Original Article

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Frequency of De Quervain's Tenosynovitis among Female Salon Workers and its Association with Activities of Daily Living: A Cross-Sectional Survey

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ABSTRACT

Background: De Quervain's tenosynovitis (DQT) is a painful stenosing tenosynovitis of the first dorsal wrist compartment that mainly affects women and people performing repetitive thumb movements. Salon work involves sustained gripping, pinching and wrist deviation, yet data on DQT among Pakistani salon workers are lacking. This study aimed to determine the frequency of DQT among female salon workers and its association with activities of daily living (ADLs).

Methods: This six-month cross-sectional survey was conducted in beauty salons and beautician training institutes in Rawalpindi and Islamabad, Pakistan. Using convenience sampling, 377 female salon workers were assessed with the Finkelstein test, Numeric Pain Rating Scale (NPRS), Patient-Rated Wrist Evaluation (PRWE) and General Activities of Daily Living (GADL) scale. Associations were tested with the chi-square test and correlation analysis.

Results: The Finkelstein test was positive in 219 workers, giving a DQT frequency of 58.1% (95% CI 53.1–63.1%). Wrist pain was unilateral in 52.0% and bilateral in 7.7%; current pain was moderate in 32.1% and severe in 6.6%. PRWE scores correlated with GADL scores ($r = 0.333$; $p < 0.001$). A positive Finkelstein test was associated with domestic ADLs ($p = 0.004$) but not with self-care ($p = 0.165$) or complex ADLs ($p = 0.195$).

Conclusion: More than half of female salon workers screened positive for DQT, and wrist pain and disability were linked to reduced independence, mainly in household tasks. Early screening, ergonomic modification and timely physiotherapy referral are recommended.

Keywords: *Activities of Daily Living; Beauty Culture; De Quervain Disease; Occupational Diseases; Tenosynovitis*

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INTRODUCTION

De Quervain's tenosynovitis (DQT) is a stenosing tenosynovitis that affects the wrist's first dorsal compartment. The tendons of abductor pollicis longus and extensor pollicis brevis pass through a narrow fibro-osseous tunnel over the radial styloid, and thickening of the retinaculum and tendon sheath produces radial-sided wrist pain that worsens with thumb movement and ulnar deviation. Affected people often notice tenderness over the radial styloid and difficulty with pinching, gripping and lifting. Repetitive and forceful hand use, wrist deviation, pregnancy and the postpartum period have all been proposed as risk factors, although the strength of the occupational link is still debated[1]. The condition can also have consequences beyond the wrist; in a nationwide cohort of more than 32,000 patients, DQT was associated with a later risk of adhesive capsulitis[2].

DQT is considerably more common in women. Worldwide, the age-standardized prevalence of this group of musculoskeletal disorders is about 47% higher in females than in males[3], and hormonal effects on tendon collagen turnover and healing may partly explain the gap[4]. First childbirth and prolonged pregnancy raise the risk of postpartum DQT[5]. In Lahore, DQT was found in 26.8% of infant caregivers, with lifting frequency and hand dominance as significant risk factors[6], and 15.6% of physiotherapists practicing manual therapy tested positive on the Finkelstein test[7]. Heavy smartphone use has likewise been linked with positive tests in more than half of college students[8]. In Pakistan, a lot of young women also handle the majority of childcare and household chores, which puts additional strain on their thumbs outside of paid labor.

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Work-related wrist disorders are common in jobs that demand sustained gripping, pinching and wrist flexion, and female sex and longer service add to the risk[9,10]. Salon work brings these demands together, and in Pakistan it is often informal, with long shifts, few breaks and little ergonomic training. In Turkey, more than half of cosmetologists' work postures were rated high risk, with frequent neck and upper limb complaints[11], while 80.4% of salon workers in India reported work-related musculoskeletal pain, often involving the wrist and hand[12]. In addition to chemical exposures, musculoskeletal complaints are reported by nail salon employees[13]. Female beauticians in Islamabad frequently reported upper back and shoulder pain associated with bad posture, extended standing, and workdays lasting as long as 13 hours[14]. Workers at local salons carry out facial massage, hair styling, makeup, and henna (mehndi) application for many hours with minimal breaks, which repeatedly strains the first dorsal compartment.

The diagnosis of DQT is mainly clinical, and the Finkelstein test is still the standard bedside screening method, although work-related cases are frequently overlooked when occupational exposure is not taken into account[15]. Conservative treatment, which includes corticosteroid injection followed by thumb spica immobilization, is most effective when initiated early[16], so prompt identification is essential. Yet the frequency of DQT among Pakistani salon workers has not been established and its impact on daily function remains unclear. Function matters as much as frequency, because wrist pain that limits household tasks or self-care affects quality of life and the ability to keep earning. This study therefore aimed to determine the frequency of DQT among female salon workers of Rawalpindi and Islamabad and to assess its association with activities of daily living (ADLs).

