The consequences of orofacial pain symptoms: a populationbased study in Hong Kong

Wong MCM, McMillan AS, Zheng J, Lam CLK. The consequences of orofacial pain symptoms: a population-based study in Hong Kong. Community Dent Oral Epidemiol 2008; 36: 417–424. © 2008 The Authors. Journal compilation © 2008 Blackwell Munksgaard

Summary - Objectives: To investigate the impacts associated with orofacial pain symptoms among adult Chinese people in Hong Kong. Associations between impacts, pain characteristics and professional treatment seeking behaviour were explored. Methods: A cross-sectional, population-based study was conducted using a telephone survey method. A sample of Cantonese-speaking Chinese people aged 18 years and over living in Hong Kong was interviewed. The questionnaire incorporated questions on recent orofacial pain experience and characteristics. Respondents with orofacial pain symptoms were asked about the consequences of the pain on various aspects of daily life and whether they had sought treatment for the pain. Results: Of the 1222 survey respondents, 41.6% reported some form of orofacial pain. 79.3% of those who reported orofacial pain and about one-third of the total sample had experienced at least one impact. The most common impact was worried about oral and dental health (59.8%) followed by avoided certain food (50.4%). Respondents with toothache were found to be more likely to have experienced all the impacts investigated (OR range: 2.048-3.309). People who had stayed in bed more than usual (OR = 2.342), experienced sleep disturbance (OR = 2.149), and worried about their oral and dental health (OR = 2.851) were more likely to seek professional treatment. Conclusions: The adverse impact of orofacial pain on the well-being of the adult population of Hong Kong was substantial. Despite this, treatment seeking was low with a high level of untreated orofacial pain symptoms.

Orofacial pain can be defined as pain related to the face and/or mouth and may involve both hard and soft tissues in these anatomical regions (1). Orofacial pain is common and epidemiological studies in the USA, Canada and the United Kingdom have shown that the prevalence of orofacial pain symptoms in adult populations ranges from 14% to 40% (2–5). In a population-based telephone survey of orofacial pain symptoms in adult Chinese people in Hong Kong, the 1-month period prevalence of the orofacial pain (42%) was found to be consistent with estimates in Western countries (6). However, not everyone with pain seeks professional help, some may just ignore the pain while certain symptoms may prompt action (7–9). The reported proportion of people with orofacial pain who sought professional help in



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Key words: epidemiology; impact; orofacial; Pain; treatment seeking

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Submitted 20 December 2006; accepted 21 August 2007

studies in Western cohorts was 44–46% (7–9). However, only 20% of Hong Kong Chinese adults with orofacial pain symptoms sought professional treatment which is considerably lower than that in the Western countries (6). Thus it is important to explore the factors and barriers relating to professional treatment seeking behaviour in order to understand the disparity in treatment seeking in Chinese adults compared with their Western counterparts. The decision to seek professional treatment may be related to the consequences of the orofacial pain as experienced by the individual and also affected by culturally mediated responses to the pain experience and its consequences (10).

The consequences of orofacial pain have an impact on various aspects of daily life and include

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work loss, sleep disturbance, need for more rest, avoidance of social contacts, difficulty eating and getting worried about oral and dental health (4, 7). The magnitude of the orofacial pain impact has been found to be related to the pain characteristics (type and severity) and socio-demographics (sex, age and place of birth) of the respondents (7). It has also been observed that pain-related sleep disturbance is a key impact in determining the likelihood of seeking professional treatment (8).

There is scant information available on the consequences of orofacial pain symptoms in Hong Kong Chinese people. In a population-based survey of symptoms of temporomandibular disorders in Chinese people in Hong Kong, approximately one-fifth of the respondents described associated sleep problems (11). In elderly Koreans with chronic orofacial pain conditions, around 30% of those with joint pain, toothache and burning mouth symptoms had significant associated disability and impairment of daily living activities (12).

