocentesis and ultrasound - are being used primarily for sex- determination, with the intention of aborting the fetus, if it is female. This is rather unfortunate given the fact that there is a high prevalence of genetic disorders in India. An estimated 495,000 infants with congenital malformations; 390,000 with G6PD deficiency; 21,400 with Down syndrome; 9,000 with beta-thalassaemia; 5,200 with sickle cell disease, and 9,760 with amino acid disorders are born each year. The prevalence of late-onset multi-factorial disorders (including coronary artery disease, hypertension and psychiatric disorders) is greater than in Western countries [2]. But, the Government's response to this problem has been poor. Only 16 genetic diagnosis and counseling units have been set up for pre-natal diagnosis and counseling for major genetic disorders. Standards for Genetic Laboratories and reliability of interpretations are also inadequate. This is amply clear from the fact that only forty out of fifty thousand clinical laboratories in urban settings have obtained accreditation from the National Accreditation Board for Testing and Calibration Laboratories [3]. Given the fact that in general, treatment, diagnostics, management, rehabilitation and care structures for genetic disorders are inadequate in India, lack of legal - medical provision for late- term abortion is likely to cause untold misery to a woman / couple. While globally, the disconnect between diagnosis and treatment/termination, and suffering resulting from foreknowledge has been debated in theoretical circles, very little is actually known in terms of real life situations in countries like India which allow shorter gestational periods for abortions compared to other advance countries. Moreover, not much clarity is available for ethical decision-making on these issues. The case illustrates the ethical dilemmas arising from scientific foreknowledge of fetal anomaly for a couple in the city of Mumbai (India), and shows the inadequacies in the medico-legal framework of resolving such debates. The presentation of the case is based exclusively on extensive media reporting of the event without going into the intricacies of the original documents.

Background of the case

In July 2008, a middle class couple from Mumbai moved the Bombay High Court to enable them to abort their twenty-five week old fetus which had been detected as having a congenital heart condition. The private doctor's opinion in the petition stated that the unborn child's heart had a blockage that would require an expensive permanent pacemaker. The court asked for an opinion on the health of the fetus and future well -being of the unborn child from a panel of doctors at Mumbai's State run hospital. The panel's report stated that there were fair chances that the child would be born incapacitated and handicapped (for survival). A sonogram showed a complete heart blockage with low ventricular rate. The great artery was mal-positioned but the heart was without any other structural damage and was viable for normal life provided there was no other anomaly in the heart. The report observed that only a small percentage of kids exhibit symptoms of the condition and this case would require implantation of a pacemaker , costing less than Rupees One lakh, which could be replaced by an adult pacemaker at a later date. Paradoxically, although the medical report said that there was a "fair chance" the child would suffer abnormalities after birth, leading to severe physical handicaps [4,5] and a very poor quality of life, if it was born, it concluded that medical reasons do not substantively support the finding that doctors will have to resort to termination of pregnancy. Deeming the report of the panel to be contradictory by supporting the contention of the petitioner for abortion as well as opposing it, the court ordered the panel to submit a second report and give a "positive and firm" opinion whether abortion should be allowed owing to a risk to the fetus [6].

The second report revealed a "typographical error" in the first; whereby, the sentence, "The committee is of the opinion that there are very fair *chances* that child will be born incapacitated and handicapped to survive" should have been read as, "The committee is of the opinion that there are very least chances that child will be born incapacitated and handicapped to survive" [7]. Following this, the court ruled against termination of the pregnancy. A few days later, the woman had a miscarriage after suffering acute pain. Her husband said he was relieved and requested the media to leave his wife alone. The doctor with whom she was registered did not know about the miscarriage since the couple took help at a different suburban nursing home. No autopsy was conducted since it was a fetal body and hence, no death certificate was issued [8]. The episode led to much public outcry against the antiquated MTP Act which sets the deadline for abortion at twenty-weeks. The media's attempt to highlight the ambiguity and contradictions in the report added to the public fury. It compelled the Health Minister to constitute a committee to review the laws relating to medical termination of pregnancy. He acknowledged the fact that new technologies can inform parent's decisions differently and that new strides in medical technologies should redefine ethics.

This paper presents the ethical complexities brought about by the case**.** It questions the processes involved in according moral weight to the medical decision and the power relations and ideologies that underlie decision-making. It contends that discourses framed exclusively in medical language fail to address moral ambiguities posed by medical technologies. They overlook macro-level structural issues viz. health care delivery systems, insurance provisos, and disability provisions; as well as subjective feelings and affects. Further, care giving is conceptualized by medical and legal experts within the medical domain alone without understanding how it is socially constructed. The intended objective is to show that grounds of ethical decision- making need to be dynamic, flexible and contextual tempered by the ethics of care and need not be exclusively rooted in medical reasoning alone. The latter, in any case, has been morally ambiguous, generating two sets of medical information-- the first which triggered the need for judicial intervention, and the second which considered the risk as not "real".

