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Risk Factor Analysis of De Quervain Syndrome in Mothers: A Cross-Sectional Study in Surakarta

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Abstract

Introduction: De Quervain's tenosynovitis is six times more common in women than in men, particularly among women of childbearing age. Household activities such as carrying children, washing, and wringing clothes involving the thumb and wrist can increase the risk of this condition. Frequent carrying of children is significantly associated with its occurrence (p=0.00), with 24% of respondents reporting severe pain. Women aged 30–50 years often experience De Quervain Syndrome, especially postpartum. This study analyzed the factors associated with De Quervain Syndrome in mothers.

Methods: This observational study employed a cross-sectional design and was conducted at several integrated health posts (Posyandu) in Pajang Village, Laweyan Subdistrict, Surakarta City, between November and December 2024. The study population consisted of mothers attending toddler Posyandu activities across six neighborhoods (Rukun Warga or RW). A total of 75 participants were selected using purposive sampling based on inclusion and exclusion criteria. Data were analyzed using descriptive-analytic methods, and the chi-square test was employed to examine the relationships between dependent and independent variables.

Results: The analysis revealed that maternal age (p=0.00), number of children (p=0.048), breastfeeding status (p=0.04), frequency of carrying children (p=0.00), and hand dominance (p=0.016) were significantly associated with the occurrence of De Quervain Syndrome (p-values < 0.05).

Conclusion: Factors such as maternal age, number of children, breastfeeding status, frequency of carrying children, and hand dominance are significantly associated with the occurrence of De Quervain Syndrome in mothers. This study highlights the importance of educating mothers about the risks of household activities on wrist health.

Keywords: De Quervain Syndrome, mothers, Finkelstein test, risk factors

Introduction

De Quervain's tenosynovitis, also known as gamer's thumb or mother's thumb, is a common pathological condition of the wrist first described by Fritz de Quervain in 1895.[12] This condition is caused by repetitive strain on the extensor pollicis brevis (EPB) and abductor pollicis longus (APL) tendons, leading to inflammation, pain, and restricted movement. The syndrome often arises from overuse or repetitive wrist and thumb movements, commonly associated with daily household activities.[3]

The first dorsal compartment consists of the extensor pollicis brevis (EPB) and abductor pollicis longus (APL) tendons, which are enclosed within a fibrous tunnel lined with a synovial sheath and measuring approximately 2.2 cm in length.[4] De Quervain's tenosynovitis is often associated with overuse or repetitive movements of the wrist or thumb.[5] Continuous friction leads to inflammation of the tendon sheath, followed by the proliferation of fibrous connective tissue, which causes the narrowing of the tendon sheath.[6] This narrowing of the tendon sheath results in restricted movement of the abductor pollicis longus and extensor pollicis brevis tendons.[7] Patients with De Quervain's syndrome experience difficulty in gripping and performing daily activities, characterized by pain on the radial side of the wrist.[3]

The incidence rate of De Quervain's syndrome is higher in women, with 2.8 cases per 1,000 individuals per year, compared to 0.6 cases per 1,000 individuals per year in men.[8] Among the adult working population aged 18-65, De Quervain's tenosynovitis is 0.5% for males and 1.3% for females, with the highest prevalence occurring in the age group of 40-60.[9] According to other studies, De Quervain's tenosynovitis occurs six times more frequently in women than in men, particularly in the age group of 30-50 years, with the highest prevalence observed in postpartum women.[8] Household activities such as carrying children, washing, and wringing clothes, which involve the use of the thumb and wrist, are at risk of causing De Quervain's tenosynovitis.[6] Women aged 30 to 50 years frequently experience this condition, with some developing it after childbirth.[10]

De Quervain Syndrome is the second most common wrist issue that occurs during pregnancy and the postpartum period.[11] Approximately 57.5% of women experience wrist pain after childbirth and 84% report that the pain lasts for more than two months postpartum, with symptoms typically appearing on the radial side of the wrist. It has been reported that the risk of wrist pain is twice as high in breastfeeding cases.[12] This diagnosis is thought to stem from endocrine factors that cause fluid retention in breastfeeding mothers, which can be observed during the first three

months postpartum.[13] According to other studies, De Quervain's tenosynovitis is most commonly thought to occur due to overuse and repetitive trauma to the wrist experienced while carrying a baby. [14] From a mechanical perspective during the postpartum period, the pressure exerted on the surrounding tendons through flexion and ulnar deviation while caring for a baby leads to inflammation of the tendons and tendon sheath, making mothers susceptible to this pathology.[14]

