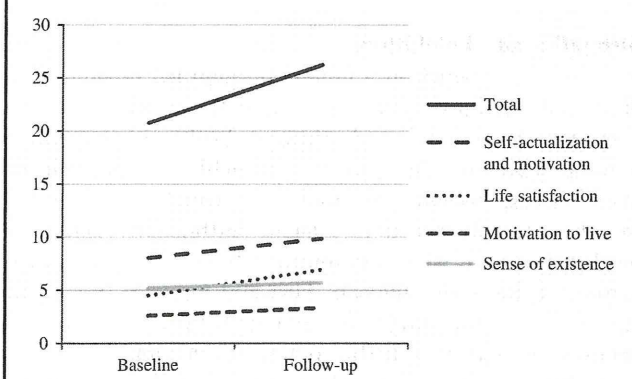
TABLE 3

Characteristics of the Participants in the Hamarassen Farm Group in Whom Purpose in Life Was Evaluated by Use of the K-I Scale

	Baseline	Follow-Up	Difference	*P* value
Number of participants, n	21	–	–	–
Age, y, mean (SE)	65.7 (12.2)	–	–	–
Women, n (%)	17 (81)	–	–	–
Residential temporary housing complex, n (%)				
Complex Y	5 (23.8)	–	–	–
Complex S	9 (42.9)	–	–	–
Complex O	7 (33.3)	–	–	–
Purpose in life score (range), mean (SE)				
Total (0–32)	20.5 (9.0)	24.9 (6.4)	4.3 (6.4)	0.005
Self-actualization and motivation (0–12)	8.1 (3.4)	9.5 (2.0)	2.0 (2.6)	0.002
Life satisfaction (0–10)	4.8 (3.5)	6.8 (3.1)	1.5 (2.6)	0.02
Motivation to live (0–4)	3.0 (1.4)	3.6 (1.0)	0.6 (1.1)	0.03
Sense of existence (0–6)	4.6 (1.9)	5.0 (1.5)	0.4 (1.3)	0.20

FIGURE 2

Estimated Changes in Purpose-in-Life Scores Among Hamarassen Participants.



Adjustments were made for age, sex, and residential temporary housing complex.

TABLE 4

Changes in Purpose-in-Life Score Among Hamarassen Participants: Results of the Generalized Estimating Equation Model[a]

	Score Change	95% Confidence Intervals		*P* value
Total Score				
Time (follow-up vs. baseline)	5.46	2.42	8.51	0.0004
Age	0.04	–0.18	0.26	0.72
Sex (women vs. men)	5.94	2.82	9.06	0.0002
Self-Actualization and Motivation				
Time (follow-up vs. baseline)	1.81	0.54	3.08	0.01
Age	–0.02	–0.08	0.04	0.59
Sex (women vs. men)	1.74	0.44	3.03	0.01
Life Satisfaction				
Time (follow-up vs. baseline)	2.42	1.16	3.68	0.0002
Age	0.02	–0.09	0.14	0.68
Sex (women vs. men)	2.20	0.73	3.68	0.003
Motivation to Live				
Time (follow-up vs. baseline)	0.73	0.18	1.28	0.01
Age	0.00	–0.03	0.03	0.94
Sex (women vs. men)	0.83	0.22	1.45	0.01
Sense of Existence				
Time (follow-up vs. baseline)	0.51	–0.16	1.17	0.14
Age	0.02	–0.02	0.07	0.31
Sex (women vs. men)	0.65	–0.05	1.36	0.07

[a]Fixed effects of residential temporary housing complex (3 complexes) were adjusted for.

DISCUSSION

The results of this study showed a remarkable improvement in the participants' mental and physical health in terms of the sense of having a purpose in life and BMD. The increased sense of purpose in life among Hamarassen participants points to the development of new interpersonal networks and continuous communications among the participants. It appears that collective activities were beneficial to the participants' health beyond simply the opportunity for physical exercise through farming. An increased social network and community social capital operates as a resource that allows mutual instrumental, emotional, and informational social support among the group members.[12-18] In other disaster settings, Haines and colleagues reported that after Hurricane Andrew, interpersonal network density and local bonds were key determinants of the provision of post-disaster support.[8] Aldrich analyzed data of recent disasters including the 1995 Hanshin-Awaji (Kobe) earthquake in Japan and Hurricane Katrina in New Orleans, Louisiana. He found evidence that recovery was faster in the community where social capital was rich.[9] Moreover, Kage discussed that the rapid post-war

