

Cross-Sectional Survey



A Pilot Cross-Sectional Study of Postpartum Wrist Pain in an Urban Chinese Population: Its Prevalence and Risk Factors

Regina W.S. Sit, MBBS¹, Wing-Hung Tam, MD², Dicken C.C. Chan, MSc¹, Benjamin H.K. Yip, PhD¹, Lucia W.Y. Tam, Bsc¹, Lyan L.Y. Chow, Bsc¹, Vincent C.H. Chung, PhD¹, Roger Y. Chung, PhD¹, and Samuel Y.S. Wong, MD¹

From: ¹The Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Shatin, Hong Kong; ²Department of Obstetrics and Gynecology, The Chinese University of Hong Kong, Shatin, Hong Kong

Address Correspondence:
Regina W.S. Sit, MBBS
4/F School of Public Health
Building
Prince of Wales Hospital,
Special Administrative Region
Shatin, Hong Kong
E-mail: reginasit@cuhk.edu.hk

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Background: Wrist pain after childbirth is commonly encountered in clinical practice. Little is known about the prevalence of this musculoskeletal disorder which is important to overall maternal health.

Objective: To examine the prevalence of and risk factors for de novo wrist pain in women after childbirth.

Study Design: A pilot cross-sectional survey.

Setting: A telephone interview was conducted 2 months after childbirth among women who delivered at a tertiary hospital in Hong Kong.

Methods: The prevalence of de novo wrist pain was recorded; its severity was rated using the numerical rating scale and Patient-Rated Wrist Evaluation (PRWE) with pain and functional subscale scores.

Results: In total, 259 women aged 32.8 ± 4.0 years participated; 149 women (57.5%) developed wrist pain after childbirth and 125 (84%) had persistent wrist pain 2 months postpartum. The majority had moderate (43.5%) to severe (21%) wrist pain. Bilateral involvement was common (56.8%), with most of the pain (59.3%) located on the radial side of the wrist. Primiparity was associated with wrist pain development (odds ratio 2.62, 95% confidence interval 1.33 – 5.16, $P = 0.01$); pain intensity was negatively correlated with the baby's birth weight ($\beta = -1.059$, $P = 0.013$). Mean PRWE pain and function scores were 22.8 ± 10.3 and 15.6 ± 10.7 , respectively.

Limitations: Cross-sectional survey is prone to volunteer bias, though recent literature indicates that the bias may not substantially affect the internal validity of the study.

Conclusion: Wrist pain is prevalent after childbirth; future studies may consider looking into its exact pathology, long-term consequences, and overall effect on maternal health.

Key words: Wrist pain, DeQuervain disease, postpartum, childbirth, mothers, prevalence, cross sectional study, survey

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Childbirth and the postpartum period is a stressful time when women experience a number of physical and psychosocial changes (1-3). Over 50% of women reported tiredness and back pain after

delivery, and many experience headaches, and perineal, caesarean wound, and breast engorgement pain (2-7). Physical problems have been identified as risk factors for poor self-rated health and emotional well-being

after childbirth; and as their presence and severity increase, women's functional limitations also increase, including ability to work, look after children, and do housework, along with an increased risk of depressive symptoms (5,8-10).

Among the physical problems, musculoskeletal pain, such as low back, neck, and shoulder pain, is common in postpartum women (1-5). Case reports and case series have suggested that wrist pain after childbirth, also mentioned as "DeQuervain Disease" or "baby wrist," is frequently encountered in clinical practice (11-15). This is an overuse syndrome of the wrist and a result of repetitive prolonged carrying, lifting, and holding of infants as well as cradling during breastfeeding; a similar phenomenon has been observed in helpers involved in taking care of newborns (12,15). Apart from the additional health expenditure, it may also lead to the development of chronic wrist pain, a common condition resulting in significant disability and time off work (16-18).

The aim of this pilot study was to evaluate the prevalence and pattern of wrist pain and its associated risk factors in women after childbirth. We hypothesized that postpartum wrist pain is common and is associated with a heavy baby, breastfeeding practices, and nonattendance of antenatal classes.

METHODS

We conducted and reported the study according to the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) Guidelines. The study was approved by the Survey and Behavioral Research Ethics Approval Committee of the Chinese University of Hong Kong on February 5, 2014. Informed consent was obtained from all participants.

STUDY DESIGN

This was a pilot cross-sectional study using a telephone survey conducted 2 months after childbirth.

