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OBTAINING HEALTH INFORMATION FROM FARMERS: INTERVIEWS *VERSUS* POSTAL QUESTIONNAIRES IN A NEW ZEALAND CASE STUDY

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Abstract: Purpose. To compare the effectiveness of interviewer-led and postal surveys in gathering adequate health data for occupational health programmes among farmers. Methods. Two cross-sectional studies of farmers from southern New Zealand were conducted. Farms were randomly selected from the public land valuation roll and all farmers and farm workers invited to participate in the farmers' health study. First, 477 farms were invited to participate in an interviewer administered questionnaire and health check; and second, a further 432 farms were selected and invited to participate in a self-administered postal survey. Both groups completed the same questionnaire. Results. The response for the interviewer-led and postal surveys was 65.4% and 51.6% respectively. The 2 groups differed demographically, with fewer young farm workers in the postal survey, but were similar in all areas of health information collected, except that men in the interviewer-led survey were significantly more likely to have a psychological disturbance than men in the postal survey (chi^2=5.06, df=1, p=0.024). Conclusions. Despite the interviewer-led survey having a higher response rate, the postal survey produced similar health data, which is adequate for planning occupational health programmes for farmers. Extra effort should be made to recruit younger farm workers in future research.

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INTRODUCTION

Agriculture is a vital industry for New Zealand, employing 9% of the workforce and accounting for over 50% of exports [32, 34]. In New Zealand, pastoral and dairy farming predominate and stock are grazed outside all year, so that occupational exposures may differ from those in countries where animals are wintered indoors. Agriculture is a hazardous occupation with high rates of mortality and morbidity. From 1985-94 the annual work-related fatal injury rate in agricultural occupations in New Zealand was 21/100,000, four times the all-industry average [10]. Patterns of injury on farms in New Zealand are similar to elsewhere with agricultural machinery such as tractors, all terrain vehicles and animals being the primary agents for fatal and non-fatal injury [22]. Other studies have shown that stress, mental health and suicide are also contributing factors [5, 12, 19, 21, 24, 28, 36].

Little is known about farmers' health in New Zealand as adequate surveillance systems do not exist. Even injury surveillance systems do not identify farmers as an occupational group [20]. Many injuries to farmers that

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cause loss of work-time attract no workers' compensation and therefore are not recorded on any national database. Similarly, there is no systematic recording of work-related illness. Farmers and farm workers are a difficult occupational group to investigate. Their geographic and occupational isolation, long hours of work and the transitory nature of the workforce, combine to make recruitment to studies and completion of surveys difficult [4]. Even large, well designed studies may experience response rates of less than 50% [35].

Traditionally, 3 methods of collecting health information have been used among farmers: completion of an interviewer-led telephone questionnaire, a postal questionnaire, or an interviewer-led face-to-face questionnaire which may also include collecting other health and environmental data. This paper describes 2 studies utilising the latter 2 methods, undertaken in a large farming region in southern New Zealand, to assess effective methods for gathering health information from farmers. In 1 study, farmers and farm workers were asked to describe their health experiences through an interviewer-led face to face survey and health check, and in the other, a postal self-administered survey was carried out. This paper has 2 main aims: firstly, to determine whether the different methods access different participants; and secondly, to determine whether the different methods affect the adequacy of information gathered.

METHODS

Both studies were cross-sectional, with participant farms identified from the public land valuation roll where the telephone number could be found in the telephone directory. The first study was an interviewer-led survey where all male and female farmers and farm workers aged 15 years and over from a random sample of 477 farms were invited to participate. Each farmer was mailed an introductory letter, followed by a telephone call from trained occupational health nurses. Following agreement to participate, the farm was visited by the occupational health nurse who administered a questionnaire and health check to as many participants as agreed to take part per farm [11].

The second study was a postal self-administered survey. This was completed after the interviewer-led survey and excluded participants in the first study. 432 farms were invited to participate. Two questionnaires were sent to each farm for 2 farm owners or workers aged 15 years or over to complete. Questionnaires were sent out on 2 further occasions at 3-weekly intervals to non-responders.

The 2 surveys used the same questionnaire format. This included questions concerning background information relating to the farm and farm residents, general health, respiratory health [23], and mental health, using the 12-point General Health Questionnaire (GHQ), where a score of ≥2 was used to indicate a psychological distress [13], alcohol consumption (using the Alcohol Use Disorders Identification Test - AUDIT), where a score of ≥8 indicated hazardous or harmful drinking [27], musculoskeletal health, noise exposure and chemical-related illness.

Table 1. Demographic data for interviewer-led and postal survey of New Zealand farmers and farm workers: numbers and percentages.