TABLE 5

Comments From Hamarassen Participants in November 2012

Participants communicated with each other. I saw more smiley faces. We helped each other to grow vegetables. My health condition got better. Local residents lent us farming tools and equipment, shared seeds and seedlings with us, and gave us advice on farming. I would like to make more friends.
I may have been in shock from the earthquake; I could not get used to this new environment and tended to stay home all the time, which caused pain in my knees and arms. Now, I enjoy weeding and watering.
After I joined the project, I got to know many people and started chatting and laughing with them. Now I remember them by name. We talk more and more and I now enjoy life every day. I even look forward to meals every day.
I leased farmland and did farming on my own before, but now I enjoy farming together with many people.
Every time I go to the farmland, I see someone. I look forward to seeing our vegetables grow. Even the course for my dog walk has changed. My husband used to take a walk purposelessly, but now he does it with a purpose (that is, dropping by the farmland to see people). I can eat the vegetables we grow and share them with other residents. I enjoy getting to know people in my housing complex.
I look forward to seeing our vegetables grow every day.
Before the project, I did greet other residents in the complex but did not know them well. Now, I got to know the participants well and talk more with them. I think the farmland provides us with a place and opportunity to interact with others. We now have more topics in common, and I can't wait to go to the farmland.
Even those who did not join the project come to see our farmland. The farmland plays a role in connecting us.
I used to live my life purposelessly, but now I have a purpose.
Since I joined the project, I talk to neighbors with whom I did not talk much before.
I feel joy in growing and eating vegetables together with my children. I get to hang out with neighbors more.

recovery of Japanese society can be explained by the strong growth of civic engagement in both communities and society.[10] It has also been pointed out that poor social capital is related to functional disability and mortality.[19,20] A lack of communication with others has been reported as increasing the development of dementia.[21] Because the work in this study was carried out on fallow farmland located outside the complexes, many residents were obliged to go beyond their complex to undertake the farming activities, and in the process they communicated with local people, which led to the development of bridging social capital.[22]

Before the earthquake, the area around Rikuzentakata had large numbers of locals who were engaged in farm work. However, approximately half of the Hamarassen participants lacked prior experience with farm work, which suggests that their primary intention in taking part was to have the opportunity for socialization rather than physical activity. This observation was reflected in the respondents' comments in the questionnaire survey (Table 5).

Among the four components of the purpose-in-life scale used in this study, improvements were observed in self-actualization, satisfaction with life, and motivation to live. This finding supports the notion that farm work and communication among the participants changed their state of mind from emptiness to fulfillment. Nevertheless, no evidence was obtained for a large improvement in the participants' sense of existence. An individual's sense of existence is a fundamental component, and enhancing this sense may require more intensive interventions or perhaps the large-scale recovery of the entire community.

An improvement in the participants' BMD was also observed. A meta-analysis has demonstrated a significant positive effect of exercise on BMD,[23] and it has also been determined that farm work is correlated with BMD in elderly Japanese women.[24] The BMD of postmenopausal women is reportedly related more to high-intensity loads applied to bone rather than to muscle.[25]

Strengths and Limitations

This study was based on a unique hospital-led program in a disaster-affected area in which farm work was introduced to maintain the mental and physical health of temporary housing residents. The program is highly generalizable to many places, because this study was based on a real-life situation after the Great East Japan Earthquake. Caution is needed, however, when interpreting these results as an evaluation of the health impacts. First and foremost, the participants were not randomly separated into 3 groups for comparison, and there is thus potential selection bias. However, this issue was partly addressed by adjusting for differences in multiple baseline characteristics. Second, because the sample size was small, there is the possibility of type II error. Although the Hamarassen participants had a wide age range and the effect of the activity on physical and mental health might vary across ages, given the limited sample size, the differential effects by age could not be evaluated. Third, information about the purpose in life at baseline was based on the respondents' recollection of the time when they first participated in the program. Thus, there is also the possibility of recall bias. Moreover, the participants in our evaluation of BMD changes were women only. Evaluation of male participants will be necessary in the future.

CONCLUSIONS

Most similar voluntary activities, such as setting up flower gardens and small farms near temporary housing areas, have been very small or unsustainable owing to the failure of the self-management scheme. The Hamarassen Farm project is

thus an exception, being maintained as a large-scale operation. Its success may be attributable to the involvement of a local hospital and its maintenance by the hospital staff as a primary prevention activity as part of its preventive medical practices.[26] The indirect involvement of familiar hospital workers, rather than complete strangers, may help to remove doubts on the part of residents regarding participation.

The Hamarassen Farm project faced 2 challenges. One is that the number of male participants was limited. This has been observed in other intervention programs promoting social participation.[27] After the Hanshin-Awaji (Kobe) earthquake in 1995, Okamoto et al found in their study at temporary housing for victims that social connections could be developed in the community relatively easily among women but not among men, because social connections among men were mostly based not in the community but at the work place.[28] Okamoto et al also found that men's participation in social gatherings in the community was only 50% of women's. Empirical studies and narrative observations have identified that unlike women men usually require specific roles in the group or other reasons to be a part of group activities.[29] Although Hamarassen Farm did not have a particular gender-oriented strategy to promote men's participation, one approach to increasing male participation emerged from the experience. In the case of participating married couples, the husbands sometimes visited their wives' farmlands during their walks, which could lead to a spillover effect on the husbands. A second challenge was the closed nature of the Hamarassen Farm: the members of the farm became basically fixed, and there was subsequently little chance for new participants to join. This has become a barrier to the project's efforts to increase the total number of participants and their diversity.[30] Recently, community health-promotion activities have been recommended for medical professionals in addition to public health practitioners.[31] Although the limitations mentioned above require further study, health-promotion interventions such as the Hamarassen project, which aim to strengthen social networks and community social capital, may be effective in preventing disuse syndrome among adult disaster victims. With the rapidly aging populations in many countries, similar approaches may be adopted in non-disaster settings as a possible option for the health-promotion activities of medical institutions.[32]