SETTING

Women were recruited from the postnatal ward at the Prince of Wales Hospital, a regional institution in the Eastern New Territories (NTE) of Hong Kong, which provides obstetric services to a population of 1.26 million with an average of 7,000 deliveries per annum at the time of the study, representing 17.2% of the Hong Kong population. Between February 2014 and March 2015, women in the postnatal ward who were within the first 5 days of delivery were invited to participate

in this survey. Recruitment was conducted in the afternoons of Mondays and Thursdays because it took around 3 days for women with a normal spontaneous delivery to be discharged.

Invited women were asked to sign a consent form allowing us to contact them via telephone at 2 months after delivery. A cut-off of 2 months was chosen because of the amount of time taken for wrist pain to develop after childbirth and to eliminate the effect of confounding factors, including the mother's occupation, which may involve repetitive wrist strain and could influence the severity of wrist pain. In Hong Kong, women are entitled to 10 weeks of maternity leave.

Participants

Women were eligible to participate if they fulfilled the inclusion criteria: (i) aged ≥ 18 years; (ii) able to read Chinese; and (iii) free of any wrist pain in the previous one year. Exclusion criteria include individuals with (i) previous wrist pain related to pregnancy; and (ii) hearing or speech impairment that would hinder a telephone interview.

Variables

Dependent Variables

The outcome was self-reported history of wrist pain after childbirth. Wrist pain was defined as pain around the wrist joint without any associated palm or finger pain, numbness, tingling, or weakness, which would otherwise be suggestive of carpal tunnel syndrome (19). A screening question ("Did you develop any wrist pain after childbirth?") was asked. A positive answer prompted further questions concerning the onset of wrist pain, whether it was unilateral or bilateral, and its location.

Women were then asked about whether the wrist pain had resolved or persisted. If the pain had persisted, they were asked to rate the present overall pain intensity at rest based on the 0 – 10-point numerical rating scale (NRS); the pain was categorized as none (0), mild (1 – 3), moderate (4 – 6), or severe (7 – 10) (20). If both wrists were affected, the more painful wrist was rated. The women were then asked to answer the Chinese (Hong Kong) version of the Patient-Rated Wrist Evaluation (Chinese PRWE) questionnaire based on their activities in the previous 7 days (21). The PRWE was originally developed in 1998 to measure subjective pain and performance-based functional ability of the wrist (22). It is a 15-item questionnaire focusing on wrist injuries,

with 5 pain questions categorized under the “pain” subset and 10 questions under the “function” subset. This questionnaire has a simple scoring system based on a 0 – 10 Likert scale, with each of the subsets having a subtotal score of 50, making up a total score of 100. The PRWE has been translated into a number of languages and used worldwide due to its good responsiveness and sensitivity (23), and a Chinese (Hong Kong) version was used in this study (21). Again, for bilateral wrist pain, the more painful wrist was used for scoring. The women were also asked if they had sought any medical treatment for their wrist pain in the previous 2 months.

Independent Variables

Several variables that have been shown to be related to postpartum low back pain (24,25), such as age (with a cutoff of ≥ 35 years indicating advanced maternal age), parity (primiparas versus multiparas), neonatal birth weight (for multiple gestations, the average neonatal birth weight was collected), and maternal history of previous wrist pain or injury were considered to be confounders in this study. Other variables hypothesized to be associated with wrist pain, such as availability of helpers, attending antenatal classes, and breastfeeding, along with the methods used, were also included in the questionnaire to evaluate their possible relationship with wrist pain. We defined breastfeeding status by asking if the baby was still receiving any breast milk at 2 months, and if so, classified the current method of milk feeding as either breast milk only or mixed breast milk and formula. Babies were deemed to be breastfed if only exclusive or mixed feeding and non-breastfed if on formula milk only (26).

Sample Size Calculation

As there were no similar studies in the published literature, we adopted the Raosoft method for sample size calculation in this pilot study (27). Assuming a response of 30%, a margin of error of 6%, and a 95% confidence interval (CI), the target sample size was calculated to be 222.

Statistical Analysis

The data were analyzed using Statistical Package for Social Sciences software version 20.0 (SPSS Inc., Armonk, NY, USA). Descriptive data were reported as the mean \pm standard deviation, and a P -value < 0.05 was considered statistically significant. Univariate and multivariate analyses were performed to identify risk factors; all variables in univariate analysis were entered

into multiple logistic regressions for evaluation of confounders. The odds ratio (OR) and beta coefficient were calculated, and a 95% CI was applied.