In a previous study, we described the prevalence of orofacial pain symptoms and treatment seeking among Cantonese-speaking Chinese people in Hong Kong (6). In the present study, we aim to describe the consequences of orofacial pain symptoms in this same population based on information from the same data set and to further analyze treatment seeking behaviour in relation to psychosocial impacts as these aspects of the study have not yet been reported.

Methods

The design was a cross-sectional, population study using a telephone survey method. We have described the study method previously and published data on prevalence of orofacial pain symptoms and treatment seeking from the available data set (6). In brief, the study was conducted in November 2004 by the Telephone Survey Unit at the Social Sciences Research Centre, the University of Hong Kong. A sample of Cantonese-speaking Chinese people aged 18 years or over living in Hong Kong was generated for the survey by a random digit dialling technique. In Hong Kong, 95% of the population is ethnic Chinese and 96% are able to speak Cantonese (13). Interviews were conducted using a Computer Assisted Telephone Interview method and a standardized sequence viz., the research questionnaire followed by four demographic questions (age, gender, educational level, monthly income). A Chinese questionnaire was used that was based on an orofacial pain and discomfort screening measure described previously by Locker and Grushka (3). The questionnaire was translated into Chinese, back-translated into English, then pilot-tested on patients attending the Price Philip Dental Hospital in Hong Kong. Patient feedback was evaluated and the precise wording of the questionnaire determined. Approval from the Ethics Committee of the University of Hong Kong was obtained prior to commencement of the study.

Questionnaire

The questionnaire incorporated questions on current and recent orofacial pain experience, the respondents were asked 'In the past four weeks, have you had any of these types of pain?' The pain symptoms included toothache, pain in the teeth with hot or cold liquids, pain in the jaw joint/s, pain in the jaw while chewing, pain in the jaw joint/s while opening the mouth wide, pain in the face in front of the ear, a prolonged burning sensation in the tongue or other parts of the mouth, and sharp shooting pains across the face and/or cheeks. Orofacial pain was defined as present if the participant had experienced any of the above pain symptoms in the past four weeks. For those with pain reports, questions were asked about pain frequency, and intensity of the orofacial pain they experienced.

Respondents with orofacial pain were also asked about the consequences of the orofacial pain based on the work done by Locker and Grushka (7), 'Because of the pain you reported in your face and/or mouth during the past four weeks, have you:'

- taken time off from work
- stayed in bed more than usual
- stayed at home more than usual
- avoided social gatherings with family and friends.
- experienced sleep disturbance
- avoided certain foods
- worried about the health of the mouth and teeth (oral and dental health)

They were also asked whether they had consulted a doctor, dentist or traditional Chinese medicine (TCM) practitioner or taken self-prescribed medication (herbal remedy and/or over-the-counter medication) for the orofacial pain condition/s.

Data analysis

Data were entered into a computer using SPSS software (SPSS Inc, version 12). Consequences of orofacial pain were summarized as proportions in

the pain subgroup and in the total sample, 95% confidence intervals were also reported. Associations between the experience of individual impacts of orofacial pain (dependent variable, yes versus no) and pain characteristics (types of pain including toothache (yes versus no), tooth sensitivity (yes versus no), burning sensation (yes versus no), TMD-related pain (yes versus no) and shooting pain (yes versus no), pain frequency (frequent versus infrequent pain), and pain intensity (moderate/severe versus mild pain)) were explored using multiple logistic regressions. The association between seeking professional treatment (dependent variable, yes versus no) and the experience of impacts of orofacial pain (yes versus no) was also investigated using multiple logistic regressions. Age (18-34, 35-44 versus 55+-years old), gender (males versus females), education level (primary or below, secondary versus tertiary or above) and income level (0-14 999, 15 000-24 999, 25 000-39 999 versus 40 000+) were included in all the multiple logistic regressions to account for the effects of sociodemographics. A backward stepwise selection method was used, and only the significant variables were retained in the final models. The level of significance was set at 0.05.

