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ORIGINAL ARTICLE

Health-related Quality of Life of Habitual Recreational Off-Road Vehicle Riders

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Abstract

Background: Alternative forms of physical activity are becoming increasingly popular but little is known about the effects of habitual involvement in these activities on health-related quality of life (QOL). **Purpose:** The purpose of this study was to characterize the health-related QOL of Canadians who participate regularly in recreational off-road vehicle riding. A secondary purpose was to compare the levels of mental and physical functioning QOL of recreational off-road vehicle riders to Canadian population norms and determine whether differences exist among genders, age categories, and vehicle types. **Methods:** Habitual participants in recreational off-road vehicle riding were surveyed regarding QOL using the Medical Outcomes Study SF-36 questionnaire. Responses were compared between groups and to normative data. **Results:** SF-36 mental function (54.5 ± 7.5) and physical function (55.4 ± 7.1) scores of off-road riders were significantly higher than Canadian norms (51.7 ± 9.1 and 50.5 ± 9.0 , respectively). **Conclusions:** Off-road riders have high levels of mental and physical functioning QOL. Given their higher physical function, off-road motorcycle riders are less likely than all terrain vehicle riders or the general population to have physical limitations or health problems. **Health & Fitness Journal of Canada 2010;3(1):4-11.**

Keywords: alternative activity; health-related; rural; risk

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Introduction

Non-traditional forms of physical activity participation, such as video game based exercise, martial arts and adventure sports are becoming increasingly popular among segments of the population for whom traditional forms of exercise (i.e., jogging, swimming, resistance training) and physical activity (PA) may be impractical, unavailable or unappealing. Given the importance of PA in preventing avoidable morbidity and mortality (Arden et al 2003; Church et al., 2004; Fagard, 2006) and the associated cost savings to the health care system (Katzmarzyk and Janssen, 2004), involvement in any recreational pursuit that increases activity and decreases sedentary living is important. It is well known that participation in traditional PA has the ability to increase health-related quality of life (QOL) and decrease physical limitations of daily living (Brand et al., 2006; Kell et al., 2001, Warburton et al., 2001). However, little is known about the health-related outcomes of participation in alternative forms of PA and consequently how this may effect the mental and physical health of Canadians. Habitual recreational off-road vehicle riding (both all terrain vehicles; ATV and off-road motorcycles; ORM) has recently received attention for its potential to bring about changes in health and fitness,

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which may be particularly relevant to rural dwelling Canadians (Burr et al., 2010). When considering the utility of this type of activity for increasing overall population health, a participant's perception of their own physical function, mental health and general well being are important factors to be considered. Despite commonly being classed together as "off-road riding", the physiological demands of participation using an ATV has been shown to be distinct from those while using an ORM (Burr et al., 2010) and thus differences may exist in the associated health-related QOL outcomes.

The purpose of this study was to characterize the QOL of Canadians who participate habitually in recreational off-road vehicle riding. A secondary purpose was to compare the levels of mental and physical functioning QOL of recreational off-road vehicle riders to Canadian population norms and determine whether differences exist among genders, age categories, and vehicle types (ATV and ORM). As this study was explorative in nature, there is not a strong body of literature on which to base hypotheses. However, we postulated that habitual participation in recreational off-road vehicle riding would lead to increases in the overall QOL of riders compared to non-riders and that there would be no age, gender, or vehicle type differences.

METHODS

Participants

Our study population consisted of 141 habitual recreational off-road riders from Ontario and Quebec who completed the SF-36 questionnaire. Inclusion criteria captured persons who self identified as being a habitual off-road trail rider (>1 ride/wk) and owned, or had open access to an off-road vehicle for recreational riding purposes. Exclusion criteria were

those <16 yr of age (to comply with safety recommendations) and competitive racers. Descriptive statistics are provided in Table 1.

Table 1: Demographics of participants who completed the SF-36 (n = 141) combined and divided by gender for vehicle type and age, expressed as n (%).