	Postal survey % (n)	Interviewer-led survey % (n)
European	99.0 (300)	98.8 (579)
Age 15–29 years	4.6 (14)	16.7 (98)
Age 30–59 years	84.8 (257)	75.1 (440)
Age 60 years plus	10.2 (31)	8.0 (47)
Male	76.9 (233)	65.0 (381)
Married	88.8 (269)	81.2 (476)
No children	6.9 (21)	18.8 (110)
Tertiary qualification	14.5 (44)	15.9 (93)
Farm owner/family member respondents	91.7 (278)	79.9 (468)
Farm manager and share milker respondents	2.3 (7)	7.3 (43)
Farm worker respondents	3.0 (9)	10.1 (59)
Reporting more than 1 worker (including family members, paid & unpaid)	83.5 (253)	95.2 (558)
Reporting paid farm workers	53.1 (161)	39.9 (234)
Farm size (Acres):		
<250	15.7 (35)	17.5 (50)
250-620	43.9 (98)	45.1 (129)
621-1235	30.5 (68)	22.0 (63)
>1235	8.5 (19)	11.5 (33)
Farm type:		
Dairy	21.1 (47)	40.2 (115)
Sheep	28.3 (63)	22.0 (63)
Mixed stock/crop	49.8 (111)	37.8 (108)

Data were analysed using the Statistical Package for the Social Sciences (SPSS). Differences between respondents to the interviewer-led survey and the postal survey were examined using chi-square tests of association. Differences between the demography of respondents and data from the New Zealand Census for Population and Dwellings 1996 for the Southland Territorial Local Authority area were also examined. This included age, sex, ethnicity, marital status, parental status and tertiary qualifications [31]. In addition, the New Zealand Health Survey [26] and the Life in New Zealand Survey [25] presented national data concerning cigarette smoking, alcohol use and mental health, with which comparisons with farmers' data were made.

RESULTS

The response rate for the interviewer-led survey was 65.4% (n=286) of farms, and for the postal survey 51.6% (n=223) of farms. 586 individuals participated in the interviewer-led survey and 303 in the postal survey. The distribution of gender, parental status, marital status, and

age group differed between the 2 methods. The age distribution for the interviewer-led survey was similar to that of the Southland rural district; however, the age distribution of the postal survey respondents was significantly different from that of the Southland rural district (χ^2=10.98, df=1, p=0.001) [33]. The majority of the respondents in both surveys were farm owners, family members or farm managers. In the interviewer-led survey, 10.1% of respondents identified themselves as paid workers while in the postal survey, only 3.0% of the respondents were paid farm workers.

The 2 groups of respondents reported similar experiences in all areas of health information collected, except mental health and chemical-related illness. For mental health, there was no significant difference between the female groups. However, men in the interviewer-led survey were significantly more likely to score ≥2 on the 12 point GHQ than were men in the postal survey (χ^2=5.06, df=1, p=0.024). The proportions of men and women in the interviewer-led survey scoring ≥2 were similar, while in the postal survey a smaller proportion of men scored ≥2 compared to women. In the national population, 21% of men and 30% of women scored ≥2 in the GHQ [25]. Men in the postal survey were significantly less likely to score ≥2 than men in the national population (χ^2=8.97, df=1, p=0.003); whereas men in the interviewer-led survey did not differ from the national population (χ^2=0.24, df=1, p=0.626). Women in the interviewer-led survey were significantly less likely to score ≥2 in the GHQ compared to women in the national population (χ^2= 10.47, df=1, p=0.001), but there was no significant difference between women in the postal survey and the national population.

Table 2. Number and percentage of self reported health factors for New Zealand farmers and farm workers.

Health factor	Postal survey % (n)	Interviewer-led survey % (n)
Prevented from full farm duties due to injury/illness last 12 months	29.4 (89)	26.1 (153)
Injuries work related	26.7 (81)	23.2 (136)
Injuries causing ≥ 1 week off work	28.1 (85)	25.1 (147)
Musculoskeletal:		
Low back pain (LBP) last 12 months	51.2 (155)	54.6 (320)
Time off work for LBP	10.6 (32)	11.1 (65)
LBP: ≥ 1 week off work	6.6 (20)	5.1 (30)
LBP: sought treatment	18.8 (57)	23.5 (138)
LBP: compensated time off work	1.3 (4)	2.7 (16)
Respiratory:		
Current asthma	8.9 (27)	6.8 (40)
Asthma medication	3.6 (11)	4.6 (27)
Hay fever	28.4 (86)	30.9 (181)
Mental health:		
GHQ ≥ 2: total	14.5 (44)	19.8 (116)
GHQ ≥ 2: male	12.9 (30)	19.9 (76)
GHQ ≥ 2: female	20.0 (14)	19.5 (40)
Chemical related effects	12.9 (39)	19.1 (112)

Table 3. Number and percentage for alcohol use and cigarette smoking among New Zealand farmers and farm workers and the national population.