Results

Survey sample and prevalence of orofacial pain As we reported previously (6), a total of 1222 respondents were successfully interviewed giving a response rate of 85.0%. The survey sample and the general population distribution are described in Table 1 for reference. The characteristics of the study sample were relatively similar to the data described in the 2001 Hong Kong population census (14) although there were slightly more females and middle-aged and tertiary-educated people in the study sample. Of the 1222 survey respondents, 508 (41.6%) reported some form of orofacial pain (6). The most prevalent pain symptom was tooth sensitivity (27.7%) followed by toothache (12.5%) and the least prevalent symptom was shooting pain in the face (1.1%). Among those with reported orofacial pain, 20.1% had frequent (quite often or very often) pain and 46.1% had moderate to severe pain. With the awareness of some differences in the profile of the surveyed subjects compared to the general population, the unweighted and weighted prevalence estimates

Table 1. Demographic data of the survey sample (n = 1222) and the general population of Hong Kong (95% C.I.)

	Survey sample (%)	General population (%)			
Gender					
Male	41.3 (38.5, 44.1)	49.5			
Female	58.7 (55.9, 61.5)	50.5			
Age(y)					
18–34	32.3 (29.7, 34.9)	37.4			
34–54	46.8 (44.0, 49.6)	38.7			
≥55	21.0 (18.7, 23.3)	23.9			
Educational attainment					
Primary or below	16.5 (14.4, 18.6)	32.1			
Secondary	51.0 (48.2, 53.8)	52.7			
Tertiary	32.6 (30.0, 35.2)	15.2			
Household income/month(HK\$)*					
0-14 999	41.8 (38.7, 44.9)	39.5			
15 000-24 999	23.7 (21.1, 26.3)	23.7			
25 000-39 999	17.0 (14.7, 19.3)	18.5			
≥40 000	17.5 (15.1, 19.9)	18.3			

*Household income/month for the general population is reported here instead of the personal income/month reported previously (6) for better comparison between the survey sample and the general population.

were calculated and have been reported (6). Since the unweighted and weighted estmates were found to be relative similar, only unweighted estimates were reported in this manuscript.

Impacts of orofacial pain

Among those who reported orofacial pain (n = 508), 79.3% had experienced at least one of the impacts explored. About one-third of them (33.5%) experienced one impact, an additional onethird (30.3%) experienced two impacts, 8.5% three impacts and 7.1% more than three impacts. Table 2 shows the distribution of those reporting orofacial pain who responded positively to the individual impact items. The most common impact observed was worried about oral and dental health (59.8%) followed by avoided certain food (50.4%). For those who were worried about their oral and dental health, about half (49.7%) were only mildly worried, 41.8% were moderately worried and 8.6% had major concerns. Only two respondents had taken *time off from work* because of the pain (one took one day and the other took four days off) and very few avoided family and friends. In order to provide estimates of the burden on the community as a whole, the percentage of respondents experiencing orofacial pain impacts in the total sample (n = 1222) was also described (Table 2). About a quarter of the respondents reported worries about oral and dental health and one-fifth avoided certain

Impact of Pain subgroup orofacial Total sample Ν pain % (*n* = 508) % (*n* = 1222) 0.4 (0.0, 0.9) Took time off 2 0.2 (0.0, 0.5) from work Stayed in bed 8.9 (6.4, 11.4) 3.7 (2.6, 4.8) 45 more than usual Stayed at home 58 11.4 (8.6, 14.2) 4.7 (3.5, 5.9) more than usual Avoided family 2.2 (0.9, 3.5) 11 0.9(0.4, 1.4)and friends Experienced sleep 92 18.1 (14.8, 21.4) 7.5 (6.0, 9.0) disturbance Avoided certain 256 50.4 (46.1, 54.7) 20.9 (18.6, 23.2) food Worried about 304 59.8 (55.5, 64.1) 24.9 (22.5, 27.3) oral and dental health

Table 2. Distribution of impacts of orofacial pain and $95\%\ {\rm CI}$

foods due to their orofacial pain. For the other impacts, the percentages were well below 10%. Considering all impact items together, 33.0% of the respondents had experienced at least one impact of orofacial pain (one: 13.9%, two: 12.6%, three and above: 6.5%).

