ABSTRACT: In the improvement of avalanche safety countermeasures and avalanche education, it is crucial to understand the characteristics of the participants. Also, it is important to comprehend the degree to which general users of mountains experience close call which are not normally counted as accidents. Here, from the data of the Avalanche Education Seminar’s “Avalanche Night” that the Japan Avalanche Network (hereafter, JAN) held, we will report on the attributes of participants and the trends in the experience of avalanches. The number of participants are about 4,000. The ratio of male to female participants was 7 to 3. The age composition peaked in the latter half of the 30 year-old range, was centered on the 30s and 40s, and was the same as the age composition of those who have died from avalanches in Japan. About 80% of the participants were backcountry skiers or snowboarders, while mountain climbers who only walk accounted for less than 20%. The longer a person's backcountry experience, the more the experience of being caught up in an avalanche increased, and about 20% of people had ultimately encountered an avalanche. Also, the number of years from the first experience of an unsafe incident in the backcountry increased rapidly in the period of the 4th to 6th years, and a change in behavior of the participants in the field has been suggested.

KEYWORDS: avalanche education, avalanche incidents, backcountry users

1. INTRODUCTION

Japan Avalanche Network (hereafter referred to as JAN) offers a variety avalanche educational programs, including certification course for professionals such as mountain guides and snow training sessions for amateurs.

Another important task at JAN, as it is currently responsible for updating avalanche information on three mountain ranges, is to raise awareness toward proper use of these information through safety seminars.

"Avalanche Night", used in this particular data analysis, is a 2-hour free avalanche safety awareness seminar which is designed for people with less experience in backcountry. The first half of the seminar is spent on the teaching of basic knowledge related to avalanche, while the second half is a comprehensive talk on real incidents and investigation results in the past. Recently, the problem of "Side Country" has also begun to be discussed.

2. DATA

A questionnaire survey was conducted among participants of “Avalanche Night”. During the past 5 years (2012 ~ 2016), it has been held for 49 times in 19 cities across the country, with approximately 7,000 participants in total. Out of these participants, survey results were received from 5,888 people. However, to eliminate repetition, only the results from 4,007 first-time participants were used in this analysis. Unless indicated otherwise, the followings are the data of these selected participants.

2.1 Basic Attribute

Survey subjects were 72.3% male and 27.7% female. People aged between late 20s and 40s constituted 80.0% of all subjects, with 59.2% in their 30s or early 40s (Figure.1). The youngest subject was 10 years old, while the eldest was 80 years old.
Avalanche death toll in Japan over the past 25 years (1991-2015) is made up by 85% male and 15% female, with 50% in their 30s or 40s at the time of death. Hence, the ratio of women among seminar participants is higher than that among avalanche victims. Similarly, the average age of seminar participants is also slightly lower than those killed in an avalanche.

Participants who use some sort of riding gear, whether in skiing, snowboarding, or telemark skiing, constituted 81.5% of all surveyed. Mountain climbers without any riding gear made up the other 18.5% (Figure 2). In Figure 2, "SST" represents people who enjoy all 3 or any 2 out of skiing, snowboarding, and telemark skiing. "R+CL" represents people who enjoy both skiing/riding activities and winter mountain climbing.

In Japan, there is a profound history and culture of mountain climbers who like to challenge deep snow in their route. As a consequence, during the past 25 years (1991-2015), winter mountain climbers without any riding gear made up 44% of all avalanche-related deaths. However, despite such alarming figure, this type of climber is still a rare sight at "Avalanche Night".

Participants with 6 years or less experience in backcountry constitute 46.2% of all survey subjects. On the other hand, people with no backcountry experience or are considering entering backcountry for the first time totaled at 16.5% (Figure 3).

This indicates that the majority of participants are indeed people with less experience, meaning that "Avalanche Night", purposed to raise basic safety awareness, is reaching its intended audience. The results also show a considerate amount of experienced backcountry users during the second half of the seminar, where reports of past incidents are given.

In terms of average days spent on the snow in past seasons, 70.1% of participants answered 20 days or less, including 43.6% who answered 10 days or less (Figure 4).
The best period for snow activities in Japan is between mid-January and late-March, where the amount and condition of snow are both at their peak. Consequently, travelling to the mountains during weekends of such peak season would normally require 20 days.