RESULTS

Description of Study Sample

A total of 277 women were invited to participate, of whom 259 responded (93.5%) to the telephone survey at 2 months. The mean participant age was 32.8 ± 4.0 years, and 250 women (96.5%) were married. Among the responders, 149 (57.5%) had developed wrist pain after childbirth and 125 (84%) had persistent wrist pain at 2 months after delivery. Figure 1 summarizes the recruitment process used for this survey. Bilateral wrist pain was documented in 84 women (56.8%); the chances of pain developing in the left and right wrists were similar (23.6% and 19.6%, respectively).

In the 2 months postpartum, only 35 of 149 women (23.5%) sought help for their wrist pain, which included a combination of western medicine (17%), traditional Chinese medicine (49%), physiotherapy (9%), and self-medications (51%); only 2 women had recovered by the time of the interview.

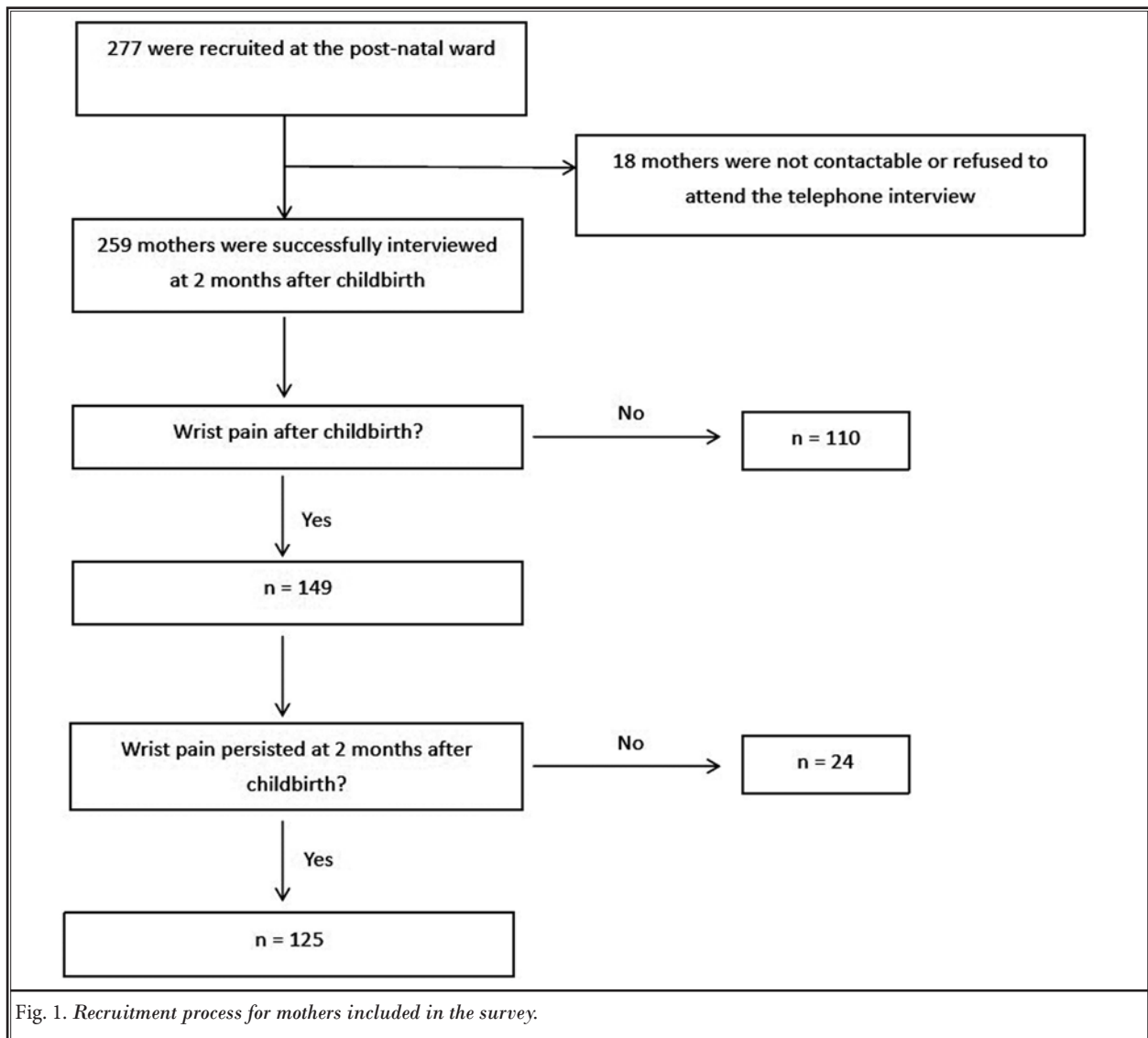
Of the 125 women who had persistent wrist pain, 24.2% experienced mild, 43.5% experienced moderate, and 21% experienced severe pain at rest. The mean PRWE pain and function scores were 22.8 and 15.6, respectively.