METHODOLOGY

Study Design and Setting

A cross-sectional survey was conducted in beauty salons and vocational (beautician) training institutes in the twin cities of Rawalpindi and Islamabad, Pakistan. Data were collected over six months following institutional approval in July 2021. Written permission was obtained from each salon or institute before data collection began.

Sample Size and Sampling Technique

The sample size was calculated with the Raosoft sample size calculator using a 95% confidence level, a 5% margin of error, a 50% response distribution and an estimated population of 20,000 salon workers, giving a required sample of 377 participants. Participants were recruited through non-probability convenience sampling.

Selection Criteria

Inclusion Criteria

Female salon workers (beauticians) aged 20–50 years, working more than six hours a day, with more than six months of work experience.

Exclusion Criteria

Participants diagnosed with neurological or psychiatric disorder, rheumatoid arthritis, cervical radiculopathy or previous trauma to the hand.

Data Collection Procedure

Eligible participants were approached at their workplaces. The purpose of the study was explained, and written informed consent was obtained using English and Urdu consent forms. A self-structured questionnaire recorded age, marital status, city, work specialty, work experience, daily working hours, the side of any wrist pain and other self-reported symptoms in the previous six months; these symptoms were recorded as complaints and were not formal diagnoses. The questionnaire was self-administered, and a member of the research team assisted participants who were unable to complete it. Moreover, some questionnaires were distributed via an online form that was shared on social media. To conceal the volunteers' identities, all data were coded.

Outcome Measures

Finkelstein Test

The participant flexed the thumb into the palm and closed the fingers over it, and the wrist was then ulnarly deviated. Reproduction of pain over the radial styloid was recorded as a positive test, indicating DQT. Each wrist was tested separately.

Numeric Pain Rating Scale (NPRS)

Current wrist pain intensity was rated on an 11-point scale from 0 (no pain) to 10 (worst imaginable pain) and grouped as no pain (0), mild (1–3), moderate (4–6) or severe (7–10). The NPRS has excellent test–retest reliability for musculoskeletal pain[17].

Patient-Rated Wrist Evaluation (PRWE)

The PRWE is a 15-item self-report questionnaire consisting of a pain subscale (five items) and a function subscale (ten items: six specific and four usual activities), with each item scored from 0 to 10. Total scores range

from 0 to 100, with higher scores indicating greater pain and disability. The PRWE exhibits high reliability, internal consistency and responsiveness[18].

General Activities of Daily Living (GADL) scale:

The GADL assesses independence in 13 activities across three domains: self-care (five items), domestic (four items) and complex activities (four items). Each item is graded as dependent (0), partially dependent (1) or independent (2).

Statistical Analysis

Data were analysed in IBM SPSS Statistics (version 28). Categorical variables are presented as frequencies and percentages. The frequency of DQT was calculated as the proportion with a positive Finkelstein test, with its 95% confidence interval (CI). The association between the Finkelstein test and each GADL domain was assessed with the chi-square test, and the relationship between PRWE and GADL scores with correlation analysis (r). A p-value < 0.05 was considered statistically significant.

Ethical Consideration

The study was approved by the Ethical Review Committee of Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Islamabad (Ref. No. RIPHAH/RAHS/DPT(G)/Letter-0971). Written informed consent was obtained from all participants, participation was voluntary, and participants could withdraw at any time. The study followed the principles of the Declaration of Helsinki.

RESULTS

A total of 377 female salon workers took part, 191 (50.7%) from Rawalpindi and 186 (49.3%) from Islamabad. Ages ranged from 22 to 40 years, with most aged 22–28 years (65.8%), and 230 (61.0%) were unmarried. Facial massagers (28.1%) and makeup artists (21.5%) formed the largest groups. Overall, 289 (76.7%) had more than six months of experience and 157 (41.6%) worked more than eight hours a day (Table 1).