According to the study by Aneeqa Manzoor (May–June 2021), out of 190 participants, consisting of 144 mothers (75.8%) and 46 other caregivers (24.2%), 51 individuals (26.8%) reported a positive Finkelstein Test result, with 36 (70.5%) being mothers and 15 (29.4%) caregivers. Significant risk factors for De Quervain syndrome included the age of the baby (p=0.00), frequency of carrying (p=0.00), and hand dominance (p=0.02).[15] In Indonesia, research on the factors associated with De Quervain's syndrome is still minimal. Therefore, this study aims to identify the aspects related to De Quervain syndrome in mothers. This research hypothesizes that maternal age, breastfeeding status, frequency of carrying children, number of children, and hand dominance are associated with the occurrence of De Quervain syndrome in mothers.

This study investigates the relationship between maternal age, breastfeeding status, frequency of carrying children, number of children, and hand dominance with the occurrence of De Quervain Syndrome. Variables such as maternal age, breastfeeding status, frequency of carrying children, number of children, and hand dominance are significantly associated with the occurrence of De Quervain Syndrome in mothers.

Methods

This study employs an observational design with a cross-sectional approach to identify factors associated with De Quervain syndrome in mothers. This approach was chosen as it efficiently provides an overview of the relationship between variables at a specific point in time. The study was conducted at several integrated health posts (Posyandu) in Pajang Village, Laweyan District, Surakarta City, from November to December 2024. This location was selected due to the high attendance of mothers with toddlers, which aligns with the study's objectives.

The study population involved mothers attending toddler activities at six community units (Rukun Warga) with a total population of 302 individuals. The sample size was calculated using Slovin's formula with a 10% significance level, as this level of significance is deemed acceptable for a relatively small study population, resulting in a minimum sample size of 75 individuals. Sampling was conducted using purposive sampling based on inclusion and exclusion criteria. Inclusion criteria included mothers aged 20-45 years, those with a baby or child under 3 years old, those who care for their children independently, and those with a direct relationship with the child's mother. Exclusion criteria included mothers with a history of rheumatic disease, carpal tunnel syndrome, peripheral neuropathy, or other musculoskeletal disorders; those who experienced acute wrist trauma or injury within the last six months; those with a history of hand or wrist surgery; and those who are currently pregnant. Before data collection, all participants were informed about the study and asked to sign an informed consent form.

Data collection was conducted through questionnaire completion and physical examination using the Finkelstein test. The questionnaire contained participant demographics (age, number of children, and age of children), child care activities (such as the frequency of carrying children per day), hand dominance during activities, and history of injuries or musculoskeletal symptoms such as wrist tingling. The Finkelstein test was chosen due to its high sensitivity (93%) and specificity (85%) in detecting De Quervain syndrome, particularly in breastfeeding mothers. The physical examination using the Finkelstein test involved flexing the thumb to touch the palm, followed by bending the four fingers to make a fist. The examiner then moved the hand toward the ulnar deviation. The onset of severe pain along the distal radius was considered a positive sign for De Quervain syndrome. This examination was selected due to its high sensitivity, low false-positive rates, and minimal discomfort for the patient.

The obtained data were analyzed in two stages. Univariate analysis was conducted to describe respondent characteristics using mean values, standard deviation (SD), minimum and maximum values, and frequency (n). The bivariate analysis utilized the chi-square test to evaluate the relationship between independent variables (maternal age, child's age, number of children, frequency of carrying, breastfeeding status, and hand dominance) and the dependent variable (occurrence of De Quervain syndrome). A relationship was considered significant if $p \leq 0.05$. Selection bias was minimized through strict inclusion and exclusion criteria, while information bias was reduced through direct supervision during questionnaire completion and physical examination.

The sample size used was determined based on Slovin's formula to ensure the representativeness of the broader population. This study also received ethical approval from the Health Research Ethics Committee of Muhammadiyah University of Surakarta. All respondents were provided with detailed information regarding the study's objectives and their rights, including assurances of data confidentiality. The study aims to produce valid, reliable, and relevant results with these measures.

Results

This study involved an initial population of 302 mothers attending toddler activities at the integrated health posts (Posyandu) in Pajang Village from November to December 2024. Based on Slovin's formula with a 10% significance level, a sample size of 75 individuals who met the inclusion and exclusion criteria was determined. Out of the initial population, 227 individuals were excluded from the study because they did not meet the inclusion criteria, such as having children older than 36 months or declining to participate. All eligible participants consented to complete the study, and no data for the main variables analyzed were missing. The flowchart of the recruitment, inclusion, and analysis process is illustrated in Figure 1.