Location of Wrist Pain

The pain distribution among the 125 women with wrist pain is summarized in Table 1. The majority of these women (59.3%) reported pain on the radial side of the wrist, followed by dorsal wrist pain (12.4%) and generalized wrist pain all around the wrist (12.4%).

Risk Factors for Development of Wrist Pain after Childbirth

Differences in specific demographic variables between women with or without wrist pain are summarized in Table 2; the OR and 95% CI for these variables calculated by multiple logistic regression are summarized in Table 3. After adjusting for confounders, advanced maternal age (OR 1.18, 95% CI 0.65 – 2.13, $P = 0.59$), helper availability (OR 1.62, 95% CI 0.81 – 3.26, $P = 0.17$), and history of wrist pain or injury (OR 1.76, 95% CI 0.90 – 3.44, $P = 0.10$) were not significantly associated with wrist pain. However, primiparity (OR 2.62, 95% CI 1.33 – 5.16, $P = 0.005$) and attendance of antenatal class-



es (OR 2.17, 95% CI 1.20 – 3.95, $P = 0.01$) were significant risk factors for wrist pain. Women who breastfed their children had more than twice the risk of wrist pain than women who did not breastfeed, but this association was not statistically significant in the multiple regression results (OR 2.58, 95% CI 0.99 – 6.71, $P = 0.051$).

Factors Associated with Severity of Wrist Pain and Functional Disability

Neonatal birth weight was found to be associated with the severity of wrist pain in women reporting persistent wrist pain at 2 months postpartum; women with lower birth weight babies had a higher NRS score ($\beta = -1.059$, $P = 0.013$). No other risk factors were identified

to be associated with the severity of the NRS score or the PRWE score.

DISCUSSION

In this study, we confirmed that wrist pain is very common after childbirth, and the prevalence is higher than that for low back pain (about 40% – 50%) or neck and shoulder pain (approximately 30% – 40%) (2,3,5). Over 50% of the women in our study experienced moderate to severe wrist pain; both wrists had a similar chance of being affected and bilateral wrist pain was common.

To the best of our knowledge, this is the first report of the prevalence of postpartum wrist pain and

no overseas data are available for comparison. We searched 12 electronic databases including OVID MEDLINE, EMBASE, Global Health, NHS Health Technology Assessment Database, Digital Dissertation Consortium, International Pharmaceutical Abstract, BIOSIS Preview, AMED, Inspec, Ovid Nursing Database, and MIDIRS. The search period started from their inception until July 2016, using terms "postpartum," "childbirth," "wrist pain," "prevalence," "mothers," "DeQuervain disease," and "baby wrist." We could not identify any studies that evaluated the prevalence of postpartum wrist pain. Therefore, we are uncertain whether it is a unique health care problem to our study population due to cultural differences in post-partum care or there is an issue of ethnic predisposition.

Etiology of Postpartum Wrist Pain

Similar to low back pain, development of wrist pain is believed to have multiple causes, including mechanical strain and joint laxity (28). Repetitive prolonged carrying, lifting, and holding babies contribute to heavy mechanical strain at the wrist (29). Peripheral joint laxity increases during pregnancy (30,31), and joint laxity is a known risk factor for joint pain and injury (32-34). Given that incorrect wrist posture has been found to be associated with development of wrist pain, posture evaluations may be considered in future research (35,36).

Location of Wrist Pain

Previous case reports concerning postpartum wrist pain have focused mainly on De Quervain disease, i.e., stenosing tenosynovitis of the abductor pollicis longus and/or extensor pollicis brevis tendon(s) at the radial styloid process (11-13,15,37). Our study reports similar findings, with wrist pain in the radial side in the majority of women; however, we also identified other patterns of wrist pain, including dorsal wrist pain, volar wrist pain, and, to a lesser extent, ulnar wrist pain. Wrist overuse leading to tenosynovitis of individual tendons may contribute to pain at different regions of the wrist (38). Dorsal and volar wrist pain can be due to distal radioulnar

Table 1. Pain distribution among 125 mothers with persistent wrist pain at 2 months postpartum.