2.2 Avalanche experience

Participants who had near miss were 33.9%, while 8.0% were actually caught in an avalanche. Moreover, 25.4% of participants know of someone who has been in an avalanche.

The ratio of different activities undertaken by participants at time of avalanche is showed in Figure 5. The number for mountain climbing is generally lower than skiing/riding activities. In terms of total average for skiing, snowboarding, and telemark skiing, those answered “Caught” are 6.9%, “Near Miss” 37.6%, “Partly Buried” 5.3%, and “Completely Buried” 0.9%.

![Fig. 5: Avalanche experience ratio of activities](image)

Note that “Caught” means people who were swept away but not buried by an avalanche; people who were partly or completely buried are excluded from this category.

Next, people who have previously experienced avalanche are divided according to their years of experience in backcountry in Figure 6. Results showed a steady increase in the ratio of people who have been caught in or buried by an avalanche among those with more experience in the backcountry. Also, the number of people with “Near Miss” avalanche experience rise sharply among participants in the 4 ~ 6 years backcountry experience category.

![Fig. 6: Backcountry and avalanche experience](image)

In order to understand the background for such a rapid increase, the year that a subject first experienced avalanche is compared against his/her total years of experience in the backcountry.

It is revealed that the ratio of people who have had a “Near Miss” avalanche experience in their third year is the highest among subjects with 4 to 8 years of backcountry experience. Furthermore, regardless of the level of backcountry experience, all subjects had their first “Near Miss” avalanche experience after spending at least a few years in the backcountry.

![Tbl. 1: Backcountry experience and near miss](image)

Note that “BC3” represents survey subjects who had spent 2 seasons in backcountry, while “NM3” indicates first “Near Miss” avalanche experience during the third year in backcountry.

3. DISCUSSION

Avalanche fatality in Japan is extremely low among beginners with only a few years of backcountry experience. However, the data shows an alarming number of these beginners with “Near Miss” avalanche experience. The fact that out of
all seminar participants who had been caught in an avalanche (319 people), 83.1% also had a “Near Miss” avalanche experience is quite disconcerting.

It is difficult to discern the nature and danger of these so-called “Near Miss” experiences due to limitations of this survey and a lack of judgement from subjects with less backcountry experience.

In addition, recollection of first “Near Miss” avalanche experience is quite ambiguous among subjects who had spent more years in the backcountry, hence the accuracy of their answer could be compromised to some degree. However, it should also be noted that, after overcoming initial risks during the first few years in backcountry, the ratio of “Near Miss” experience still shows slight growth several years later. This is believed to be influenced by a change in form of action and the effect of experience bias.

4. CONCLUSION
This study has collected data from participants of “Avalanche Night”, a safety awareness seminar for all types of backcountry beginners, in order to perform an analysis on avalanche experience.

Results found a rapid increase in "Near Miss" avalanche experience among people with 4~6 years of experience in backcountry. Most people indicated that their very first “Near Miss” avalanche experience occurred during their first few years in backcountry. Also, a majority of seminar participants who had been caught in an avalanche said they have also had a “Near Miss” avalanche experience before.

5. FUTURE OUTLOOK
In order to improve avalanche safety measures, 2 factors must be taken into consideration. One, the investigation of the nature of these “Near Miss” incidents, and two, the promotion of safety awareness among beginners. For investigation of “Near Miss” incidents, the content of the survey must first be reviewed and time must be allocated for more detailed instruction during the seminar so that the accuracy of answers can be ensured.

Similarly, to further promote safety awareness, a new seminar called “Mini Avalanche Night” has been launched in the 2016 season. These seminars are held at regional outdoor equipment stores, with lectures given by professionals and active members from JAN. Unlike “Avalanche Night”, which is normally held in big cities, these smaller seminars aim at the “grass-root” by taking place in more intimate venues outside the metropolitan areas. Last season, it attracted approximately 600 people in 22 different locations across the nation with just 9 members. This is scheduled for expansion in near future.

Furthermore, a new awareness program called "Beyond the Rope" has also started in 2016 season as a measure for beginners to target those enjoying new snow on ski slopes, who are considered to be potential background users. Apart from avalanche, the danger of tree well and NARSID (non-avalanche-related snow immersion death) on “unmanaged slope” is also taught during this program. Lessons are delivered with simple pictograms that can help participants to identify dangerous elements visually and intuitively.

REFERENCES