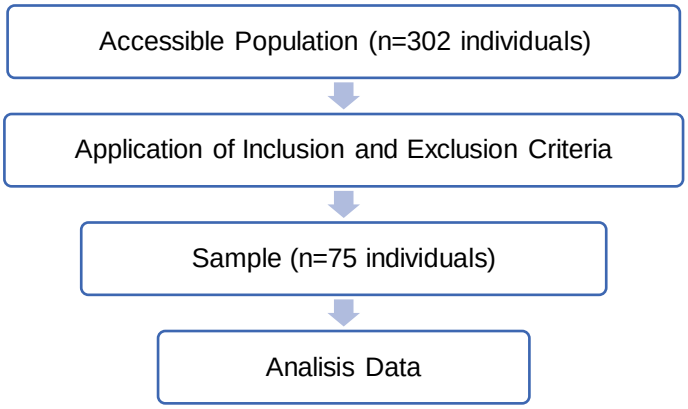

Figure 1. Flowchart of the recruitment, inclusion, and analysis process.

Table 1. Characteristics of Study Subjects

Variable	Mean ± SD	N (%)	Min	Max
Age of Mother	31.2 ± 6.3		22	45
Age of Child (months)	17.3 ± 11.3		1	36
Weight of Child	9.7 ± 2.7		4.3	14.9
Breastfeeding Status				
- Yes		44 (58.7%)		
- No		31 (41.3%)		
Number of Children				
- 1		35 (46.7%)		
- 2		24 (32.0%)		
- 3		14 (18.7%)		
- 4		2 (2.7%)		
Handedness				
- Right		50 (66.7%)		
- Left		6 (8%)		
- Both		19 (25.3%)		

Characteristics of the respondents are presented in Table 1. The average age of the mothers was 31.2 years (SD ±6.3 years), with the average age of the children being 17.3 months (SD ±11.3 months) and an average weight of 9.7 kilograms (SD ±2.7 kg). Most mothers (58.7%) were still breastfeeding their children, and most (66.7%) predominantly used their right hand in daily activities. Most respondents had two children, with a maximum number of children being four. According to the study results, the distribution of hand dominance indicated that 78.4% of respondents experiencing pain reported the location of pain in their right hand, which is consistent with their right-hand dominance in activities.

Table 2. Frequency of Repetitive Childcare Activities per Day

Childcare Activity	Mean ± SD	N	Min	Max
Breastfeeding	6.3 ± 5.4		0	18
Carrying Child				
- Never (0)		13 (17.3%)		
- Very Rare (1-3 times)		24 (32%)		
- Rare (4-6 times)		8 (10.7%)		
- Often (7-10 times)		12 (16%)		
- Very Often (>10 times)		18 (24%)		
Changing Diapers	4.1 ± 2.7		0	12
Feeding	2.7 ± 1.4		0	5

Table 2 presents the frequency of childcare activities performed by the respondents. The most frequently reported activity is breastfeeding, with an average of 6.3 times per day and a maximum frequency of 18 times per day. Diaper changing occurs an average of 4.1 times daily, with the highest frequency reaching 12 times. Meanwhile, feeding is the least common activity, with an average of only 2.7 times daily. Additionally, 32% of respondents reported a "very rarely" category for carrying children, likely due to the average age of 17 months. At that point, they are already able to walk.

Table 3. Results of the Finkelstein Test Examination

Variable	N (%)
Finkelstein Test	
- Positive	37 (49.3%)
- Negative	38 (50.7%)
Pain Intensity	
- Mild pain	26 (70.3%)
- Moderate pain	11 (29.7%)
Pain Location	
- Right	29 (78.4%)
- Left	4 (10.8%)
- Both	4 (10.8%)

The results of the Finkelstein Test conducted on 75 respondents indicated that 37 individuals (49.3%) received a positive result, while 38 individuals (50.7%) received a negative result (Table 3). Among the respondents with positive results, most (70.3%) experienced mild pain, while 29.7% reported moderate pain. Regarding pain location, 78.4% of respondents reported pain in the right hand, 10.8% in the left hand, and 10.8% in both hands.

Table 4. Results of the Chi-Square Correlation Test

Variable	N	p-value
Mother's Age	75	0.001
Number of Children	75	0.048
Breastfeeding Status	75	0.004
Frequency of Carrying	75	0.000
Handedness Dominance	75	0.016

The analysis of the relationship between the dependent variable and the occurrence of De Quervain's syndrome using the Chi-Square test indicates that maternal age (p=0.001), number of children (p=0.048), breastfeeding status (p=0.004), frequency of carrying children (p=0.000), and handedness dominance (p=0.016) all have p-values < 0.05, indicating significant relationships. For example, the frequency of carrying children is categorized as very rare (0–1 time/day), rare (2–3 times/day), frequent (4–5 times/day), and very frequent (>5 times/day).

