Risk Management and First Aid Knowledge of Trekkers in Nepal

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A – the preparation of the research project
B – the assembly of data for the research undertaken
C – the conducting of statistic alanalysis
D – interpretation of results
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Abstract

Background: Trekking in Nepal is popular and generally safe. However preventable trekking injuries and deaths are often the result of poor risk managementand lack of skills – i.e. acute mountain sickness (AMS) and specific First Aid (FA). Shlim and Gallie's reviews in 1992 and 2004 of trekking deaths here found a fivefold higher risk for fatal outcomes in organized trekking tours (OT) compared to independently organised trekkers (IT), including preventable deaths (i.e. AMS). Our survey sought to identify the AMS, FA and risk management knowledge/ skills of OT and IT whilst trekking in Nepal.

Methods: Based on previous pilot studies at the Khumbu region in Nepal, and on risk management information provided by leading German trekking operators, a survey was conducted using two questionnaires: one each for OT and IT.The study site was Manang (3,500m) in Annapurna region, Nepal. All trekkers passing through this site who volunteered their participation were included. For evaluation descriptive statistical methods and non-parametric tests were used.

Results: 442 questionnaires were completed (155 OT; 287 IT). Mean agewas 36.4 +/– 12.0y and 61% were male. Mountaineering experience was low and FA training was scarce in both groups. IT (92.7%) followed acclimatization recommendations and 59.2% carried AMS medication, compared respectively to OT at 63.2% and 25.2%. Only 27.1% of OT had repatriation plans for a medical emergency.

Conclusions: Most of OT and IT were inexperienced in mountaineering and in mountain emergencies. The preparedness of OT overall was inadequate and over-reliant on the organisers whose skills may also be inadequate when responding to an emergency. Responsible trekking should require that more than one person in a group have adequate, up-to-date riskassessment/ management and FA skills specific to the trek, and in particular an understanding of altitude profile, AMS, and individual abilities.

Keywords: trekking, mountaineering emergencies, acute mountain sickness, acclimatization, risk management

Introduction

Trekking tourism shows a more or less constant increase over decades [1-5]. Some specific problems are also well-known since Shlim and Gallie's 1992 review analysing trekking emergencies with fatal outcomes [6]. Their data recalculated gave a fivefold increased risk of dying whilst trekking with organized tours (OT) compared to independent, self-organized trekkers (IT)[7]. A sec-

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ond investigation by the same authors showed similar data [6].

Many known risk factors can be reduced by trainable skills and the preparedness of the trekkers themselves – e.g. by choosing a reputable company that offers adequate altitude profiles, or by learning and applying adequate risk management skills when mountain trekking.This study was conducted in parallel to another[8] and used mainly the same collective. Our study soughtto investigate whether trekkers already on ahigh altitude trek were aware of the potential risks of their tour and to identify what skills they had to handle them.

Material and methods

A questionnaire was handed out to every trekker who spent an acclimatization day at Manang (3.500m, Annapurna Circuit, Nepal)and was willing to participate (n = 500). There were two different versions of the questionnaire - one for trekkers travelling with an organized touroperator (OT), and another for independent trekkers (IT). The OT questionnaireconsisted of 31 questions concerning general information provided by the tour operator, specific trekking demands, knowledge of medical recommendations, strategies in case of emergencies, and the behavior of the trekking guide. The questionnaire for ITconsisted of 15 questions concerning knowledge about health care, recommendations about acclimatization, plans for emergencies, and their ideas aboutimprovements forfuture trips.

The results of the questionnaire were entered into the database dBase IV (Ashton Tate, Torrance CA, USA) and analyzed using SPSS V15 (SPSS Inc. Chicago IL, USA). The statistical analysis was initially descriptive. Comparisons of the subgroups was performed by non-parametric tests (χ^2-Test, Mann-Whitney-U-Test). $P < 0.05$ was set as level of significance and $0.05 < P < 0.1$ was interpreted as tendency. The study was approved by the Ethical Commission of Salzburg University, Austria.