	Vehicle Type		Age (yr)		
	ORM	ATV	<45	≥45	
<i>Combined</i>	141 (100%)	79 (56%)	62 (44%)	76 (54%)	65 (46%)
<i>Male</i>	107 (76%)	59 (75%)	48 (77%)	52 (68%)	55 (85%)
<i>Female</i>	34 (24%)	20 (25%)	14 (23%)	24 (32%)	10 (15%)

Note: Combined values are expressed as n (% of overall cohort); gender specific values are expressed as n (% of gender split within cohort).

Protocol

Participants were recruited through ORM and ATV riding clubs across Ontario and Quebec, using internet postings and word of mouth. The SF-36 was administered prior to the initiation of a comprehensive health and fitness screening undertaken for an adjunct project (accepted for publication, Journal of Sports Sciences 2010). Data collected from participants on the 8 main SF-36 scales were transformed into two summary scales, the physical component scale (PCS) and mental component scale (MCS) which allow a greater power to detect changes and reflect physical function, mental wellbeing and QOL. These scores are calculated for each of the PCS and MCS using 4 of the 8 sub-scales of the SF-36 with no overlap. The PCS, which reflects physical health, is constructed using the SF-36 sub-scales of "physical functioning," "role-physical," "bodily pain" and "general health"; whereas the MCS, which reflects mental health and QOL, uses "vitality," "social functioning," "role-emotional" and "mental health" sub-

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scales. The construction, validation and associations of these summary measures have been described in detail elsewhere (Ware and Sherbourne, 1992; Ware and Kosinski, 2007). The summary scores from each scale were compared to comprehensive Canadian SF-36 normative data (Hopman et al., 2000) as well as data from the Medical Outcomes Study (MOS) for interpretation of scores as they relate to expected health outcomes determined from longitudinal study (Ware and Kosinski, 2007).

After verbal explanation of procedures, written informed consent was provided by all participants, with those under 18 yr also providing parental consent. This project was approved and conducted in accord with York University Human Ethics Review Board guidelines.

Statistical Analyses

The SF-36 data were split into a younger and older age group (< 45 and ≥ 45 yr) for comparison with Canadian population norms and data from the MOS. Where no differences existed between vehicle types, the data were collapsed across ATV and ORM groups to make a “riding” group for comparison with the non-riding normative Canadian group. This increased statistical power and allowed an a priori estimate of a 5-10 point mean score sensitivity between groups (Ware and Kosinski, 2007). Further sub-group comparisons were made between genders, ages and vehicle types using ANOVA. Significance for all tests was set a priori at $p < 0.05$.

RESULTS

There were no significant differences between riders of either vehicle type on the MCS scale measures, therefore data were collapsed across these groups to form an overall riding group for analysis

and comparison with norms. PCS scale measures revealed significant vehicle type differences and thus these groups were examined both as a combined group of riders and separately by vehicle type. Group mean data of all off-road riders combined (both ORM and ATV) versus normative Canadians on the SF-36 PCS and MCS scales are presented in Table 2.

Table 2: Physical (PCS) and Mental (MCS) Component Summary Scores of off-road riders and Canadian norms divided by gender and age (Young <45 yr, Old ≥45 yr). Values are expressed as mean ± SD.