Location of Pain	Unilateral		Total
	Left	Right	
Volar side of the wrist	11 (11.1%)	6 (6.3%)	17 (8.8%)
Dorsal side of the wrist	10 (10.1%)	14 (14.7%)	24 (12.4%)
Radial side of the wrist	57 (57.6%)	58 (61.1%)	115 (59.3%)
Ulnar side of the wrist	4 (4.0%)	5 (5.3%)	9 (4.6%)
Generalized wrist pain	14 (14.1%)	10 (10.5%)	24 (12.4%)
Others	3 (3.0%)	2 (2.1%)	5 (2.6%)

Table 2. Demographic data stratified by pain (n (column %), mean ± standard deviation).

	Total (n=259)	Wrist pain		P ^ψ
		Yes (n=149, 57.53%)	No (n=110, 42.47%)	
Age (years)				0.96
≥35	82 (31.66%)	47 (31.54%)	35 (31.82%)	
Parity				0.00*
Primiparity	153 (59.07%)	100 (67.11%)	53 (48.18%)	
Baby's birth weight (kg) ¹	3.10 ± 0.49	3.11 ± 0.53	3.08 ± 0.44	0.60
Helper availability	215 (83.01%)	127 (85.23%)	88 (80.00%)	0.27
Breastfeeding				0.02*
Yes	234 (90.35%)	140 (93.96%)	94 (85.45%)	
Method of breastfeeding (%)				
Direct breastfeeding	62.87 ± 40.22	60.03 ± 40.29	67.14 ± 39.96	0.19
Electronic pump	32.60 ± 39.39	35.63 ± 39.41	28.07 ± 39.13	0.16
Manual pump	4.69 ± 17.82	4.63 ± 17.91	4.78 ± 17.78	0.95
Previous history of wrist pain/injury	95 (36.68%)	56 (37.58%)	39 (35.45%)	0.73
Antenatal class ¹	180 (69.77%)	117 (79.05%)	63 (57.27%)	< 0.00*
Exercise class		37 (25.00%)	19 (17.27%)	0.14
Breastfeeding class		80 (54.05%)	48 (43.64%)	0.10
New born class		89 (60.14%)	48 (43.64%)	0.01*
Other class		18 (12.16%)	8 (7.27%)	0.20

Missing - ¹, 1, ², 5*: P < 0.05. ^ψTwo sample t-test for continuous variable, chi-squared test or Fisher's Exact test for categorical variable

joint subluxation (39,40) and carpal instability such as scapholunate dissociation (41,42). For ulnar wrist pain, it is important to rule out triangular fibrocartilage complex injury and a tear of the lunotriquetral ligament (43,44). As this was a self-reported survey, future research may consider looking into the exact pathologies of the wrist pain with the help of different imaging modalities (45,46).

Table 3. Logistic regression model comparing mothers with and without wrist pain.

	Univariate			Final model ^y		
	OR	95% CI	P	OR	95% CI	P
Age ≥35 years	0.99	0.58 – 1.68	0.96	1.18	0.65 – 2.13	0.59
Primiparity	2.20	1.32 – 3.64	0.00*	2.62	1.33 – 5.16	0.01*
Baby's birth weight (kg)	1.15	0.69 – 1.91	0.59	1.31	0.76 – 2.26	0.33
Helper availability	1.44	0.75 – 2.77	0.27	1.62	0.81 – 3.26	0.17
Breast feeding	2.65	1.12 – 6.24	0.03*	2.58	0.99 – 6.71	0.051
Previous history of wrist pain	1.10	0.66 – 1.83	0.73	1.76	0.90 – 3.44	0.10
Antenatal class	2.82	1.63 – 4.87	<0.00*	2.17	1.20 – 3.95	0.01*

^yMultiple logistic regression; **P* < 0.05. Abbreviations: CI, confidence interval; OR, odds ratio

Risk Factors for Development of Wrist Pain after Childbirth

In this study, primiparity was the risk factor for developing postpartum wrist pain. This finding is consistent with evidence from other studies that primiparas are more at risk of developing physical problems in the first 8 weeks postpartum (5,47). New mothers are often less experienced and less prepared for the great physical and psychosocial changes of motherhood. The health problems that can occur in new mothers appear to be under-recognized (3) and more attention may be needed to address their difficulties and needs, and well beyond the 6-week period traditionally allotted for recovery after childbirth (48).