Health factor	Postal survey % (n)	Interviewer-led survey % (n)	New Zealand population %
Current smoker	9.2 (28)	12.5 (73)	24.8
Alcohol:			
AUDIT: ≥ 8 total	15.5 (47)	14.2 (83)	17.3
AUDIT: ≥ 8 male	18.9 (44)	19.7 (75)	25.5
AUDIT: ≥ 8 female	4.3 (3)	3.9 (8)	9.3
AUDIT: ≥ 8 male age 25–44 years	19.8 (24)	15.3 (35)	27.4
AUDIT: ≥ 8 male age 45–64 years	13.8 (22)	7.8 (17)	20.5

DISCUSSION

Although the methods of collecting information, and the resources required in these surveys were different, the health information gained was similar. This was despite the demographic profile being different between the 2 groups. Self reported prevalences of current asthma, low back pain, alcohol use disorder, and injury/illness in the last 12 months were similar. The only major differences found were in the prevalence of chemical-related illness, and psychological disturbance. Both groups were significantly less likely than the comparative national population to be current smokers and the interviewer-led survey group were less likely to have high AUDIT scores. Several important issues arise from the comparison of the 2 survey methods.

Response rates to a number of farm related surveys vary greatly, and low response rates are not uncommon. The 65.4% response rate for the interviewer-led survey was higher than for the postal survey, at 51.6%. A previous survey of farmers regarding agri-chemical use in another farming district of New Zealand resulted in a 50% response rate for dairy farmers, and a 55% response rate for maize growers [16]. In comparison, in a study regarding asthma prevalence in New Zealand farmers, researchers sent questionnaires out 3 times with reminder postcards between the first and second questionnaires, and achieved a 77.5% response rate [17]. The New Zealand Ministry of Agriculture and Fisheries (MAF) conduct a variety of farming production surveys using quantitative and qualitative methods. In 1999, MAF completed a large-scale survey of farmers regarding agricultural production. Their response rate was 85.7% [6]. In the Agricultural Health Study of farmers in Iowa and North Carolina, USA, the response rate at enrolment was 77%. This questionnaire was completed at the end of a course, but the follow-up questionnaire, which was completed at home later, had only a 47% response rate [35].

The Tailored Design Method [7] is so pervasive in survey design that many aspects are now included as a matter of 'common sense' to enhance response rates. It builds on many years of survey work and research by Dillman and others. A 1974, review of the published literature regarding response rates found that the number of contacts and the relevance of the questionnaire to the participating population could explain 51% of the variance in response rates. Other factors, which in combination explained a further 40% of the variance, included government organisation sponsorship, the type of population, length of the questionnaire, a different type of third contact, survey questions about others, and the appearance of the envelope [14]. A 1991 meta-analysis of response behaviour to mailed questionnaires found the factors outlined above remained key explanations, with the addition that a better response was gained from questionnaires no longer than 4 pages that were accompanied by a cover letter which appealed for participation. The study also found that the sponsorship of a government agency did not increase participation [37]. Most recently, a systematic review of factors influencing response rates to postal questionnaires found that universities as sponsors were more likely to increase response rates, as was personal contact beforehand and personalised letters. Other findings of this review were consistent with the previous meta-analyses outlined above [8].

The potential participants in the New Zealand studies could be considered a homogeneous group, in that all were farmers or farm workers from the same region of the country. These 2 New Zealand surveys were carried out by university-based researchers, in consultation with local farmer groups, and related organizations. The main part of the questionnaire in both studies was 19 pages long. Extra pages were added for each agri-chemical the farmer reported using. Difficulties in obtaining chemical information using this method probably contributed to inaccuracies in the postal survey. While the interviewer-led survey was lengthier, and included personal health measurements, its response rate was higher. It is possible that the length and general health nature of the survey influenced the response rate in both studies, but the lack of personal contact in the postal survey contributed to its much lower response rate. Health is, of course, relevant to farmers, although the general health questionnaire may have lost some salience as it covered a wide range of topics. This could explain the higher response rate in the New Zealand asthma study in farmers where the survey was focused on a particular health area [17].