Impacts of orofacial pain and pain characteristics

Since only two respondents took time off from work due to the orofacial pain they experienced in the past 4 weeks, this impact was not analyzed further in the investigation of associations between impacts of orofacial pain and pain characteristics. Table 3 shows significant (P < 0.05) pain characteristics and socio-demographics of the respondents with pain reports in relation to their

Table 3. Orofacial pain impacts and pain characteristics (results from multiple logistic regressions)

	OR	95% CI	Sig
Stayed in bed more than usual			
Toothache	3.309	(1.620, 6.761)	0.001
Burning sensation	3.505	(1.485, 8.276)	0.004
TMD-related pain	3.584	(1.745, 7.360)	0.001
Pain frequency (frequent versus infrequent pain)	2.224	(1.067, 4.636)	0.033
Education level (Primary*)	1		0.002
Secondary	0.230	(0.100, 0.526)	0.012
Tertiary	0.311	(0.125, 0.773)	< 0.001
Staved at home more than usual		(0.1_0) 0.1 0)	
Toothache	2.308	(1.290, 4.128)	0.005
TMD-related pain	2.200	(1.229, 3.935)	0.008
Age (18–34-years old*)	1		0.003
35–44-vears old	1.598	(0.760, 3.359)	0.216
55 + -vears old	3.666	(1.674, 8.028)	< 0.001
Avoided family and friends	0.000	(10.1,00020)	101001
Toothache	4.214	(1.047, 16.959)	0.043
Shooting pain	9.168	(1.501, 56.013)	0.016
Pain frequency (frequent versus infrequent pain)	5.571	(1.503, 20.652)	0.010
Experienced sleen disturbance	0.07 1	(1000) 201002)	01010
Toothache	3.072	(1.840, 5.129)	< 0.001
Shooting pain	5 561	(1409 21948)	0.014
TMD-related pain	3.065	(1.10)(210)(10)	<0.001
Pain intensity (moderate/severe versus mild pain)	3.085	(1.801, 5.101)	<0.001
Avoided certain foods	01000	(11000) 01202)	101001
Toothache	2 048	(1,355,3,095)	0.001
Pain frequency (frequent versus infrequent pain)	1.735	(1.075, 2.802)	0.024
Gender (female versus male)	1.536	(1.055, 2.235)	0.025
Age (18–34-years old*)	1		0.014
35–44-years old	1.851	(1.223, 2.800)	0.004
55 + -vears old	1.379	(0.816, 2.333)	0.230
Worried about oral and dental health	1.07 /	(0.010) =:000)	0.200
Toothache	2,215	(1.444, 3.398)	< 0.001
Sensitivity	1.583	(1.063, 2.358)	0.024
Education level (Primary*)	1		0.005
Secondary	2.224	(1.350, 3.665)	0.002
Tertiary	2.130	(1.235, 3.672)	0.007

*Reference category.

experience of individual pain-related impacts. Respondents with toothache were found to be more likely to have stayed in bed more than usual (OR = 3.309), stayed at home more than usual (OR = 2.308), avoided family and friends (OR = 4.214), experienced sleep disturbance (OR = 3.072), avoided certain foods (OR = 2.048)and worried about oral and dental health (OR = 2.215). People with TMD-related pain were found to be more likely to have stayed in bed (OR = 3.584), stayed at home (OR = 2.200) more than usual and experienced sleep disturbance (OR = 3.065). Those with shooting pain were more likely to have avoided family and friends (OR = 9.168) and experienced sleep disturbance (OR = 5.561). People with pain occurring frequently were more likely to have stayed in bed more than usual (OR = 2.224), avoided family and friends (OR = 5.571) and avoided eating certain foods (OR = 1.735). People with moderate to severe pain were more likely to have experienced sleep disturbance (OR = 3.085). Respondents in the middle and older age group were more likely to have stayed at home more than usual (OR > 1.5) while respondents in the middle age group were more likely to have avoided eating certain foods (OR = 1.851) due to their orofacial pain compared with the younger group. People with a higher education level were less likely to have stayed in bed more than usual (OR < 1) but more likely to be concerned about their oral and dental health (OR > 2). No significant associations were found between the gender and income level of the respondents and the experience of orofacial pain impacts (P > 0.05).