Results

A total of 457/500 questionnaires were completed (155 by OT; 287 by IT), a91.4% return rate. The volunteers were 61% male, and 39% female. The mean age was 34.4 years (+/– 12.0). The subgroup of OT was 36.3 +/– 12.9 years old; IT 33.5 +/– 11.6 years ($P < 0.05$).

Mountaineering experience of the subjects was 8.1+/– 11.
2 years (OT 5.5 +/– 9.2, IT 9.3 +/– 11.9, $P < 0.05$). Some subjects had no mountaineering experience at all or just one season. The whole collective reported a mean of 1.2 (+/– 4.8) stays above 3,000m per year as an independent indicator of mountaineering experience or intensity (OT 0.8, IT 1.4, $P = 0.059$), and 20.5% had at least some experience in rock climbing (OT 14.3%, IT 23.8%, $P < 0.05$). Experience of travelling in snow and ice was virtually absent in the collective (2.0% overall, with 5/9 from IT experiencedon easy slopes).

A total of 312 trekkers (68.3%) received any type of information concerning health and health care before departure (IT 90.6%, OT 33.5%, $P < 0.05$). IT reported using physicians, books, the Internet and friends as sources for their information, and all options were used equally. On average 2.5 sources were used. More of IT(59.2%) brought some medication against acute mountain sickness (AMS) compared to OT 25.2% (n.s.). More IT (75.3%) had medical travel insurance compared to OT (60%) (n.s.). Any type of First Aid (FA) training was reported by 54.7% of the total collective (OT 46%; IT 56.4%, $P < 0.01$), but the mean period since the last training was 7.8 +/–8.4 years (OT 7.2 +/–8.7; IT7.7 +/–8.4; n.s.), and only a minority had any “alpine” FA training which focused on typical medical emergencies at altitude (AMS, frostbite, hypothermia etc.).

Significantly more of the IT 266 (92.7%) compared to OT 98 (63.2%) reported that they were following the recommendations for acclimatization ($P < 0.1$). Regarding flexibility about changing the trekking schedule (e.g. in the case of acclimatization problems or disease), significantly more of IT 254 (88.5%) compared to OT 88 (56.8%) indicated they had options for changes ($P < 0.01$), with 191 (66.6%) of IT and 42 (27.1%) of OT having repatriation plans in the case of a medical emergency ($P < 0.01$).

Discussion

The mean age and sex distribution of this study was representativeof a typical trekking collective in the Himalayas [1,4,9], although there were some extremes in the OT group aged 5 and 69 years. Although the “typical trekker” is about 28 to 45 years old, some take heir very young children to this remote region, and some significantly older trekkers also go there.

AMS in trekkers is very common and children have the same risk as adults[10-12]. It is often difficult to make an AMS diagnosis in young children due to their verbal limitations [10,11,13]. Another problem for the correct differential diagnosis is that children often show similar symptoms for several underlying diagnoses, and sometimes they even show similar symptoms at sea level [14]. To facilitate the diagnosis several approaches exist, some of which are non-verbal [13,15-17]. Unfortunately no one in our study collective was aware of such approaches previously. Families with children tend to travel as part of an OT. Since the OT personnel may be limited in their ability and number to care for these young or other trekking patients and simultaneously care for the group in a remote region in an emergency, the OT families travelling with their young may be at a greater risk of not having their child’s AMS accurately diagnosed and treated correctly.

There was a significant ($P < 0.05$) difference between IT’s 90.6% and OT’s 33.5% regarding the medical information they received in advanceof their high altitude trek. This was alarming given AMS is a common occurrence. With enough information

and knowledge about AMS symptoms, treatment and prevention, and discipline while en route, trekkers could prevent severe cases and even a fatal outcome (high altitude pulmonary edema (HAPE), or high altitude cerebral edema (HACE)). The prevalence of AMS depends on an adequate altitude profile [18]. Another risk factor for AMS is the lack of a rest day [19]. The latter is of special interest for treks where the altitude profile makes a sudden and unavoidable increase of altitude, as in the ascent to Thorong La at the Annapurna Circuit (rest day recommended at Manang, 3,500 m) or when going to Everest Basecamp (rest day recommended at Namche Bazaar, 3,440 m).