The Construction of an "Ethical" Opinion: The Dominance of Medical – Scientific Rationality

As mentioned above, the court sought a second report from the medical panel, seeking a "firm and positive opinion" on the termination of the pregnancy. The decision-making was left to the medical fraternity alone, overriding the couple's autonomy to choose. The court's conduct thus betrays an overwhelming bias towards scientific positivism, and the exclusive dominance of medical rationality in ethical decision-making. It is not known whether the second report which admits of a typographical error was merely a strategy to maintain the supremacy and uncontested power of medicine in judicial decision-making. It is further not possible to gauge the alignment of interests which might have led to admission of a typographical rather than a technical or interpretative error. But it is undoubtedly illustrative of the unreliability and attending confusions that lie in the path of diagnosis confronting most health seekers in India. One may at this juncture ask: how reliable is the enterprise of knowledge generation in medicine? How are meanings negotiated? How is one set of interpretations valued over another? Why is this decision informed by technical and medical morality only? And finally, is not the conjoining of the powers of medicine and law, a deadly combination? There was no attempt made to comment on the cause and nature of medical ambiguity. If the predicted outcomes were different what was the cause? These questions have the potential to empower the patient as a consumer and are crucially linked to their rights. These questions also have the power to decipher and decode the processes underlying the use of technology and the meanings underlying their uses - meanings for both the users and the providers.

Studies in the first world of the efficacy of prenatal diagnostics in general, and the pitfalls and errors in ultrasound - the procedure specific to the case, show error margins to be significant [9,10,11,12]. While no substantial studies of this nature have been conducted in India, it may be assumed that procedural and judgmental errors are more rampant in this country characterized by a largely unregulated and private health care system. That in this case, the error was committed by a reputed metropolitan government hospital raises grave concerns about the nature, quality, and interpretations of medical data in lesser known medical establishments.

Symbolic Meanings or Functional Utility: What do PNDTs suggest?

A prevailing cultural assumption in the West with respect to prenatal diagnosis is that foreknowledge is essentially good [13,14]. Individuals and societies are presumed better-off knowing in advance of its birth, whether a baby is well or impaired. Prenatal diagnosis helps to prepare parents for the birth of a baby with a structural or genetic problem and enables babies who may require specialist care at birth or soon afterwards, to be born in a hospital where right care is available. But, the value of potentially devastating and possibly fatal foreknowledge may both be appreciated and questioned. A study involving forty interviews with parents who had obtained unfavorable antenatal diagnostic knowledge provided an insight into how parents evaluate and deal with unfavorable or ambiguous knowledge. While couples agreed that foreknowledge was essentially good and helped them prepare for complications later on; the lack of specific course of action available for pre-natal fetal abnormalities as opposed to other diseases, the lack of parental choice as opposed to doctors' choice and the interference of foreknowledge with the pleasures of pregnancy led to an ambiguous attitude towards scientific prescience [15]. While it is difficult to generalize from such studies, it is certain that the utility and meanings of medical technology varies in different societies. A study on the perception of ultrasound by women in Botswana found that many women overestimated the diagnostic power of ultrasound and elaborate explanations were required to fully inform the women of the potentials and limitations of prenatal diagnostic techniques. Unlike the West where ultrasound is seen primarily as an affirmation that "everything is right", women, in a society where pregnancy had not completely been medicalized, perceived it as a clinical ritual to detect if anything was wrong [16].

In India, sex-selection has emerged as a primary reason for the deployment of PNDTs, resulting in a major transmutation of meanings. It is estimated that in the late 1990s more than 100,000 sex-selective abortions of female fetuses were being performed annually in India, leading to a skewed sex ratio of 107-121 males per 100 females in 16 of India's 26 states in 1998-99 [17]. Data now reveal that many women in India seek unsafe late-term abortion procedures from untrained providers, having waited for the results of pre-natal sex determination tests. As Johnston points out, sex-selective abortion increases the propensity for unsafe abortion [18].

The meaning of PNDT for users who do not go for sex-selection is not well known. Even less is known about their meanings in clinical practice. Some of the intended uses of PNDTs mentioned earlier (viz. preparing parents for the birth of a baby with structural or genetic problem or enabling babies who will require specialist care at birth to be born in a hospital where the appropriate care is available) are clearly absent, and it is quite possible that utility gets shrouded in mere symbolic value of the technology. As Jordon says, sometimes high technology is adopted because it is equated with progressive medicine and, especially in developing countries, with being modern rather than backward [19].