Impacts of orofacial pain and professional treatment seeking

As reported previously, among those who reported orofacial pain (n = 508), 20.3% had received professional treatment for the orofacial pain they experienced (6). However, further analysis using multiple logistic regression showed that people who had stayed in bed more than usual (OR = 2.342), experienced sleep disturbance (OR = 2.149), and worried about their oral and dental health (OR = 2.851) were more likely to seek professional treatment (Table 4). In addition, people in the middle and older age groups were also more likely to seek professional treatment (OR > 2) compared to the younger age group. No significant associations were found between the gender, education and income level of the respon-

Table 4. Orofacial pain impacts and professional treatment seeking (results from multiple logistic regression)

	OR	95% CI	Sig
Stayed in bed more than usual	2.342	(1.147, 4.784)	0.020
Experienced sleep disturbance	2.149	(1.247, 3.704)	0.006
Worried about oral and dental health	2.851	(1.688, 4.816)	< 0.001
Age (18–34-years old*)	1	_	0.004
35–44-years old	2.399	(1.340, 4.296)	0.003
55 + -years old	2.942	(1.482, 5.841)	0.002

*reference category

dents and professional treatment seeking (P > 0.05).

Discussion

Unweighted estimates were reported in the present study since the weighted estimates which were calculated by assigning weights according to the actual general Hong Kong population profile were considered to be relatively similar to the unweighted estimates (6). However, it should be noted that this is a limitation in the present study in that the sample differed in some respects from the population of Hong Kong and should be taken into account when interpreting the data.

The survey method adopted in this study was similar in approach to a community-based mail survey by Locker and Grushka (3, 7) and there were aspects comparable with a mail survey by Macfarlane et al. (4), therefore comparisons could be made with these studies. We have shown previously, based on the same data set, that the 1-month period prevalence of orofacial pain in adult, Hong Kong Chinese people was 42% and around half had moderate to severe pain (6). This result was consistent with estimates by Locker and Grushka (3) and Macfarlane et al. (4) in Western countries. However, analysis of previously unreported data revealed that there were some differences in the level of consequences experienced by the people with orofacial pain regarding taking time off from work, avoiding eating certain food and worrying about oral and dental health. In this study, only two respondents (0.4%) had taken time off from work because of the pain, this was much lower than the reported percentages in other studies (17% and 4% respectively) (4, 7). This could be explained by a different work-related culture and business practices in Hong Kong where people

might worry about losing their jobs if they take sick leave for such a condition. It is notable that more respondents in this study had avoided eating certain foods because of the pain they experienced, and was probably because of the fibrous nature of Chinese food, particularly lightly cooked vegetables and meat (15). On the other hand, fewer of the respondents with orofacial pain symptoms worried about their oral and dental health compared with the findings of Locker and Grushka (59.8% versus 70.3%). When all impact items were considered together, about 80% of the respondents with pain reports had experienced at least one impact and about one-third of the total sample (respondents with or without pain reports) had experienced at least one impact (a quarter worried about their oral and dental health and one-fifth avoided eating certain foods), which suggested there was still a substantial burden on the well-being of adult Hong Kong people as a whole.

Consistent with Locker and Grushka's findings (7), respondents with toothache were more likely to experience of all the impacts investigated and gender was not associated with the experience of the impacts. Contrary to Locker and Grushka's findings (7), pain frequency was found to be associated with more of the impacts rather than severity of the pain. In addition, there were some age-related differences in the experience of impacts, with respondents in the middle and older age groups being more likely to have stayed at home more than usual while respondents in the middle age group were more likely to have avoided eating certain foods due to their orofacial pain compared with the younger group.