Table 1. Sociodemographic and Occupational Characteristics of Participants (n = 377)

Variable	Category	n (%)
City	Rawalpindi	191 (50.7)
	Islamabad	186 (49.3)
Age group (years)	22–24	122 (32.4)
	25–28	126 (33.4)
	29–32	66 (17.5)
	33–36	21 (5.6)
	37–40	42 (11.1)
Marital status	Married	147 (39.0)
	Unmarried	230 (61.0)
Work specialty	Facial massager	106 (28.1)
	Makeup artist	81 (21.5)
	Hair stylist	71 (18.8)
	Mehndi (henna) designer	69 (18.3)
	Hairdresser	35 (9.3)
	Nail technician	15 (4.0)
Work experience	>6 months	289 (76.7)
	<6 months	88 (23.3)
Daily working hours	≤6 hours	42 (11.1)
	>6–7 hours	94 (24.9)
	>7–8 hours	84 (22.3)
	>8 hours	157 (41.6)
Self-reported symptoms (past 6 months)	None	305 (80.9)
	Radiating neck–arm symptoms	30 (8.0)
	Psychological complaints	28 (7.4)
	Neurological symptoms	14 (3.7)

Values are presented as n (%). Symptoms were self-reported complaints, not formal diagnoses

The Finkelstein test was positive in 219 workers, giving a DQT frequency of 58.1% (95% CI 53.1–63.1%). Over the previous six months, wrist pain was reported on one side by 196 (52.0%) and on both sides by 29 (7.7%) workers; this self-reported figure (225 workers) is slightly larger than the number with a positive test because some workers with wrist pain tested negative. Current pain on the NPRS was rated above zero by 210 workers. On the NPRS, 64 (17.0%) reported mild, 121 (32.1%) moderate and 25 (6.6%) severe pain, so close to two in five workers had at least moderate wrist pain (Table 2; Figure 1). Frequency of DQT = 58.1% (95% CI 53.1–63.1%). Side of wrist pain was self-reported for the previous six months and includes some workers with a negative Finkelstein test; NPRS rates current pain, so the two 'no pain' counts differ. DQT: De Quervain's tenosynovitis; NPRS: Numeric Pain Rating Scale.

Table 2. Frequency of De Quervain's Tenosynovitis and Pain Intensity (n = 377)

Variable	Category	n (%)
Finkelstein test	Positive (DQT)	219 (58.1)
	Negative	158 (41.9)
Side of wrist pain (past 6 months)	Unilateral	196 (52.0)
	Bilateral	29 (7.7)
	No pain	152 (40.3)
Current pain (NPRS)	No pain (0)	167 (44.3)
	Mild (1–3)	64 (17.0)
	Moderate (4–6)	121 (32.1)
	Severe (7–10)	25 (6.6)

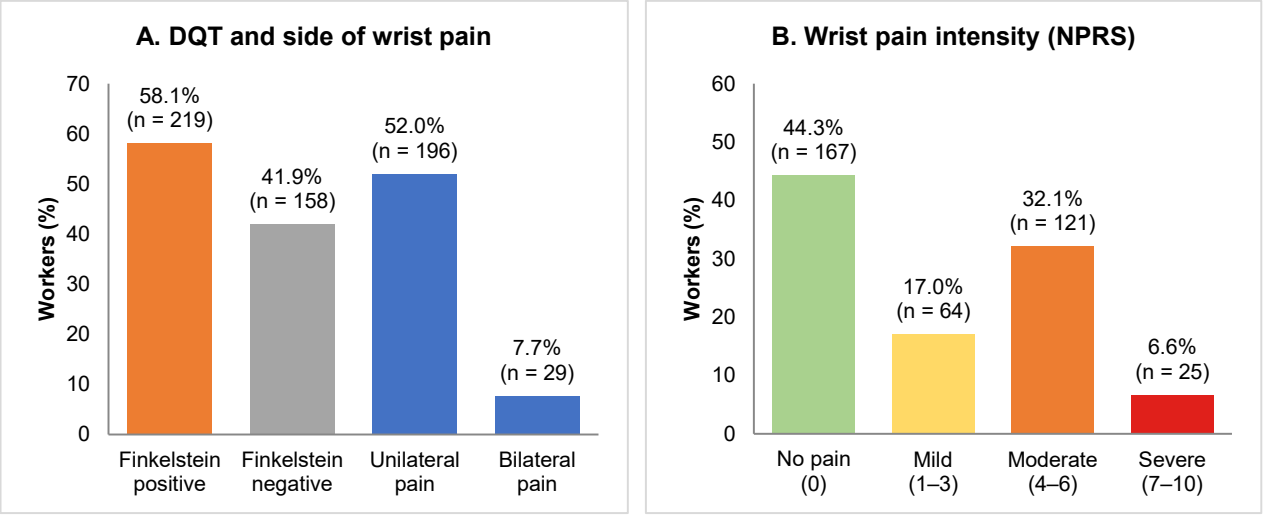


Figure 1. (A) Finkelstein test result and side of wrist pain among female salon workers. (B) Wrist pain intensity on the Numeric Pain Rating Scale (n = 377).