The absence of requisite data on the meanings of PNDT is accompanied by lack of provision for genetic counseling which can help couples to deal with the foreknowledge, and make informed choices about the risk of congenital disorders and options to ameliorate them. In fact, genetic counseling is a relatively new field even in some advanced countries of the West. The American Board of Medical Genetics began certifying practitioners only in 1981 [20] and there are only about 2000 certified practitioners in the USA today. The absence of such facilities in India compels one to question the very utility of pre-natal diagnostic techniques beyond the gestational age when abortion is legally permitted. Scientific foreknowledge in such cases merely

leads to new forms of suffering, in addition to suffering resulting from birthing a sick child.

The Tyranny of Diagnosis? Denying the Right to Choose

In a developing country with poor post- natal facilities to deal with serious chronic illnesses, the disconnection between testing and the right to treatment/ termination constitutes a Therapeutic lag [21] and a 'Tyranny of diagnosis', as Rosenberg calls it [22]. Research suggests that when a diagnosis of fetal disability is made even when it is quite late, it is natural to expect that couples would exercise a choice to abort the fetus. A study in Germany showed that 90% of all women elect to abort a fetus diagnosed as disabled [23]. While no such data is available for Indian women, it is quite natural to expect women/ couple to make a similar choice. Hence, in this case, denial of abortion would have exerted a coercive power on the woman to continue with the pregnancy. Further, it can be argued that the moral ambiguity posed by contrasting medical interpretations of the data may have created considerable harm and 'mental injury' to the couple involved. Thus, although the MTP Act makes mention of "mental injury" as one of the conditions for performing abortions, the court's denial of the woman / couple's plea has not been considered as leading to the same effect. "Mental injury" has been correlated exclusively with aggressive acts like rape and violence. This rather myopic way of looking at subjective meanings stands in contrast with more liberal judgments in other parts of the world. For instance, in 2001 a court in Australia acquitted a doctor of all wrong doing for aborting a 31-week old fetus which had developed skeletal dysplasia, on the grounds that the mother was suicidal and any other feasible alternative would put her in serious danger to her life and mental health [24].

It needs to be borne in mind that although we are speaking of a woman's right to choose, this right is more imaginary than real once a woman opts for a medicalised pregnancy where her competence to negotiate choices is highly restricted on account of literacy, type of health care structure and information and awareness channels available to respond to patient requirements. In India, the medical model of maternity care does not permit choices; it is also far less comprehensive than in the West. Key aspects of care delivery such as appropriateness, accessibility, effectiveness and efficiency are improperly identified and addressed. Factors such as unavailability of doctors, access to health services and personal life circumstances may render rigorous weekly monitoring of the fetus unfeasible and delay detection of abnormalities critical to decisions regarding termination. The medical model of maternity care in India is also highly fragmented and lacks integration of medical and social care. This is amply illustrated in the way the case unfolded itself with the woman finally suffering from a miscarriage and being attended to at a less known medical establishment where she was not even registered.

Care giving, Disability and the Ethics of Care

Ethical decision-making on pre-natal technologies in the West is primarily framed in the language of reproductive rights-- the autonomy of the woman versus personhood of the fetus. These frameworks guide decision-making in India too. While these issues are undeniably important, they fail to consider important factors pertinent to this case --- quality of life of the disabled, the seriously ill and the caregivers themselves. They also fail to understand the ways in which caring practices are constructed and socially conceptualized in countries like India. As mentioned earlier, care has been conceptualized in this case within the medical domain alone, i.e. the possible need for a pace maker for the infant and the expected costs of such intervention. This is a poor way of understanding care-giving. Needless to say, caring practices are not exhausted by medical technologies, nor are they confined to formal services in institutional settings alone.

Care giving in large parts of the world is as an exhausting and ongoing family responsibility' and caring for children with congenital disabilities takes a toll on the parents' physical and emotional wellbeing. In life threatening disorders family caregivers face tremendous challenges in accepting the presence of death and its integration into everyday life [25].

Care in India is met largely within a domestic context, provision for institutional and community based care being largely negligible. It is all the more important in such settings that potential care givers judge their capacities at different levels--financial, physical, and psychological. Responsible parenting in such a context entails a correct assessment of all the dimensions, particularly the psychological dimension i.e., the capacity to respond realistically to adversity. A realistic assessment would mean adjusting to the idea that no support would be available while parents are working, no day care provisions, no special schools, no transportation benefits and no help in day to day care for the disabled. The debate, thus, inevitably veers away from the rights and autonomy of the woman and personhood of the fetus. Much would depend upon the nature of social – environmental provisions for coping with disability and illness in a particular society.