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社会の中の神経学 NS-08：大規模災害後の神経疾患と神経内科医の果たす役割

5月22日（金） 8：00～10：00 第3会場（朱鷺メッセ 2階 201） 公募

座長：
寺山靖夫（岩手医科大学内科学講座 神経内科・老年科分野）

古川勝敏（東北大学加齢医学研究所 老年医学分野）

多くの戦後生まれの日本国民にとって東日本大震災が与えたインパクトは，これまで経験した災害の中でおそらく最大のものであっただろう．とは言え，本震災から丸4年が経過し，被災地以外ではその忘却と風化が既に始まっている感は拭えない．我々神経疾患に携わる医療者の立場から見ると，震災後多くの神経疾患（認知症，脳血管障害，てんかん等）において，発症率の増加や症状の増悪が報告されており（Furukawa et al. *Lancet* 2011, Furukawa et al. *J. Neurol* 2012, Ishiki et al. *Geriatr Gerontol Int* 2014, Omama et al. *Stroke* 2014, Shibahara et al. *Epilepsia* 2013），神経内科医，脳外科医，老年内科医達が震災後，疾患の発症&増悪予防，治療，ケアに最大限の尽力を続けてきた．本シンポジウムでは，上記の論文の筆頭著者達が幸運にも全員集うことができ，震災後のこれらの疾患の詳細な調査について一つの場で発表し，議論することが可能となった．発表者達は皆，震災時から今日に至るまで岩手県または宮城県で医療に従事してきた医師であり，この間ずっと被災地の現場で実際に医療活動に携わってきている．発表者達が経験した医療についての情報，収集したデータは，将来起こりうる災害時の医療や保健事業においてこの上なく貴重なものであり，これらを未来に残し伝えていくことは，我々の使命であろう．今回は，石木愛子先生には，気仙沼市における仮設住宅に居住する高齢者の認知症について，大間々真一先生には，岩手地域脳卒中登録データを基にした脳血管障害の発症状況とそれらへの対応について，柴原一陽先生には，気仙沼市立病院におけるてんかんの発症の増加ついて，座長もお願いしている寺山靖夫先生には，岩手県における被災者の健康状態と医療活動について総括的な御発表をしていただくことにしている．全ての先生方とは，各疾患のみではなく，被災者（特に高齢者）の神経疾患以外の健康状態，Activity of daily living（ADL），Quality of life（QOL）などについてもディスカッションを行う予定である．

本シンポジウムでは，「社会の中の神経学～神経内科の社会貢献を考える～」というテーマを鑑み，東日本大震災後の神経疾患の発症の状況，症状の変化などについての情報を共有し，神経内科医，脳外科医，老年内科医達が震災後何をしてきたか，また今後予想される災害に対して何を準備していくべきかを多くの医療従事者達と議論したい．

NS-08-1
東日本大震災後の認知症患者の状況

東北大学加齢医学研究所老年医学分野
○石木愛子，冨田尚希，宇根かおり，冲永壮司，古川勝敏，荒井啓行

2011年の東日本大震災後，被災地では長引く避難生活，公共交通機関や道路などのインフラの未整備，居住コミュニティの分断といった問題から，居住者のアクティビティの低下，そして生活習慣病の増悪，運動機能や認知機能の低下といった健康被害が報じられている．震災以前より高齢化率が高かった被災地域は，超高齢社会と壊滅的な津波被災の両者を抱えており，震災以前から問題となっていた要介護者の増加は震災後さらに加速した．これらの問題は被災地域で大きく取り上げられているが，高齢化が進む日本全国で共通の問題とも言える．我々は宮城県気仙沼市において，仮設住宅に居住する高齢被災者を対象に前向きコホート研究を行っており，認知機能低下者の割合が日本の他地域に比し高率であることを報告している．現在被災地では徐々に応急仮設住宅から災害公営住宅への転居が開始されているが，応急仮設住宅で構築されたコミュニティの分断，住み慣れない高層住宅での生活等により，再びアクティビティの低下や引きこもり，うつなどが生じ，フレイル・サルコペニアの進行，認知機能の低下，そして要介護者の増加や介護度の上昇がもたらされるのではないかと危惧されている．我々の気仙沼市での調査を含め，被災地における認知症の現状および取り組みについて紹介する．

《略歴》
2009年弘前大学医学部医学科卒業後，岩手県立中央病院で初期研修を行う．初期研修を修了する2011年3月に東日本大震災が起き，その後2年間被災地である岩手県陸前高田市の岩手県立高田病院に内科医として勤務．2013年4月より東北大学大学院医学系研究科に進学，東北大学加齢医学研究所脳科学研究部門老年医学分野に所属し，高齢者医療の研究に携わっている．