

Unveiling the Dynamics: Facilitators and Barriers in Traditional Hand Splint Fabrication-Insights from an Online Survey of Occupational Therapists in the West Bank

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Abstract

This study aimed to identify the factors influencing occupational therapists in the West Bank in fabricating traditional hand splints for patients with hand-physical conditions. A structured questionnaire was distributed to 40 randomly selected certified occupational therapists working in rehabilitation centers, hospitals, or clinics in the West Bank. The study found no significant relationship between therapists' years of experience and the frequency of splint fabrication ($p=0.085$). Similarly, a negative correlation between knowledge of hand splints and their fabrication ($r=-0.3$, $p=0.06$) was observed, along with a weak positive correlation between attitudes towards splint fabrication and actual practice ($r=0.2$, $p=0.19$). Additionally, Spearman's rho showed negligible correlations between therapists' confidence ($r=-0.028$, $p=0.8$) and the availability of materials ($r=0.067$, $p=0.68$) with splint fabrication. Overall, the study concluded that there are no significant relationships between these factors and the practice of fabricating traditional hand splints in the West Bank.

Keywords: Occupational therapy; Orthosis; Thermoplastic; Traditional hand splints; Fabrication; Knowledge; Attitude; Practice

Introduction

People of all ages can engage in daily life activities with the help of occupational therapist (OT's). Occupational therapists focus on what you need and wish to accomplish in your daily life. OT is a client-centered health profession concerned with promoting health and well-being through occupation, "which refers to the practical and purposeful activities that allow people to live independently and have a sense of identity" [1-7]. OT practitioners serve all ages (infants to older adults) and clients with physical, cognitive, psychological, and/or psychosocial impairments, which may be the result of an accident or trauma, disease, conflict or stress, social deprivation, genetics, or congenital anomalies (birth defects)" [8].

The primary goal of an occupational therapist is to help patients become more capable of performing daily living activities that they desire or are required to perform. In order to help a patient, perform these daily activities, customized equipment and instruments, such as splints, are occasionally utilized to gently shape and mold their extremities. These treatment methods are essential for improving abnormal muscle tone, increasing range of motion, and assisting in the recovery of soft tissue and joint contractures carried on by trauma [9]. A splint is defined as an orthopedic device for immobilization, restraint, or support of any part of the body.

OT's of orthotic fabrication is recommended, from the initial assessment of need, through the design phase, the fabrication, and the training and follow-up necessary to ensure proper use and fit of the splint. This involvement requires an understanding of the anatomy and biomechanics of the normal, unimpaired hand and of the pathology of the impaired hand [10].

Numerous research endeavors have explored the functional outcomes associated with the utilization of splints among stroke survivors, yet there remains a dearth of studies focusing on other neurological disorders. The effectiveness of splinting for adults with neurological conditions, especially stroke, has been a debated topic in

academic discussions [11].

Also, Copley, Kuipers, Fleming and Rassafiani (2013) conducted a study where they looked into how personalized resting hand splints affected individuals with TBI in a randomized, single-blinded manner. Findings from individuals experiencing moderate hyper tonicity and contracture indicated 2 favorable clinical results, such as maintaining passive ROM, decreasing muscle stiffness, and easing spasticity. The experimental group showed significant decreases in pain and swelling, indicating that utilizing resting hand splints can improve upper extremity function in stroke survivors [12].

Rehabilitation facilities serve an important role in assisting people to maintain current capabilities, prevent a decline in capabilities, and recover from hand injuries, hand surgeries, or overall hand disabilities. Traditional hand splints are an important part of the recovery process. That is utilized to stabilize, joint, or protect an injured body part. It could be either movable or immovable. There are many different rehabilitation approaches being utilized at present [13-15]. However, an issue arises as many rehabilitation centers in the West Bank don't fabricate traditional hand splints, which are essential for patient care. Based on this problem, our research suggests understanding the reasons behind the non-fabrication of traditional hand splints in rehabilitation centers and assessing the level of knowledge, attitudes, and practices among therapists regarding traditional hand splint fabrication

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techniques, as well as knowing the facilitators that actually exist. The aim of the current study is identifying the facilitators and barriers that influence occupational therapists working in rehabilitation centers, hospitals, and clinics in the West Bank in fabricating traditional hand splints for patients with hand-physical conditions.