To understand the full implication of the court judgment denying the right to abort an anomalous fetus, one will have to go beyond the MTP Act to its interconnectedness with the disability provisions existing in the country. India has an outdated Disability Act [26] which hardly goes beyond the concept of physical handicap and impairment. It is based on an individualistic medical model of disability which does poor justice to understanding contemporary social organization which excludes the disabled from the mainstream of social activities, and the barriers within the environment and the social context which preclude their participation. WHO's [27] unified and integrated "bio-psycho-social" approach to disability is hardly implemented in practice, with the result that the potential for normal human life is severely compromised even by the smallest disability. Further, the financial strains are enormous, bearing in mind that less than eleven percent of the Indian population is covered by medical insurance schemes [28].

The medical and legal fraternity has hitherto displayed a poor understanding of the concept of suffering associated with care. Technologies which allow

us to work in the margin of life and death compel us to look at how people are cared for, how care is offered. Gilligan [29], Noddings [30] and Tronto [31] advocate an "ethics of care" centered on "responsiveness in an interconnected network of needs, care, and prevention of harm" challenging the prevalent "justice based" model. The "one size fits all' model of legal reasoning often favored by law needs to be tempered by socio-economic contextual details and offer protection to those most vulnerable to the outcomes of any ethical decision. For the case being discussed, this would entail taking into account the provisions for the disabled in India and the suffering associated with care giving for the immediate and extended family members .

Conclusion

The case shows the need to reconsider the theoretical frameworks for examining issues in pre-natal testing in developing countries. Once a positive fetal diagnosis is obtained, it is common for most women to abort the fetus. In this case lack of medico-legal choices with respect to termination demonstrate the potential of such technologies to create unwanted suffering. This, along with the lack of visionary medical and social support systems to benefit from foreknowledge raises questions on the very utility of these technologies.

Again, in so far as legal procedures help to substantiate medical frameworks, the decisions also prove to be coercive and oppressive. This case further highlights the fact that unresolved ethical issues remain inherent in fairly standard technologies like ultrasound, in an era where more advanced technologies for genetic testing are becoming commonplace even in Indian cities. Hence alternative visions are required to appreciate that with the emergence of new technologies, medical issues must be dealt within the social, cultural and political domain rather than being restricted to medical domain alone. There is further a need for legal and social structures to be flexible enough to keep up with the challenges posed by new technologies. Taking social–cultural factors into cognizance in this particular case means adopting a more grounded approach for understanding the processes and contexts governing the deployment of technologies and the choices open to a woman at each stage in her pregnancy. The considerable uncertainty of medical diagnosis in developing countries pose serious challenges for authentication of clinical results, leading to a situation which is far from empowering for the couple. The failure of the medico-legal paradigm to take a realistic view of the costs and burdens of care giving in locales where disability provisions are meager further exacerbates suffering. Bearing in mind the above points, it appears that the cornerstone of the theoretical framework of bioethics i.e., autonomy and beneficence may not be wholly adequate in contextualizing the ethical debate; particularly in countries like India with poor health care and social welfare systems. These demand a model based on the ethics of care.

Finally, the conclusion of the woman's story indicates a certain irony which can hardly be dismissed by ethicists. In a country where back-alley abortions are freely available, she chose to stay on the right side of the law by seeking judicial redress, exposing in the process critical errors in the functioning of a reputed public hospital. The woman, on suffering a miscarriage was compelled to seek help in a private nursing home, obviously not the one where she was originally registered and had received medical guidance. Does it not throw light, albeit indirectly, on the circumstances which prompt many women to seek less- than competent services in resolving reproductive health issues? At a social level, will this woman's story lead others to question the legal route which she attempted to take, weakening the discourse of "safe motherhood" in government awareness programs? More broadly, what does this portend for those who seek professional assistance in resolving ethical dilemmas in their personal lives?

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Human Evolution – New Finds and New Problems

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As is known, the modern humans, *Homo sapiens* evolved from the *Homo erectus* ancestor in eastern Africa about 200,000 years ago, while this ancestral hominin evolved into the Neanderthal man (*Homo neanderthalensis*) in the Middle East. *H. sapiens* migrated from Africa to the Middle East more than 80,000 years back, and from there they spread out to the rest of the world, and *H. neanderthalensis* disappeared in Europe and southwest Asia about 2500 years back (Verma & Saxena, 2000).

In recent years (2010 onwards) some revolutionary findings about human evolution have come to light, and they have posed new problems. It is these findings and problems which are to be discussed in this review.

African origin of modern humans

That modern humans (*Homo sapiens*) evolved in Africa has been well supported by recent molecular studies. The Y chromosome DNA, other portions of the nuclear DNA, and the mitochondrial DNA have been sequenced in different populations of Africans, and these studies show that "…Africans …(are) the most diverse genetically", and that they have had more time to accumulate mutations than modern humans anywhere else (Gibbons, 2011). The origin of modern humans about 200,000 years back has also been attested by such studies.

