Avalanche Fatalities in Himalayan Mountaineering

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Introduction. Avalanches are probably the greatest single cause of fatalities in Himalayan mountaineering and the avalanches as well as the fatal accidents they cause have their own distinct character. They range in size from harmless sloughs to some of the largest known avalanches in the world. Many avalanches coming off these gigantic peaks have tremendous fall heights and, in addition, can entrain large amounts of snow on their descent. This combination can produce masses of snow and ice which can run for very long distances making it very difficult or even impossible in some instances for safe camp placement.

Another factor in the large numbers of fatalities is the big number of mountaineers and native porters which have been employed by many expeditions to reach the summits of these giant peaks. The risk from avalanches cannot help but increase with such large numbers of people exposed in avalanche terrain for the lengths of time required on those expeditions (up to several months). Risk will logically usually increase with the difficulty and height of the peak.

The present study spans the period from 1895—Mummery's attempt on Nanga Parbat—the first serious attempt on an 8000-meter peak—through 1979. This study is taken from accident reports from mountaineering journals, books about the Himalaya and mountaineering magazines—all listed in the bibliography. Since all existing literature has not been searched there may be fatalities not recorded in the sources used. Japan, for example, sends on the order of 50 expeditions to the Himalayan ranges yearly now and it is highly possible that fatal accidents have taken place which are unreported in western publications.

This study reports only accidents in which fatalities were incurred from snow and ice avalanches. In actuality, then, the total number of accidents will be much greater than reported here. However, the fatal accidents are probably the only ones documented well enough to report. (The term accident is used henceforth to mean fatal accident.) Only fatalities encountered in mountaineering or mountaineering related activities, such as the Japanese Ski Expedition to Mount Everest, are reported here. Accidents involving villages, for example, are not included.

Fatalities and Accidents According to Peak Height. The data in this study indicate that avalanches account for a high percentage of fatalities on the world's ten highest peaks and that the number of avalanche fatalities on these peaks is proportionately higher than on any other group of Himalayan peaks. Ward (1975) provided statistics on this group ranging from Everest (8848 meters) to Annapurna I (8091 meters) for fatalities from all causes *up to the first ascent.* Ward's data indicate that 53% of the 64 known fatalities were caused by avalanches. Other causes of death were: exhaustion-sequelae (23%), unknown (8%), heart failure-pulmonary edema (5%), cerebral-vascular (3%), frostbite (3%), lost and related causes (3%) and enteric fever (2%).

Table I lists the number of avalanche fatalities for the world's 25 highest peaks from Everest to Nanda Devi (7816 meters). Everest leads

TABLE I

AVALANCHE FATALITIES ON THE WORLD'S 25 HIGHEST PEAKS: 1895-1979
EVEREST—8848 m to NANDA DEVI—7816 m

Rank of Peak in Height	Peak	No. of Fatalities
1.	Everest	34
2.	K-2	2
3.	Kanchenjunga	5
4.	Lhotse	0
5.	Makalu	1
6.	Dhaulagiri I	17
7.	Manaslu	17
8.	Cho Oyu	4
9.	Nanga Parbat	20
10.	Annapurna I	12
•	•	(1)
•	•	
•	•	
19.	Himalchuli	3
•	•	
•	•	
•	•	
22.	Kungyang Chhish	2
23.	Peak 29	3
•	•	
25.	Nanda Devi	0

(1) When no entry appears there are no recorded avalanche fatalities.

the list with 34 avalanche fatalities, many of which are from the Khumbu Icefall which has served as the approach to the peak for most expeditions. Of all these peaks Nanga Parbat stands out, however, as the most savage mountain since at present there have been 20 successful summit climbers, with 20 avalanche fatalities and 36 total fatalities for an average "cost" of 1.8 fatalities for each person reaching the summit. For the others Dhaulagiri I and Manaslu also have greater than 0.5 fatalities per summit climber.

Table I illustrates the high concentration of deaths on the ten highest peaks and there are a number of reasons. One is because traditionally large numbers of people have been exposed for long periods in avalanche terrain. Also, the highest peaks attract more expeditions and normally the logistics increase with height of the peaks. An additional factor is geographical location, which will be treated later.

Table II shows accident statistics from all peaks in the range stratified in terms of 10 highest peaks, 25 highest and all peaks lower than the highest 25. The 10 highest peaks account for almost half of the accidents and more than half of the deaths. The next 15 highest peaks show only 5 accidents and 8 fatalities, while the many thousands of peaks lower than Nanda Devi show 31 (44%) of the accidents and 78 fatalities (39%). Also of interest from Table II is that the number of deaths per accident appears to decline with the height of the peaks. This latter trend is consistent with the data compiled by Schoemperlen (in press). Her data show that in North American mountaineering the average is 1.9 deaths per avalanche accident, which is less than any of the figures in Table II.