On the PRWE, pain was most often reported when it was at its worst (moderate 25.5%, severe 9.3%) and when carrying a 10-lb object (moderate 23.9%, severe 5.8%). Among usual activities, 20.4–23.6% reported moderate difficulty with personal care, household work, their usual job and recreation (Table 3).

Table 3. Responses on the Patient-Rated Wrist Evaluation (n = 377)

PRWE item	None n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Pain				
At rest	195 (51.7)	100 (26.5)	73 (19.4)	9 (2.4)
Repeated wrist movement	184 (48.8)	92 (24.4)	83 (22.0)	18 (4.8)
Lifting a heavy object	183 (48.5)	81 (21.5)	92 (24.4)	21 (5.6)
When at its worst	181 (48.0)	65 (17.2)	96 (25.5)	35 (9.3)
How often in pain	185 (49.1)	82 (21.8)	93 (24.7)	15 (4.0)
Specific activities				
Turn a door knob	201 (53.3)	92 (24.4)	74 (19.6)	10 (2.7)
Cut meat with a knife	189 (50.1)	86 (22.8)	86 (22.8)	16 (4.2)
Fasten buttons on shirt	208 (55.2)	82 (21.8)	77 (20.4)	10 (2.7)
Push up from a chair	186 (49.3)	93 (24.7)	82 (21.8)	16 (4.2)
Carry a 10-lb object	181 (48.0)	84 (22.3)	90 (23.9)	22 (5.8)
Use bathroom tissue	236 (62.6)	83 (22.0)	51 (13.5)	7 (1.9)
Usual activities				
Personal care (dressing, washing)	193 (51.2)	84 (22.3)	77 (20.4)	23 (6.1)
Household work	187 (49.6)	89 (23.6)	81 (21.5)	20 (5.3)
Work (usual job)	185 (49.1)	88 (23.3)	89 (23.6)	15 (4.0)
Recreational activities	187 (49.6)	92 (24.4)	81 (21.5)	17 (4.5)

PRWE: Patient-Rated Wrist Evaluation. Items scored 0–10 and grouped as none (0), mild (1–3), moderate (4–6) and severe (7–10).

On the GADL scale, most workers were independent in all domains. Dependence or partial dependence was most frequent in domestic activities, including washing and ironing (14.6%) and minor household chores (14.1%), and in using transportation (14.4%) (Table 4).

Table 4. Independence in General Activities of Daily Living (n = 377)

GADL item	Dependent n (%)	Partially dependent n (%)	Independent n (%)
Self-care			
Dressing/undressing	20 (5.3)	26 (6.9)	331 (87.8)
Toileting	21 (5.6)	24 (6.4)	332 (88.1)
Bathing	21 (5.6)	22 (5.8)	334 (88.6)
Bed/chair transfer	20 (5.3)	25 (6.6)	332 (88.1)
Feeding with tableware	21 (5.6)	22 (5.8)	334 (88.6)
Domestic			
Minor household chores	26 (6.9)	27 (7.2)	324 (85.9)
Using the telephone	20 (5.3)	22 (5.8)	335 (88.9)
Preparing meals	26 (6.9)	26 (6.9)	325 (86.2)
Washing and ironing	27 (7.2)	28 (7.4)	322 (85.4)
Complex			
Managing money	21 (5.6)	24 (6.4)	332 (88.1)
Running simple errands	21 (5.6)	25 (6.6)	331 (87.8)
Taking medications	22 (5.8)	25 (6.6)	330 (87.5)
Using transportation	21 (5.6)	33 (8.8)	323 (85.7)

GADL: General Activities of Daily Living scale; items graded dependent (0), partially dependent (1) or independent (2).

PRWE scores correlated significantly with GADL scores ($r = 0.333$; $p < 0.001$). A positive Finkelstein test was significantly associated with the domestic domain of the GADL ($p = 0.004$), but not with the self-care ($p = 0.165$) or complex activity domains ($p = 0.195$) (Table 5).

Table 5. Association of De Quervain's Tenosynovitis and Wrist Function with Activities of Daily Living

Variables	Test	Statistic	p-value
Finkelstein test × GADL self-care	Chi-square	—	0.165
Finkelstein test × GADL domestic	Chi-square	—	0.004*
Finkelstein test × GADL complex	Chi-square	—	0.195
PRWE total × GADL total	Correlation	r = 0.333	<0.001*

**Significant at p < 0.05. GADL: General Activities of Daily Living; PRWE: Patient-Rated Wrist Evaluation.*

DISCUSSION

In this survey, 58.1% of female salon workers in Rawalpindi and Islamabad had a positive Finkelstein test. Wrist pain and disability were related to ADL scores, and a positive test was associated with reduced independence in domestic activities. DQT therefore appears to be both common and functionally relevant in this occupational group.