Migration to Arabia

Migration of *Homo sapiens* from Africa to Arabia seems unacceptable at the first sight due to inhospitable conditions there. The Arabian peninsula is mostly a desert, with scanty rains, and inhabited by sparse and mostly nomadic human populations. But, as pointed out by Lawler (2011), 125,000 years back the region was not a desert, but a savanna with moisture, having hillocks with rock-shelters. Such shelters were used by northward migrating *Homo sapiens*, under which they rested and made their stone tools. Skulls of modern humans and such tools have been discovered in the Skhul and Qufzeh caves in Arabia, and have been dated as 100,000 to 130,000 years old (Lawler, *loc. cit.*)

These tools have been found to be remarkably similar to those found in east Africa (Armitage et al., 2011), where *H. sapiens* were the only hominins known in that period. Archaelogical sites in the United Arab Emirates are yielding even more evidences of early modern humans migrating from Africa to Arabia (Petroglia, 2011).

The Neanderthal Man

As has been said earlier, while *Homo erectus* evolved into *Homo sapiens* in Africa, they evolved into another hominin species, *Homo neanderthalensis*, the Neanderthal man in the Middle East and Europe. The Neanderthals had several obvious morphological differences from the modern humans (Verma & Saxena, 2007a). *Homo erectus* migrated from Africa to Europe 1.8 million years ago (Gibbons, 2011). Palaeoclimatic changes in Africa, as inferred from study of land and ocean sediments, seem to have influenced human evolution and migration (deMenocal, 2011). Neanderthals evolved in the glacial climatic conditions in the Pleistocene of Europe and South-west Asia. DNA, analyzed from Neanderthal remains from a cave in Croatia, suggests that the remains are about 38,000 years old. Neanderthals are known to have survived in southern Europe and South-west Asia till 28,000 years back, while modern humans appeared in these parts 40,000 years ago. Hence the Neanderthals and the moderns lived together for more than 10,000 years. Then the Neanderthals disappeared; but why and how? It has been generally believed that the disappearance of the Neanderthals was due to they being the losing competitors in the struggle to survive with *Homo sapiens* due to the latter having better thermoregulatory advantage, being anatomically better suited for locomotion in an open environment with the colder steppe conditions appearing (Verma & Saxena, 2007a). It may be said that under changing conditions the modern humans replaced Neanderthals.

Now the replacement concept is being replaced with a newly emerging hybridization and genetic assimilation concept. In May 2010 Neanderthal genome could be fully sequenced from fossils, 38,000 years old, from Croatia. Paabo and his coworkers have noted that 1 to 4% of the nuclear DNA in *Homo sapiens* outside Africa (and not inside Africa) is of Neanderthal origin, clearly indicating that Neanderthals and moderns interbred (Gibbons,

2011). Paabo has opined that the interbreeding occurred before the Neanderthals extended their range in Asia and Europe (Gibbons, *loc. cit.*). It is known that Neanderthals extended their range eastward in South Siberia, almost reaching the border of Mongolia (Verma & Saxena, 2007b). As the Neanderthal contribution in the modern human's genome (outside Africa) is only small, it seems that replacement and genetic assimilation both have led to the extinction of Neanderthals. A recent surprising find has been from the Denisova cave in South Siberia. DNA from a female fossil hominin from this cave, when analyzed, revealed that it was mostly like that of a Neanderthal, but the population there had been long separated from the rest of Neanderthals. This population is now being referred to as "Denisovans". The Melanesian modern humans, in Papua New Guinea and Bougainville Islands, have 4 to 6% DNA of Denisovan origin (Gibbons, 2011). These parts of DNA are not known either in Neanderthals or in modern humans elsewhere. Obvious inference from this situation is that Melanesians have had, in their history, interbreeding with Denisovans (Gibbons, *loc. cit.*).

The species concept, as applied to humans

Among biologists the generally accepted species concept is the Biological Species Concept (BSC) of Dobzhansky and Mayr. The Mayr's concept, expressed in 1957, and repeated in Mayr and Ashlock (1991), is that a species is "a group of interbreeding natural populations that is reproductively isolated from other such groups". Thus according to this concept two groups of populations, belonging to two different species, should not interbreed. The new finds, outlined in the previous section of this review, pose a problem in making out species among humans. The modern humans (*Homo sapiens*) and the Neanderthals (*Homo neanderthalensis*) have been taken as two distinct species. But now, when we know about them having interbred, should we take them as two different species? Denisovans, though genetically divergent, have also interbred with *Homo sapiens*. Will it be correct to take them as another species of hominins, and assign to them a species name?