Subgroup analysis reveals that mothers with two or more children have a higher frequency of carrying and a greater prevalence of De Quervain's syndrome compared to mothers with one child. No sensitivity analysis was conducted in this study, as all the required data were available, and there were no missing data for the main variables analyzed.

This study demonstrates that maternal age, number of children, breastfeeding status, frequency of carrying children, and handedness dominance are significantly associated with De Quervain's syndrome in mothers. These findings provide valuable insights into the risk factors that may influence the development of this syndrome, particularly among mothers engaged in intensive childcare activities.

Discussion

De Quervain's syndrome is characterized by inflammation accompanied by pain in the tendon sheath of the synovial membrane surrounding the extensor pollicis brevis and abductor pollicis longus muscles.[6] This study involved 75 mothers attending toddler health services at Pajang Village, with an average age of 31. The results indicate that women aged 30 to 50 years, particularly those who have recently given birth, frequently experience De Quervain's syndrome.[10] This is likely related to the high physical activity involved in childcare, which includes repetitive movements of the hands and wrists, increasing the risk of developing De Quervain's syndrome.

Breastfeeding status is significantly associated with De Quervain's syndrome (p=0.004). This study indicates that De Quervain's syndrome is more commonly observed in women of childbearing age, particularly those who are breastfeeding or pregnant.[8] Fluid retention during pregnancy and breastfeeding can lead to swelling in the first dorsal compartment, thereby increasing the risk of stenosing tenosynovitis in the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons.[18] These findings are consistent with a study by Naim at the Islamic Hospital of Yogyakarta, which demonstrated a relationship between pregnancy, breastfeeding, and De Quervain's syndrome (p=0.029).[3]

Fifty respondents (66.7%) in this study predominantly used their right hand in daily activities. Among the 37 respondents with positive Finkelstein test results, 26 reported pain in their right hand, indicating that pain is more commonly experienced in the dominant hand.[19] Raeda (2019) reported that 48% of participants with positive Finkelstein test results experienced more intense pain in their dominant hand due to activities involving wrist movements, pinching, and gripping.

Interestingly, all respondents in the category of frequently carrying children had positive Finkelstein test results. Among the 18 respondents who very frequently carried children, 14 also showed positive results. One risk factor associated with De Quervain's syndrome is the frequency of lifting children (p=0.02).[15] Postpartum childcare activities, such as breastfeeding and lifting, require excessive strain on the mother's wrists, potentially leading to the development of De Quervain's syndrome.[18]

The average number of children among the respondents is two, ranging from one to four. However, nearly half of the respondents (46.7%) have only one child. Daglan's study (2024) indicates that the first pregnancy carries a twofold higher risk of developing De Quervain's syndrome compared to subsequent pregnancies. This supports the finding that a lack of maternal experience increases the risk of adopting non-ergonomic hand positions.[16]

However, this study has several limitations that need to be considered. The relatively small sample size and the selection of respondents from a single location may affect the generalizability of the results. Potential bias could also arise from the method used to select respondents, making it challenging to directly apply these findings to a broader population.

The results should be interpreted cautiously, considering these limitations and comparing the findings with other relevant studies. The results of this research contribute significantly to the understanding of De Quervain's syndrome among pregnant and breastfeeding mothers. Recommendations for mothers at toddler health services include simple ergonomic training and assistive devices for carrying babies to reduce strain on the wrists.

Future research should involve more extensive and diverse samples to explore the factors that may influence the occurrence of De Quervain's syndrome and how effective prevention and management strategies can be implemented for this population. Longitudinal studies are needed to evaluate the long-term impact of repetitive activities on the incidence of De Quervain's syndrome, including effective interventions such as physical therapy or splints.

Conclusion

This study demonstrates that factors such as maternal age, number of children, breastfeeding status, frequency of carrying children, and handedness dominance have significant relationships with the occurrence of De Quervain's syndrome in mothers. Repetitive activities involving the wrists and thumbs, particularly in the context of childcare, play a significant role as risk factors. Therefore, education regarding the risks of household activities on wrist health needs to be enhanced. Preventive measures such as ergonomic training, safe carrying techniques, and wrist muscle strengthening and stretching exercises can help reduce mothers' risk of De Quervain's syndrome. This research highlights the importance of educating mothers about the risks associated with repetitive activities on their wrist health. Ergonomic training programs and muscle-strengthening exercises can prevent De Quervain's syndrome in mothers who frequently engage in childcare activities.

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