Material and Methods

The study focuses on occupational therapists in the West Bank working in rehabilitation centers, hospitals, and clinics that handle hand-physical disabilities. These therapists will participate in a remote survey via Google Forms. The study employs a descriptive cross-sectional design and uses a newly created survey, as no existing survey met the study's objectives. The subjects include certified occupational therapists with at least a Bachelor's degree, excluding non-certified therapists, current students, therapists outside the West Bank, and those with diploma degrees. The survey tool was carefully designed for clarity and applicability, with feedback from eight experienced therapists and four specialists to ensure readability, content validity, and ease of use. A pilot test was conducted with ten therapists to validate the questionnaire.

The survey was distributed online from May 6-7, 2024, for the pilot phase and from May 23-26, 2024, for the final sample. It was shared via the Palestinian Association of Occupational Therapy's page and social media platforms to reach the target therapists. Confidentiality was maintained by not requesting participants' emails, and compulsory questions ensured no missing data. A simple random sample was drawn to minimize sampling, nonresponse, and measurement errors. The study aimed to collect responses from over 30 certified therapists, with a final sample size of 40, representing 13.33% of the population. The data were analyzed using SPSS for descriptive statistics and hypothesis testing, and Microsoft Excel for visual representations. Statistical methods included Chi-square tests and Spearman's rank correlation to evaluate associations between variables.

The primary outcome measure was identifying facilitators and barriers to fabricating traditional hand splints. The structured questionnaire, designed by the researchers, included five sections: therapist background, knowledge, attitudes, practice, and interest in additional training. The questionnaire assessed therapists' knowledge and attitudes toward hand splint fabrication, their current practices, and their interest in paid courses for further learning. The analysis revealed weak, statistically insignificant connections among the variables, providing insights into the factors influencing hand splint fabrication practices among occupational therapists in the West Bank.

Results

Validity refers to the accuracy and precision of a measuring instrument in performing its intended measurement task, ensuring that the test measures what it is supposed to measure Sudaryono et al., 2019. Content validity was verified by sending the questionnaire to eight certified occupational therapists knowledgeable in scientific research. They confirmed that the questionnaire appropriately measures the intended aspects, aligning with the study's purpose. Structural validity was assessed by calculating the Pearson correlation between each questionnaire section and the total score. The results showed statistically significant correlations (P-values < 0.05), indicating that the instrument effectively measures its intended constructs.

Reliability refers to a measuring tool consistently producing similar outcomes across multiple measurements (Drost, 2015). The questionnaire demonstrated high reliability, with a total Cronbach's alpha of 0.93, indicating a high level of internal consistency across all sections (Table 1 and Table 2).

Table 3 shows 40 certified occupational therapists completed the survey, representing 13.33% of the population. The sample was predominantly female (82.5%) and mostly aged between 20 and 29 (80%), with 72.5% having 0-5 years of experience, and 75% working in either private or public jobs.

Table 4 illustrates the participants' knowledge of traditional hand splints. According to the first question, 55% of occupational therapists reported that their universities provided theoretical education on traditional hand splints, though 25% received only some materials, and 20% received none, indicating a lack of uniform theoretical education. For practical training, only 42.5% had hands-on instruction during their studies, 30% had limited practical training, and 27.5% had none, highlighting variability in practical training opportunities.

The third question revealed that 67.5% of participants had not undergone a complete program on hand splint fabrication outside their institution, with only 17.5% having done so, and 15% partially completing a course. Confidence levels in selecting appropriate splints were low, with only 17.5% feeling confident. Similarly, practical experience was limited, with just 20% proficient in making splints, and only 15% felt they had adequate knowledge. Confidence in evaluating splint efficacy was low, with just 17.5% confident, and only 15% felt capable of instructing others in traditional hand splint fabrication, indicating a significant need for further education and training among therapists.

Table 1: Pearson Correlations between questionnaire's sections and total degree of questionnaire.

Section's Number	Section's Title	Pearson correlation	Sig.(2-tailed)
1	Knowledge	.746**	.005
2	Attitude	.774**	.003
3	Practice	.968**	.000

Note: Correlation is significant at the 0.01 level (2-tailed).

Table 2: Reliability coefficients of questionnaire's sections.

Section's Number	Section's Title	Reliability coefficient (Cronbach's alpha)
1	Knowledge	.746**
2	Attitude	.774**
3	Practice	.968**
		0.93

Table 3: General characteristics of study participants.

Variable	Category	Frequency	Percentage
Gender	Male	7	17.5
	Female	33	82.5
Age	20-29	32	80
	30-39	4	10
	40-49	4	10
Level of study	Bachelor	30	75
	Master	8	20
	Ph.D	2	5
Years of experience	0-5	29	72.5
	6-10	4	10
	11-15	3	7.5
	16-20	3	7.2
	21-25	1	2.5

Table 4: Answers of the respondents claiming to have knowledge about traditional hand splints.