Anthropologist John Hawks (as cited by Gibbons, 2011) is of the opinion that, since *H. neanderthalensis*, *H.sapiens,* and the Denisovans have interbred among themselves, they may all be taken as one species. But such an extreme view is not necessary. It is important to distinguish between species and speciation. Speciation is a divergent continuum, while a species is a level, chosen by a taxonomist in this continuum, in view of distinctness of morphological and other phenotypic features. The distinctness is taken as an indication of genetic divergence leading to reproductive isolation from related forms. Almost no taxonomist, before describing a new species, performs breeding experiments among similar and related populations to ascertain reproductive isolation. As a consequence some arbitrariness is involved in making out a new species (Verma, 2006). During speciation reproductive isolation gradually develops, and it may so happen that a working taxonomist, keeping in view distinctness of features, makes out and describes a new species, and that the level in speciation, at which the new species is being described, complete reproductive isolation might not have been achieved (Figure 1).

Figure 1: Gradual development of reproductive isolation

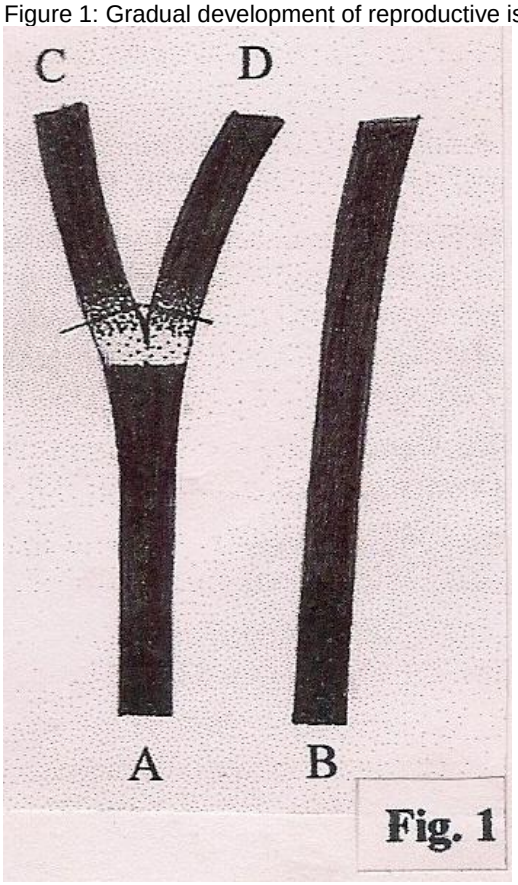


Diagram to illustrate gradual development of reproductive isolation between two lineages leading to the two species 'C' and 'D'. 'B' is a species related to 'A', which has been ancestral to 'C' and 'D'. Solid black is meant to denote reproductive isolation, and dots and their density are indicative of growing reproductive isolation between 'C' and 'D'. The lines, across the lineages, show arbitrarily chosen levels for delimiting 'C' and 'D' (From Verma, 2006).

In such a case there may be interbreeding between related species, even producing viable and fertile hybrids. Often we come across instances of a hybridization zone between ranges of two established species. Gibbons (2011) has cited Jean-Jacques Hublin saying, "There are about 330 closely related species of mammals that interbreed, and at least a third of them can produce fertile hybrids". Efforts are being made to minimize arbitrariness in delimiting species (e.g. Tobias et al., 2010), but for this all the methods, suggested so far, are not suitable for application to human populations. Keeping in view the current taxonomic practices, we should feel justified in regarding *Homo neanderthalensis* and *Homo sapiens* as distinct species, and also in thinking of assigning a species status and a species name to Denisovans.

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The Important Role of Evolutionary Medicine in Asian Bioethics

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Introduction: Principles of Evolutionary Medicine

Over the last two decades evolutionary medicine has been a growing field within medical science. Currently, courses in evolutionary medicine are being taught in North America and Europe. Recently an institute of evolutionary medicine was inaugurated at The University of Zurich Switzerland. Evolutionary medicine is increasingly being taken seriously in medical faculties which are recognising the importance of evolutionary principles in understanding human health and disease. According to the famous biologist Ernst Mayr (1982), "No biological problem is solved until both the proximate and the evolutionary causation has been elucidated. Furthermore, the study of evolutionary causes is as legitimate a part of biology as is the study of the usually physicochemical proximate causes."