In contrast with our hypothesis, women who attended antenatal classes were more at risk of developing wrist pain after childbirth. The content of our antenatal classes includes exercise, breastfeeding, and care of the newborn. It is difficult to explain this finding, although there is a suggestion in the literature that antenatal education sometimes fails to provide women with a realistic account of birth and parenting to replace the lived experience (49,50). We suspect that women who attend antenatal classes might be preparing themselves to be the primary caregivers for their babies, i.e., planning to spend more time engaged in childcare, and believe that longer times spent lifting and cuddling might predispose to chronic wrist strain and pain. Another explanation could be the selection bias inherent in this type of survey (51). It is possible that the women who agreed to participate in this survey were more likely to be participating in other activities as well, such as antenatal classes.

We hypothesized that wrist pain is associated with breastfeeding and a potential reason for early weaning of breastfeeding in our locality. Breastfeeding rates are low in Hong Kong when compared with other devel-

oped countries (52,53) only 26.7% of women in Hong Kong breastfeed their babies for more than 6 weeks (54). This is well below the international standard proposed by the World Health Organization, which recommends exclusive breast feeding for 6 months (55). The potential obstacles to breastfeeding in our region include insufficient breast milk, tiredness and fatigue, and return to work (54,56). Our results suggest that development of wrist pain postpartum could be associated with breastfeeding, although the relationship was not statistically significant in our study. Based on the estimated OR for breastfeeding, the observed proportion of women who breastfeed (90.3%), and the proportion of women within this group who develop wrist pain (36%), the estimated post hoc power was 0.598. Thus, in any future study aiming to confirm the significance of the relationship between breastfeeding and wrist pain, a sample size of 418 would be required to achieve a power of 0.80.

Factors Associated with Severity of Wrist Pain and Functional Disability

Lower birth weight was found to be associated with the severity of wrist pain. A heavier baby would result in a heavier load at the wrist and more severe pain. However, a low birth weight baby may be more physically demanding during the whole caring process (57), and one study has demonstrated that parental carrying is associated with a substantial reduction in crying and fussing behavior (58). Therefore, it is reasonable that mothers would spending more time carrying babies with a lower birth weight, thus putting more strain on their wrists and developing more severe wrist pain (29).

Help-seeking Behavior

Only a minority of the women in our survey sought medical advice for their wrist pain, and our findings in

this regard are consistent with those of previous studies showing that the majority of postpartum women do not consult a health care professional even when they feel they need help or advice for their symptoms (1,2,4). Women generally receive little information about the long-lasting physical problems that may occur as a consequence of childbirth and early motherhood, so may be unprepared and feel vulnerable when faced with such problems (5). Similar to other musculoskeletal complaints during pregnancy, greater awareness of the condition could lead to earlier reporting of symptoms, and thus timely intervention and treatment (28,59).

Sample Representation

Although the study was conducted at a single hospital, it is the only hospital which provided obstetric service to the Eastern New Territories of Hong Kong. The serving population is 1.26 million, representing 17.2% of the Hong Kong population. The NTE cluster is further divided into 3 separate regions, namely Shatin, Tai-Po, and the North District, from the most urbanized to the most rural regions, respectively. Their median monthly household incomes in 2006 were US \$2,510, US \$2,338, and US \$2,078 for these 3 regions, respectively, compared to the Hong Kong-wide fig-

ure of US \$2,240. These 3 regions have similar median ages (38 – 39 years), comparable with the median age of 39 years for Hong Kong. Therefore, we believe that even though the cross-sectional study is conducted at a single hospital, it represents the population that has demographic distributions comparable with the whole Hong Kong population (60).

The major limitation of the study is that a cross-sectional survey is prone to volunteer bias (61); however, recent literature indicates that selection bias may not substantially affect the internal validity of a study (62).

CONCLUSIONS

The results of this study confirm that wrist pain is common after childbirth. Although it seems to be trivial when compared with other types of musculoskeletal pain, if left untreated, it may result in significant disability and time lost from work. Future studies should evaluate the long-term consequences of postpartum wrist pain and its overall effect on maternal health. Interventional strategies such as focused antenatal education on wrist care and a comprehensive management algorithm for women with postpartum wrist pain should be sought as part of high-quality perinatal care.

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