Only 63.2% of OT were aware that their trek requiredany kind of acclimatization strategy, leaving the remaining third having no idea that altitude might be a risk factor that should be handled with care. IT'sawareness was 92.7%. For organizational reasons (e.g. booked accommodations), the itinerary of OT groups does not change although most OT organisers suggest otherwise before the trek [7]. All the guides which we met during the three research expeditions in three seasons recommended their clients should take acetazolamid (Diamox) – or in some cases nifedipine or dexamethason – if they experienced AMS symptoms or to take this prophylactically. Neither guides nor guests had any idea about indication, side effects or contraindications of these drugs. However, compared to years ago, the use ofdrugs to prevent AMS has slightly decreased in favor of acclimatization strategies[1].

A key risk toolder trekkers in a remote region is mainly defined by any pre-existing diseases they may have, which was a common variable in IT and OT [3,5]. Before departing on the trek, any disease should be in a fully stabilized condition [3,5], and the trekker should have sought detailed advice on how to manage their disease should it worsen enroute.

IT were obviously more aware than OT that they were responsible for their own risk management. Compared to OT, IT more often brought emergency medications, had medical travel insurance and plans for repatriation, and they had more mountaineering experience. However, in general the mountaineering experiencewas critically low in both groups. Several participants had no experience, and they were now en route to Thorong La (5,416m), a distance of 4 to 6 days to the next medical infrastructure. An important outcome fromthese results reinforces the need to ask those who are interested in a high altitude trekabout their mountaineering abilities beforehand. If these skills are nil or limited, advise them to get at least some experience in regions where there is a more accessible infrastructure to deal with medical emergencies beforehand, e.g. the European Alps.

Trekking emergencies are not a rare event. Tour operators report such incidences in about 30% of all tours – fortunately most of them with minor consequences [7]. We found only some participants reported that they had any FA training, and those with specific FA training relevant to altitude sicknesses and this environment was scarce. Most of the FA training also took place years ago. For decades, it is a well-known problem that FA skills diminish over a quite a short period of time (i.e. a year) [20-23]. It is questionable whether victims experiencing a medical emergency while trekking have a realistic chance of accessing sufficient FA at all.

We found a significant difference between the groups ($P \leq 0.01$) regarding medical advice they received prior to departure in the event of an emergency, and what their plans would be if they had to return home. Only 27.1% of OT had plans for repatriation/ MedEvac, compared to 66.6% of IT. This andother indicators strongly suggested that most of OT effectively outsourced any risk managementto the organisers, orwere naïve. The former explanation was supported by many statements made when we talked to these trekkers who believed that when they booked a "full package" with an OT organiser, this included all safety aspects. This impression was supported by the OT organiser's information and public relation activities before the trek, but in reality the OT organizer cannot provide or guarantee full medical care or repatriation for a more or less large group whilst trekking in a remote environment or at high altitude [7,24]. Any deficiency in these areas will become apparent should a medical emergency occur en route.

Conclusion

We found that trekkers already on a high altitude trek were generally inexperienced in mountaineering and were not fully aware of the risks of their tour, including the management of mountain emergencies (i.e. AMS). Understanding the altitude profile and having options to change the itinerary are important aspects to consider when planning the trek, especially as OT organisers are inflexible about the itinerary for several reasons (i.e. booked accommodation). The overall preparedness of the OT group was generally inadequateand relied on the skills of the organizer to risk manage all situations in this remote trek at altitude. This was partly due to some lack of information from the OT organizer before the trek, but there was also an expectation that by paying for a 'full package' this included all safety, medical and repatriation aspects which was incorrect and misleading. IT obviously fared significantly better with their preparedness, but with some scope to improve. First Aid (FA) training was scarce in both groups and ideally should be refreshed with skills specific to high altitude, i.e. should cover AMS, frostbite, hypothermia, sunburn, pain management, and rescue strategies in rough terrain.

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