Evolutionary principles to human health combine historical, biological, psychological and environmental factors in understanding human susceptibilities to pathogens, genetic disease and senescence among others. In their seminal book called *Why Do We Get Sick: The New Science of Darwinian Medicine* (1994) George C. Williams and Randolph Nesse discuss evolutionary principles of human illness. Their famous book explains how natural selection and mutation have informed the human body by a system of tradeoffs. "Organisms are, instead, bundles of compromises shaped by natural selection to maximize reproduction, not health. They are thus full of unavoidable tradeoffs and constraints" (Stearns *et al* 2010). This system of tradeoffs has virtually influenced the shape and function of every part of the human body. For example, according to evolutionary theory, the human body evolved its bi-pedal ability by narrowing the pelvis and birth canal which consequently made childbirth increasingly difficult to the point which necessitated external assistance. The narrowing of the birth canal also made human babies to be born in an altricial state which meant a long period of maturation. Other features such as wisdom teeth, vulnerable shoulder joints, genes that contribute to various mental diseases, coughing, and hernias originate from our unique evolutionary history. Other anatomical anomalies such as lower back and small digestive tract can be explained using evolutionary principles.

Two important ideas have been promulgated by evolutionary medicine. The first of these is to rethink about the human body from a machine to a complex evolutionary organism. Since the Renaissance period, the human body has been consistently viewed as a machine. Technological and scientific developments in physics and medicine increasingly favoured this depiction of the human body. Moreover, the entrenchment of mechanistic and materialistic frameworks in the West also informed the 'body as machine' metaphor. A reassessment of the human body locates it as an evolutionary organism, as earlier stated, that has its origin in early evolutionary history, and is phylogenetically linked with other animal species. Indeed, from both genetic and cellular levels, human evolutionary development can be traced back to the earliest period of protozoan life over 2.5 billion years ago. Early human foetal development exemplifies its long evolutionary history.

A second important idea of evolutionary medicine contends that extant humans are caught in an evolutionary 'mismatch' between their genome and modern day environments. In other words, the human genome has not had sufficient time to evolve to modern, fast changing environments, thereby causing a discordance between biology and lifestyle (Travathan 2007). Stearns et al (2007) point out that "because biological evolution is much slower than cultural change, much disease arises from the mismatch of our bodies to modern environments". A case in point is the rise of obesity in many parts of the world which is contributed to changing eating and lifestyle habits. While ancestral humans had a diet consisting of a high protein, low carbohydrate diet consisting of mainly plant foods, wild meat and fish, the current 'western' diet is high in simple carbohydrates, sodium, sugar and saturated fats (Ungar *et al* 2006; Lee-Thorpe *et al* 2003; Danforth 1999). The ancestral diet was low caloric while the modern diet is high caloric. Many theorists contend that this fundamental change in diet as being a root cause for 'diseases of civilisation' (i.e. hypertension, obesity, stroke, cardiovascular disease, cancer). In addition, the ancestral diet did not comprise dairy foods or grains which can contribute to increasing insulin levels. Human ancestors expended large amounts of energy foraging for food. On average, they walked 20-25 kilometres per day in food acquisition. This is in stark contrast to modern humans in developed societies who engage in limited amounts of physical activity or sedentary lifestyles due to dependence on technology. As Saniotis (2010) points out, "In industrialised societies physical exertion has been

limited due to technological labour saving devices and diminished recreational pursuits. On this note, current levels of physical exertion by industrialised people is much lower than what the human genome was evolved for".

Gualdi-Russo *et al* (2001:97) note that over-nutrition is a major culprit for diseases of civilisation. The irony here is that while developed societies may suffer from over-nutrition, the modern diet is nutritionally poorer than the ancestral diet. A major reason for this is modern human dependence on a limited variety of foods such as wheat, dairy and rice. In contrast, hunter-gatherer diets consist of hundreds of food types which are seasonal. The recent introduction of dairy livestock in Europe around 8,000 years ago is a relevant example. Those people who possessed dairy livestock and were lactose tolerant had more children which survived to reproductive age, thereby increasing the gene for lactose tolerance in the population (Owen 2007). This process is apparent in DNA from northern European countries whose populations have high lactose tolerance. However, even in these populations there are still a small percentage of adults who are lactose intolerance. In other words, natural selection has not had sufficient time to confer lactose tolerance to all individuals in these populations.