Contradictory findings describing the characteristics of prompt, reluctant, and non-respondents are common in the literature. In a recent study of general medical practitioners, prompt respondents were more likely to be younger and in a training practice with more partners and lower case loads, whereas in the Agricultural Health Study the increased age of the respondents was most notable [1, 35]. In the studies reported here, at least 75% of the respondents were between the ages of 30–59 years. This is in contrast to the local population of the Southland district where less than 50% of the population were in this age category [33]. The difference between the postal survey and interviewer-led survey in the under 30 year age group was also significant. The interviewer-led survey percentage of younger respondents was similar to that in the regional population, whereas there were few younger respondents in the postal survey, which may explain the differences in the AUDIT scores compared to the national population. As neither study undertook an assessment of non-responders, it is not possible to give any definitive explanation of this phenomenon but it is likely that it was a design effect. One possibility is that as the postal survey delivered only 2 questionnaires per farm, the owners or managers of the farm received the questionnaires, but the farm workers, who were more likely to be younger, did not. In contrast, in the interviewer-led survey the occupational health nurse was able to make contact with and interview the farm workers as well as the farm owners and family members. This may also assist in explaining the higher percentage of respondents who were workers rather than owners or managers in the interviewer-led survey, and subsequently the younger age profile and its higher percentage of respondents without children.

Earlier research has found that subjects with risk factors participate more in surveys while those with disease participate less [2]. More recent research suggests that respondents enjoy better health than non-respondents [9]; however, the actual profile of the disease is not dissimilar and non-respondents may simply describe their health less favourably than respondents [29]. In our studies, respondents were less likely than the national population to be current smokers, which mirrors previous studies that have found respondents less likely to be current smokers [3]. Respondents in the interviewer-led survey also scored lower on the AUDIT scale for drinking than the national population. This is in contrast to previous findings, that those with risk factors participate more and that non-respondents report less hazardous drinking [2, 15].

Conclusions on the quality of health information collected by different methods have been contradictory. One review of methods found that in "… studies that have experimentally compared home, telephone and mail methods, most have found little or no systematic difference in estimates of morbidity, health care and other parameters". Yet they also found that in other studies, while the demography of the groups of subjects did not differ, the levels of morbidity and health care parameters were higher via a mail survey than via a telephone survey [30]. More recent research shows that even with low estimates of health behaviour, most risk factors are unaffected by those not responding, and that a 33% non-response rate did not appear to introduce a substantial bias into prevalence estimates for the source community [18, 29].

Several possibilities arise regarding the status of the 2 methods reported here. Although patterns of health behaviours and experiences were similar in our surveys, demographic differences and in the characteristics of farm worker respondents may have introduced significant bias in the postal survey. The possibility exists, therefore, that the interviewer-led survey reported in this paper provides valid estimates of health data, while the postal survey does not. A second possibility is that both methods are valid but that the interviewer-led survey is better able to discern mental health issues, and chemical-related illness. A further possibility is that both surveys missed in some fundamental way the same non-respondents.

The interviewer-led survey allowed better access by the research team to all potential participants. This resulted in a higher response rate with a greater spread of age groups and workforce status. It is likely that it provided more valid health information. Its main disadvantage is its cost. Trained professional staff interviewing on average 3 people per farm is considerably more expensive than the cost of posting 2 questionnaires on 3 separate occasions. The main disadvantage of the postal survey is that only 2 people per farm were invited to participate. The respondent profile demonstrated that the postal survey had fewer young people and fewer paid workers than the interviewer-led survey. Young people frequently form a distinct sub-group in whichever group they are part of, often smoking more, consuming alcohol in a more dangerous way and displaying more risk-taking behaviour than an older population group. It is unlikely that young people in the farming sector are any different. Similarly, the salaries of many paid farm workers are likely to place them in a lower socio-economic group, with its attendant health disadvantages.

The studies reported here used survey methods in common use in research around the world. The interviewer-led survey is a resource-intensive approach with the potential to yield considerable high quality information, while the postal survey method is able to access a greater number of possible participants. As a group, respondents to both surveys tended to be older, married, have more children and were less likely to be farm workers than the district population. The postal survey emphasised this tendency when compared with the district population and with the interviewer-led survey. In particular, it is of some concern that specific groups of the farming population (young people and farm workers) were not able to be recruited. This lack of response serves as a caution when utilising the results for health care or health promotion programme planning. Similarly, it is of concern that the specific groups not recruited may have resulted in unusual estimates of health behaviour. Notwithstanding these concerns, it is reassuring to note that most self-reported health behaviours and patterns were similar from both studies.

Ensuring a higher response rate, which represents all farmers and farm workers, is clearly important for risk factor assessment and intervention planning. However, the cost of a labour intensive method such as an interviewer-led survey is likely to restrict its implementation to a regional basis. Postal surveys are more easily able to be applied on a large scale or national basis and their response rates may well be improved if surveys are shorter and more focused on particular health issues or tied to production issues. Their drawback in the agricultural sector, where place of residence is also the place of work, is that there is no straightforward way of ascertaining the baseline population of those working on the farm as owners or family members, or in a paid or unpaid capacity. Census data are likely to be the most useful in providing this information so that comparisons between the sample and the population can be made. Using postal surveys for large scale health information gathering, which are strengthened by being focused on particular health issues, are likely to yield adequate data for utilisation in health promotion programs and health care planning.

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