TABLE II

AVALANCHE FATALITY STATISTICS FROM OVER THE ENTIRE HIMALAYA STRATIFIED BY HEIGHTS OF PEAKS

		%	
Total for all peaks			
No. of accidents:	71	100%	2.8 fatalities/
No. of fatalities:	198	100%	accident
10 Highest peaks			
No. of accidents	35	49%	3.2 fatalities/
No. of fatalities	112	57%	accident
25 Highest peaks			
No. of accidents	40	56%	3.0 fatalities/
No. of fatalities	120	61%	accident
All peaks lower than Nandi Devi (#25)			
No. of accidents	31	44%	2.5 fatalities/
No. of fatalities	78	39%	accident

Stratification According to Geographical Location. Table III lists the number of fatalities stratified arbitrarily by geographical location from east to west. It shows that the number of fatal accidents and fatalities declines as one goes from east to west in the range. The trends in Table III are linked strongly to precipitation patterns. The monsoon strikes first and with greatest severity in the east. Overall snowfall generally declines from east to west and this will mean fewer snow avalanches in the west. The ranges in the far west such as the Karakoram in Pakistan are largely unaffected by the monsoon system which strikes Nepal. Another related factor is that the good weather seasons in the pre- and post-monsoon are short in Nepal. This means that many expeditions to high peaks must begin very early there so that the portion of the climb which is high on the mountain occurs before bad weather periods come again. Many expeditions must, then, begin too early during heavy snowfall periods before the good weather seasons.

The low number of fatalities in the Karakoram is perhaps surprising. The Karakoram contains many high-risk peaks. Roch (1980) suggests, however, that the reason for fewer fatalities there is essentially due to relatively less snowfall. This may seem contradictory since the Karakoram has very large glaciers which is normally an indicator of snowfall. Glaciologists in fact believe that a significant portion of the masses of the glaciers there are from avalanche snow. However, the large glacial masses there are partly due to the fact that there is so much plateau terrain at high altitudes. In contrast, in Nepal the valley terrain is steeper and the glaciers descend more rapidly into warmer melt zones.

Nanga Parbat with 20 avalanche fatalities seems to stand out as an exception in Pakistan. However, it seems more exposed to storms than, for example, the Baltoro region to the north. It should be noted that 16 of the Nanga Parbat fatalities are from one accident, which greatly influences the statistics.

TABLE III

AVALANCHE FATALITIES ACCORDING TO GEOGRAPHICAL LOCATION

Location	No. of fatalities	%
Eastern Himalaya: Nepal-Sikkim	130	66%
Central Himalaya: India	18	9%
Pakistan-Karakoram	48	24%
Hindu Kush	2	1%

Another trend which seems evident from the data at present (not shown in Table III) is that there is a significant clustering of accidents and fatalities in the Dhaulagiri-Annapurna region of central Nepal. This area may well emerge as that with the most serious overall avalanche accident potential.

Fatalities According to Type of Avalanche Accident. Table IV lists fatalities stratified in four arbitrary categories: (1) accidents evolving from falling ice from icefalls, glacier avalanches and sérac collapses *while climbing*; (2) accidents caused by improper camp placements where people were killed *in camps*; (3) accidents caused by snow avalanches triggered by the climbers themselves or where people were overwhelmed by snow avalanches from above *while climbing*; (4) the remainder of the fatalities which could not be categorized.

Table IV shows that the largest number of fatalities is from category (2) and this is an expected characteristic of the avalanches and style of climbing in these ranges. Himalayan avalanches can be very large and run for long distances. This makes safe camp placement impossible in some instances. Also, there may be tendencies to place camps where large numbers of people can be housed rather than in the safest areas. The data in Table IV also indicate that the fatalities stratify in the four categories roughly the same for the 10 highest peaks as for all of the peaks taken together.

TABLE IV

AVALANCHE FATALITIES ACCORDING TO TYPE OF AVALANCHE ACCIDENT

Type of Accident:	No. of Fatalities (Data from all peaks)	%	No. of Fatalities (Data from 10 highest peaks)	%
Icefall[1]	25	13%	20	18%
Improper Camp[2]	86	43%	53	47%
Triggered and[3] during climbing	54	27%	29	26%
Unknown[4]	33	17%	10	9%

(1) Includes glacier avalanches and sérac collapses where accidents occurred while climbing.
(2) Includes avalanches of snow or ice killing people in camps.
(3) Includes snow avalanches triggered by climbers or snow avalanches coming from above while climbing.
(4) Includes all fatalities not included in (1)-(3) or those with incomplete information as to cause of the accident.

Nationality of Fatalities. Table V lists the nationality of fatalities for 5 categories with significant numbers of fatalities. Sherpas and native porters account for by far the greatest number of fatalities. This is presumably due to their presence in great numbers and perhaps to their lack of knowledge of avalanches. The number of Japanese and British fatalities can be attributed to their activity in the range. Over the last 10 years or so Japan has sent by far the greatest numbers of climbers to the Himalaya. The British on the other hand have a very long history of climbing in the ranges.

TABLE V

AVALANCHE FATALITIES 1895-1979 for 5 NATIONAL CATEGORIES

Nationality of fatality	No. of fatalities (Data from all peaks)	%	No. of fatalities (Data from 10 highest peaks)	%
Sherpa/Native Porters	81	41%	56	50%
Japanese	31	16%	10	9%
British	17	9%	6	5%
German	14	7%	7	6%
American	10	5%	9	8%

These same trends appear when number of accidents are listed under nationality of expedition leadership (not depicted in Table V). Expeditions under Japanese leadership account for 21 accidents (30%) and those under British leadership account for 13 accidents (18%) so that together these two nations have had about half of the accidents under their leadership.

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