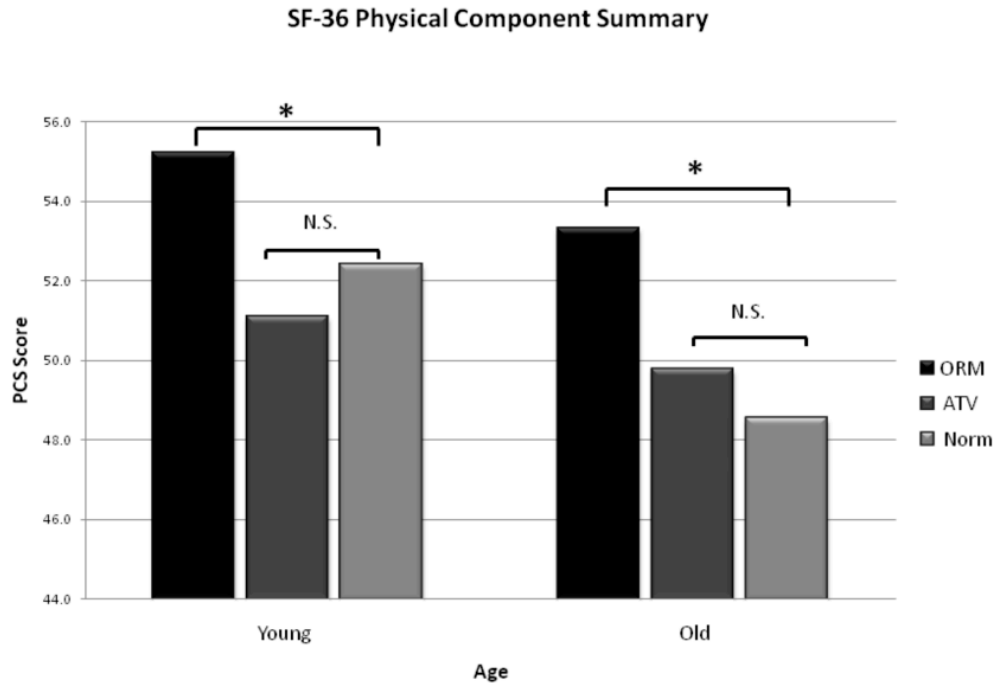
			PCS	MCS
<i>Canadian Norms</i>	<i>Male</i>	<i>Young</i>	53.0 ± 7.2	51.7 ± 8.6
		<i>Old</i>	49.8 ± 8.8	53.9 ± 7.9
	<i>Female</i>	<i>Young</i>	51.9 ± 7.9	49.5 ± 9.7
		<i>Old</i>	48.0 ± 9.8	52.3 ± 9.0
<i>Riders</i>	<i>Male</i>	<i>Young</i>	53.9 ± 5.0	56.3 ± 5.3
		<i>Old</i>	51.1 ± 9.6	55.6 ± 7.1
	<i>Female</i>	<i>Young</i>	54.8 ± 4.9	57.0 ± 3.9
		<i>Old</i>	53.5 ± 7.1	50.2 ± 13.7

Physical Component Summary

Significant group mean differences existed for PCS scores between off-road riders (55.4 ± 7.1) and Canadian population norms (50.5 ± 9.0, $p = 0.003$). Analysis of vehicle types revealed that ORM riders (male 54.6 ± 3.8, female 54.2 ± 6.5) scored higher than both Canadian population norms (males 51.4 ± 8.5, females 49.7 ± 9.4) and ATV riders (males 49.4 ± 6.9, females 53.6 ± 4.6) who were not significantly different from one another. Vehicle specific and population normative scores are depicted in Figure 1.

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Figure 1: SF-36 Physical Component Summary, groups by gender and vehicle type compared with normative Canadian data. *Significantly different ($p < 0.05$) from ATV and normative data.