'Diseases of Civilisation' in Asian Societies

During the last thirty years many Asian countries have undergone rapid social change which has also contributed to a change in dietary and lifestyle habits (Florentino 2002; Levine *et al* 2002). Consequently, obesity has seen an exponential rise in transition Asian countries which effect younger generations and middle classes (Levine *et al* 2002). This concurs with Tee (2002:S694) who states that Asian countries have witnessed "rapid advances in socioeconomic status." Individuals from middle classes have been especially prone to obesity due to increasing income to spend on non-essential items such as fast foods. Increases in the consumption of fat have been evident in most Asian countries (Tee 2002:S694). Research indicates that obesity, type 2 diabetes and cardiovascular disease are increasing in many Asian countries. For example, national nutrition surveys from 1982 to 1992 in China showed an increase in obesity "in young adults increased from 9.7% to 14.9% in urban areas and 6.2% to 8.4% in rural areas" (Tee 2002:S698). In Japan, a National Nutrition Survey taken in 2000 indicates male overweight increase by 24.5% and obesity 2.3%, and female overweight 17.8% and obesity 3.4%, with a prevalence towards male overweight and obesity (Tee 2002:S698). In Thailand, a 1995 National Survey revealed a mean average increase of 26.1% for overweight men and women, with a prevalence towards overweight for women in all age groups (Tee 2002:S698). As in the Chinese populations, urban dwellers had higher overweight and obese levels than rural dwellers (Tee 2002:S698; The Fourth National Nutrition Survey of Thailand, 1995). The prevalence in overweight and obesity in many Asian populations are associated with increases in diet related chronic diseases (Tee 2002:S698). Obesity precipitates levels of type 2 diabetes, hypertension and cardio-vascular disease. Diabetes prevalence China and India has reached over 100 million with many untreated and undiagnosed people (Chan 2008:903; Chuang *et al* 1998). Prevalence in type 2 diabetes in Asian countries has "increased between 2-fold to 5-fold" in the last twenty years whereas in western countries type 2 diabetes prevalence has increased 1.5 fold (Chan 2008:903). Asian individuals tend to accumulate more body fat than Caucasian individuals "and to develop cardiovascular risk factors at considerably lower threshold values of these anthropometric indexes" (Chan 2008:903. See also Alberti *et al* 2005; Huxley *et al* 2008). In this case, Asian Indians may suffer a double burden due to genetic predisposition to obesity triggered type 2 diabetes (Zimmet 1999; Ramachandran *et al* 2002). The high risk of type 2 diabetes prevalence in Asian populations may also be contributed to metabolic syndrome (between 10%-25% of Asians), and which is a significant predictor of type 2 diabetes and cardiovascular disease (Chan 2008; Cheung *et al* 2007).

Implications of Evolutionary Medicine in Asian Bioethics

Any relationship between evolutionary medicine and Asian bioethics should take into account the social history of Asian societies. The rich food production of China and India, for example, is juxtaposed to famines and deprivation in the past. China had been plagued by regular famines right up into the twentieth century which caused the death of millions. In India, the Bengali famine during 1943 took the lives of approximately 3 million. India still has endemic poverty in many urban areas. The introduction of 'western' foods may have been favoured by poorer people because of their high caloric intake. On the other hand, obesity in Asian countries may not have the same kinds of stigma as is evident in western countries. Studies in social stigma research indicate that stigma is a powerful deterrent in controlling human behaviour. It should be remembered that up until a few generations ago being overweight in many European countries was not disfavoured but was considered as a symbol of high social status. Traditional Greek society even had a Saint Fat, indicative of how corpulence was favoured as a sign of health.

Whether Asians perceive being overweight as a sign of health is difficult to measure as research needs to be done in this area. I would argue that the issue of overweight and obesity is complex and needs to take into account the rich ethnic makeup of Asian societies. From an evolutionary viewpoint, Asians' increasing consumption habits may indicate a concern to increase fitness. Burry (1999) points out that: "Exercising personal responsibility involves a minimum social, economic, political and educational understanding if the socially disadvantaged are to afford and to choose those foods necessary to maintain an optimum weight".

Asia possesses a number of moral and religious ideologies which have shaped many Asian societies for thousands of years. For example, Confucianist and Buddhist doctrines in East Asia emphasize moderation in behaviour which includes dietary habits. The advent of Communism during the twentieth century in China with its onus on collective and communal sharing may have further encouraged moderation. The introduction of

global capitalism and its emphasis on individual consumption and its tie to high social status and prestige has probably led to the dissolution of previous ideologies favouring moderation. From an evolutionary viewpoint Asians' immersion in globalisation may be interpreted as a means of increasing fitness, since high social status often enables an individual greater access to economic and social resources. At the same time, globalisation has led to increasing social disparity and inequity in many Asian societies which hinder individual fitness among poorer classes, such as limited access to health care due to privatisation of hospitals, burgeoning food prices, and poor housing and education.

While the new discipline of evolutionary psychology explains extant human behaviours in relation to ancestral habits and lifestyles, it does also point to the importance of ethical systems in informing "deep seated evolutionary programs" (Whitehouse 2003). For example, Asian dietary habits have been located within ethical systems for thousands of years. One may think of the complex dietary prerogatives in Indian caste system or the Confucianist doctrine emphasising moderation in eating and drinking, as well as, feeding the common people in order to promote harmonious relations. Given the high moral content of Hinduism, Confucianism, Buddhism, Islam and Shinto which have been rooted in Asia one may ask to what extent such religious codes may in the future represent a corrective evolutionary bulwark against rapacious consumerism?

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