This frequency is higher than in most other hand-intensive groups. DQT was found in 26.8% of infant caregivers in Lahore[6] and in 15.6% of physiotherapists practising manual therapy[7], whereas 52.1% of Chinese college students who used smartphones heavily tested positive[8]. A systematic review placed the 1-year prevalence of thumb disorders among physical therapists at 52.5%[19]. Salon work combines sustained pinching, gripping and wrist deviation over long days, which may explain the higher figure here; in our sample, 41.6% worked more than eight hours a day. Ramchandani et al., however, noted that evidence for a causal occupational link is limited by high risk of bias[1], and a Finkelstein test used without imaging may overestimate DQT.

Similar patterns appear in other occupations. Wrist pain affected 28% of kitchen workers in Ethiopia[20], and wrist and hand disorders were more frequent in women than in men among catering workers[21]. In more than 57,000 Chinese workers, prolonged wrist flexion, frequent pinching or tight gripping, longer service and female sex were associated with wrist injury[9]. Salon studies from Turkey and India likewise linked upper limb pain with awkward postures and repetitive tasks[11,12]. The present study adds Pakistani data, where most salon workers are young women working long hours. These comparisons are imperfect, though, because studies used different case definitions, ranging from self-reported wrist pain to clinical tests.

The link with domestic ADLs is clinically plausible. Washing, ironing, cooking and household chores require repeated gripping and wrist deviation that load the first dorsal compartment, whereas self-care and complex activities rely less on forceful thumb use. The lack of an association with self-care is somewhat reassuring, as it suggests that most workers with DQT still manage basic personal tasks. For many of these women, everyday chores start as soon as the salon day ends, so the strain on the wrist continues into the evening. Since DQT has also been associated with later adhesive capsulitis[2], its effects may extend past the wrist.

Identifying it early makes it possible to provide effective conservative treatment. Corticosteroid injection followed by 3-4 weeks of thumb spica immobilization is supported as first-line management[16], and ultrasound guidance increases symptom resolution[22]. An intra-compartmental septum predicts recurrence after injection[23]. Ultrasound-guided percutaneous release[24], extracorporeal shockwave therapy and high-intensity laser therapy[25] have also improved pain and function. Commercial wrist–hand orthoses, however, may not restrict wrist motion enough during ADLs[26], while workplace ergonomic interventions reduce wrist pain[27]. For salon workers, who depend on their hands for income, early referral may also limit time lost from work.

Strengths and Limitations

This is among the first studies to report DQT frequency among salon workers in Pakistan, and it used validated measures of pain, wrist function and ADLs in a large two-city sample. DQT was identified by the Finkelstein test alone, without ultrasound confirmation, which may inflate its frequency. The cross-sectional design cannot establish causation, and convenience sampling limits generalizability. Some respondents reported less than six months of experience or working six hours or fewer a day, and some reported radicular or neurological complaints that had not been formally diagnosed, yet all of them were included. Some questionnaires were filled out online, where clinical testing could not be standardized, and smartphone use, childcare and pregnancy were not controlled for. Self-

reported ADL scales can also be affected by recall and social desirability.

Recommendations

Owners of salons and training institutes need to establish work-rest schedules, switch tasks, employ lighter, better-designed tools, and deliver ergonomic training. Training institutes for beauticians could educate on thumb-sparing techniques before working habits become set. Workers with radial wrist pain should be screened early and referred for physiotherapy. Future studies should confirm DQT with ultrasound, combine provocative tests and use analytical designs to examine work-related risk factors.

CONCLUSION

More than half of the female salon workers in Rawalpindi and Islamabad screened positive for De Quervain's tenosynovitis. Wrist pain and disability were associated with reduced independence in activities of daily living, particularly domestic tasks. Routine screening, ergonomic modification of salon work, planned rest breaks and early physiotherapy referral are recommended. Future studies should confirm the diagnosis with ultrasound and examine work-related risk factors with analytical designs.

Author Contributions

FM: Conception and design, data collection, manuscript writing, and final approval
NUA: Conception and design, data analysis and interpretation, critical revision, and final approval
RS: Data collection, data analysis and interpretation, manuscript writing, and final approval
KZ: Data collection, critical revision, and final approval
ATC: Conception and design, data analysis and interpretation, and final approval

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Ethical approval: The study was approved by Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Islamabad (Ref. No. RIPHAH/RAHS/DPT(G)/Letter-0971).

Data availability: The de-identified dataset is available from the corresponding author on reasonable request.

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