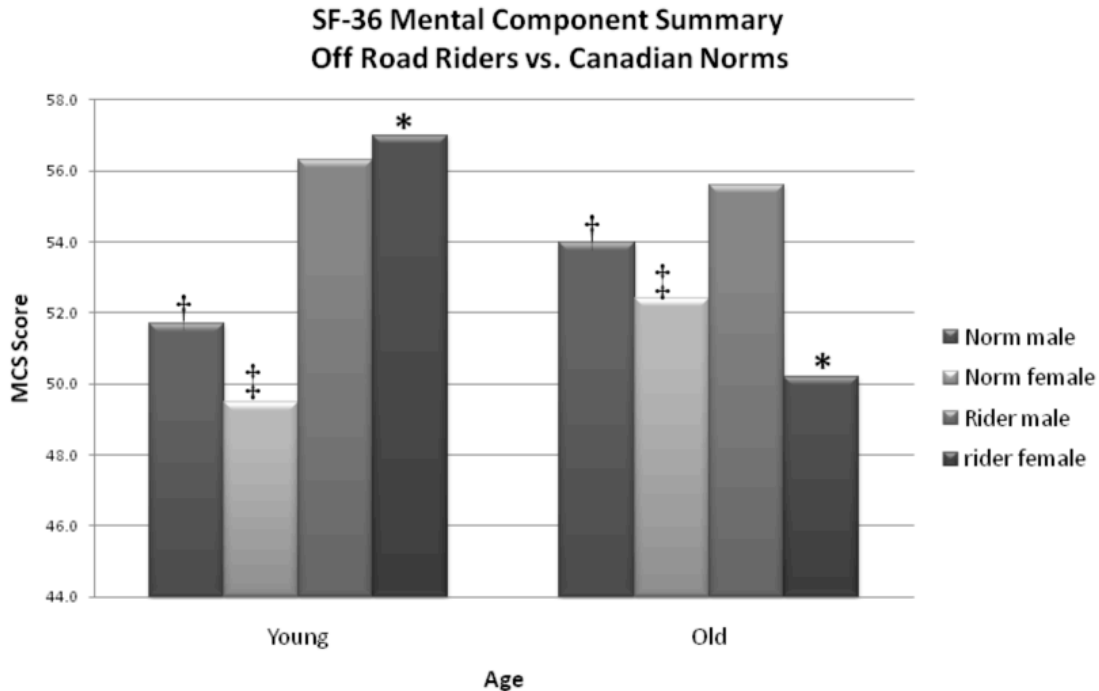
Mental Component Summary

Together, Off-road riders (54.5 ± 7.5) had higher MCS scores than the non-riding normative Canadian population (51.7 ± 9.1 , $p = 0.001$). An interaction between gender, age and riding status (off-road rider vs. non-riding population norms) was apparent for the MCS scale and is illustrated in Figure 2. Non-riding normative Canadians of both genders revealed an increase in MCS score from the young (<45 yr) to the older (≥ 45 yr) group. There was no difference in MCS score between young and old male off-road riders, owing to an elevated level in the young group, which was similarly high in the older group. Because older normative males had an increased score compared to young normative males, the difference between riders and norms was not present in the older group wherein riders and norms had similar MCS scores.

Younger female off-road riders also had an elevated MCS score compared to young normative Canadians, but in older age female riders the MCS score was significantly lower, albeit no different from the norm. Based on established score ranges associated with known health outcomes (Ware and Kosinski, 2007), the differences in the MCS scores between younger and older females for both Canadian population norms and off-road riders have meaningful implications for future health. With the exception of the younger riders, males consistently had a higher MCS score than females.

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Figure 2: Three-way interaction between age, gender and rider/non rider status on the Mental Component Summary of the SF-36. * Significant at $p < 0.05$, ‡ Significant at $p < 0.05$, † Significant at $p < 0.05$.



Discussion

The value of using the MCS and PCS summary scores is the interpretation they allow through association with known health states drawn from large databases such as the MOS. Using the content and criterion based interpretation guide for the SF-36, which allows for extrapolation of scores to expected health outcomes, along with comparison to Canadian normative data (Hopman et al., 2000), PCS and MCS scores of off-road riders (Table 2) support the interpretations discussed below.

Physical Component Summary

Group differences between off-road riders and Canadian population norms were driven by the higher scores of ORM riders as opposed to ATV riders who were no different from non-riders in the general Canadian population. Compared with normative Canadian data and

interpreted with reference to large population data from the MOS (Ware and Kosinski, 2007), an overall score of 54.6 in ORM riders suggests that less than 30% of this group would be expected to have limitations in vigorous physical activities; whereas the ATV and non-riding Canadians have scores with an associated limitation range from 62-85%. Compared to Canadian norms and ATV riders, ORM riders are expected to have a low physical limitation rate (ORM% vs. range of ATV and norm %) for walking one block (0.3% vs 0.9 - 8.2%) and climbing 1 flight of stairs (0.6% vs. 3.2 - 12.9 %). Based on their high level of physical functioning, very few ORM riders would be expected to have physical difficulty at work (1.2% vs. 4.4 -16.6%) or the need to cut down time at work (0.4% vs. 4.1 - 9.5%).