Rather than investigate the associations between orofacial pain characteristics and professional treatment seeking behaviour directly, this study investigated first the association between pain characteristics and impacts of orofacial pain and then the association between impacts and professional treatment seeking behaviour. It is conceivable that there is a natural process that relates pain characteristics and impacts to professional treatment seeking for orofacial pain symptoms. First, the characteristics of orofacial pain (type, frequency and severity) an individual experienced would have varying consequences on different aspects of daily life (impacts). As discussed by Locker (16), the functional and psychosocial consequences of oral disorders varied from individual to individual even though the severity of their clinical condition remained the same. Then, depending on the nature and magnitude of the impacts experienced by the individual, they would contribute to the decisionmaking process regarding seeking professional treatment. It was found that respondents who had to stay in bed more than usual, had experienced sleep disturbance, and worried about oral and dental health were more likely to seek professional treatment. It should be noted that in the present study the assessment of emotional responses was relatively crude due to the limitations of conducting the telephone survey. However, in a community setting where personal interviews were possible, it would be more appropriate to investigate emotional responses more thoroughly using standardized, psychometrically-derived and tested measures of anxiety and depression. Besides measuring the impacts of orofacial pain on various aspects of daily life studied as undertaken in this study, other investigators have sought to measure the impacts of orofacial pain by using alternative approaches, for instance, the Manchester orofacial pain disability scale (17), the Oral Health Impact Profile (OHIP) (18), the General Health Questionnaire (GHQ) (19) and the Illness Behaviour Questionnaire (IBQ) (19). It would be of interest to compare the performance of the different measures in relation to pain characteristics and professional treatment seeking behaviour.

In Hong Kong, dental services for the general public are mainly provided by dentists in private general practice on a fee-for-service basis. Emergency treatments (basically extraction) are provided to the public for the relief of dental pain on selected sessions in a few government out-patient clinics. Third party payment schemes are uncommon and mainly exist as an employment benefit provided by companies which have contracts with specific dentists or which reimburse dental care expenses to their staff (20). Based on the same data set, we reported previously that only 20% of those in pain sought treatment which is considerably lower than previous reports of 44–46% in the Western countries (4, 6, 7, 9). The high level of untreated orofacial pain symptoms in adult Hong Kong Chinese people is another example that only a small amount of the overall symptoms give rise to a professional consultation. In the present study, further analysis of the treatment seeking data showed that in addition to the impacts of orofacial pain, there were other factors such as pain coping strategies (11, 21, 22), persistence of pain (23), perception and acceptance of pain (24–26) and potential barriers to treatment seeking (27, 28) that also contributed to the decision regarding seeking professional treatment. As suggested by Hastie et al. (10), besides seeking professional treatment, an individual can adopt other painreducing behaviours which included self-care, seeking social support, passive strategies (e.g. decreasing activity) and spiritual/religious coping in response to orofacial pain. Hastie et al. (10) have also observed a difference in the pattern of pain-reducing behaviours between healthy young African-Americans, Hispanics and non-Hispanics whites indicating an ethnic dimension to pain-reducing behaviour. Thus, there could be an ethnic difference in pain-reducing behaviours or more effective pain coping strategies among the Hong Kong Chinese compared to Western cohorts that may account for the lower proportion of people in pain who sought treatment. When exploring potential barriers to treatment seeking, people's belief that they need health care and that their health status will get better after such care should also be considered (28). Further investigations of the above factors are warranted to provide insights into the apparent disparities in treatment seeking behaviour.

In conclusion, the impact of orofacial pain on the well-being of the adult population of Hong Kong was substantial. Despite this, treatment seeking was low with a high level of untreated orofacial pain symptoms.

Acknowledgement

The study was supported by a grant from the Committee for Research and Conference Grant (CRCG), The University of Hong Kong. The authors are thankful to the interviewers and staff from the Social Science Research Centre, The University of Hong Kong in conducting the survey and assisted with the data entry and cleaning.

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