Given their higher level of physical functioning compared to ATV riders and non-riding Canadians, ORM riders belong

to a group associated with higher levels of vitality; with 61% vs. 34-49% of group members reporting high energy levels and only 5.5% vs. 7-9% feeling tired “all or most of the time.” In general, ORM riders are in a range wherein 34% (vs. 4-13%) of the population would rate their own health as “excellent”.

The ORM riders scored within the top quartile of the PCS rating in which approximately 15% of the population reports a recent visit to the doctor. Due to their lower PCS score, an additional 5% of ATV riders and non-riding Canadians would be expected to have had a doctor’s visit in the past month. Similarly, those who place in the top quartile of PCS scores are less likely to have one or more cardiovascular risk factors or disease manifestations including hypertension, congestive heart failure, myocardial infarction, diabetes, angina, chronic lung disease, arthritis, or back pain (33% vs. 55%).

Mental Component Summary

No difference existed for MCS scores between vehicle types, which indicates that ATV and ORM riders have similar feelings about mental/psychological functioning and QOL. These data reveal that male riders of all ages, and young female riders, had MCS scores associated with a low prevalence of feeling “downhearted or blue” (0.1% vs. 1.0%); a high likelihood of self-classification as a “happy person” (90% vs. 64%); little chance of having to cut down time at work (0.4% vs. 3.7%), accomplishing less than expected (1.9% vs. 11.5%), or working less carefully (1.0% vs. 5.3%); minor social activity limitation (2.5% vs. 7.8%); and high vitality, with 62% (vs. 36%) having lots of energy and only 3% (vs. 8%) feeling tired. Based on their MCS scores, all male and younger female riders

are expected to have lower levels of stress and depression (11.5 and 18.4% respectively for riders vs. 18.4 and 29.1% for norms) and a higher overall life satisfaction (66.3%) compared to the normal population (47.5%). The finding of an increased mental wellbeing/QOL in older norms is in line with previously published population literature (Stone et al., 2010); however, the finding of a lower MCS value in older compared to younger female riders was surprising. At present the reasons for this lower value remain unclear, but it is worth noting that older female riders had much lower representation (15%) compared with younger female and male riders and thus may not be representative of the population as a whole.

It is known that those who accumulate too much or too little PA show an association with a lower health-related QOL (Brown et al., 2004) at all ages. High scores on the MCS and PCS suggest that off-road riding likely presents an appropriate dose of PA in this regard. Research has consistently shown that PA is related to the postponement of disability and increased independent living in older adults. Thus riding may play an important role into older age, possibly even beyond the age represented in the current study (Spirduso and Cronin, 2001).

As with any cross-sectional study, this investigation was limited in its ability to establish cause and effect relationships. Further investigation is required to establish if participation leads to these outcomes or if an uncontrolled selection factor is affecting participation rates in the activity as a whole or simply the participants of the current study. As this was the first study in this area, we were unable to verify if participants were representative of all Canadian riders.

Further investigation, including analysis of socio-demographic profiles of riders, will aid in determining the true effects of participation in this activity on off-road riders.

Summary and Conclusions

Habitual off-road riders appear to have relatively high physical and mental functioning, possibly as a result of their participation in recreational off-road riding. Both ATV and ORM riders revealed high QOL based on their MCS scores. In general, being an off-road rider had greater effects on the QOL of younger participants than older participants and was more influential amongst male riders than females across the lifespan. Overall, off-road riders had higher levels of physical functioning than Canadian population norms. This elevated PCS score, which is associated with lower physical limitations and health problems, was attributable primarily to ORM riders as opposed to ATV riders who were no different from the average Canadian. It is possible that the higher levels of vitality, general happiness and QOL of recreational off-road vehicle riders is a consequence of participation in the sport and thus further research is warranted to determine if this type of alternative activity should be recognized as a means to increase the health and QOL of Canadians.

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Qualifications:

The author qualifications are as follows: Jamie Burr, PhD, CSEP CEP,

Veronica Jamnik, PhD, CSEP CEP, Norman Gledhill, PhD, CSEP CEP.

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