Question no.	Questions regarding Knowledge about traditional hand splints	Category	Frequency	Percentage
1	Did your graduating university provide theoretical materials for teaching traditional hand splints?	Yes	22	55
		Partially	10	25
		No	8	20
2	Did your graduating university provide practical training on traditional hand splinting?	Yes	17	42.5
		Partially	12	30
		No	11	27.5
3	Have you completed a full course on traditional hand splint fabrication outside of your university?	Yes	7	17.5
		Partially	6	15
		No	27	67.5
4	Do you feel that you have sufficient knowledge to confidently choose the type of traditional hand splint that suits your patient?	Yes	7	17.5
		Partially	20	50
		No	13	32.5
5	Do you feel you have adequate experience in fabricating traditional hand splints?	Yes	8	20
		Partially	14	35
		No	18	45
6	Do you believe you possess sufficient information about fabricating traditional hand splints?	Yes	6	15
		Partially	26	65
		No	8	20
7	Are you confident in your ability to assess the effectiveness of thermoplastic hand splints for your clients?	Yes	7	17.5
		Partially	21	52.5
		No	12	30
8	Do you feel confident in your ability to teach another occupational therapist about traditional hand splint fabrication?	Yes	6	15
		Partially	13	32.5
		No	21	47.5

Table 5 presents the attitudes of occupational therapists toward fabricating traditional hand splints, with data divided into response frequencies and percentages. Most therapists (52.5%) are satisfied with their expertise in fabricating traditional hand splints, although 25% expressed dissatisfaction. A significant 67.5% showed interest in teaching the fabrication process, while 55% believed in the efficacy of online education for this purpose, though there was a notable 22.5% who were neutral and another 22.5% who disagreed. Opinions on the complexity of constructing traditional hand splints were mixed, with 37.5% finding it difficult and 30% remaining neutral. An overwhelming 87.5% believed in the efficacy of traditional hand splints for improving patient outcomes, and 62.5% felt confident in their ability to create them, though 22.5% lacked confidence (Table 5).

There was unanimous support for enhancing knowledge and education about traditional hand splints, with 85% agreeing on its

importance. The need for extra training was also high, with 90% in favor. Interest in training courses on traditional hand splint production was strong, with 85% expressing eagerness. However, opinions varied on workplace improvements to increase production, with 47.5% in favor and 35% against. Finally, 70% felt that resources for creating traditional hand splints were sufficient, though 17.5% disagreed, indicating some therapists face challenges in accessing materials.

Table 6 provides insights into the practices of occupational therapists regarding the development and use of traditional hand splints. A significant proportion (42.5%) of therapists never produce traditional hand splints, while only 10% always do. When it comes to recommending traditional hand splints, the responses are varied, with 'Sometimes' being the most common (35%), though 27.5% of therapists never prescribe them. Client acceptance of traditional hand splints also varies, with 35% reporting 'Sometimes' as the most frequent response,

Table 5: Attitudes towards fabrication of traditional hand splints Among occupational therapists.

Question no.	Question	Category	Frequency	Percentage
1	I am satisfied with my experience in fabricating traditional hand splints.	Agree	14	35
		Neutral	6	15
		Strongly agree	7	17.5
		Disagree	9	22.5
		Strongly disagree	1	2.5
2	I am interested in teaching how to fabricate traditional hand splints.	Agree	11	27.5
		Neutral	6	15
		Strongly agree	16	40
		Disagree	6	15
		Strongly disagree	1	2.5
3	Learning to fabricate traditional hand splints remotely via the Internet is effective.	Agree	14	35
		Neutral	9	22.5
		Strongly agree	8	20
		Disagree	5	12.5
		Strongly disagree	4	10
4	Fabricating traditional hand splints is complicated.	Agree	10	25
		Neutral	12	30
		Strongly agree	5	12.5
		Disagree	9	22.5
		Strongly disagree	4	10
5	Traditional hand splints are effective in improving patient outcomes.	Agree	19	47.5
		Neutral	4	10
		Strongly agree	16	40
		Disagree	1	2.5
		Strongly disagree	0	0
6	I am confident in my skills to fabricate traditional hand splint	Agree	20	50
		Neutral	6	15
		Strongly agree	5	12.5
		Disagree	7	17.5
		Strongly disagree	2	5
7	Increased awareness and education about traditional hand splints could improve its utilization in occupational therapy practice	Agree	12	30
		Neutral	6	15
		Strongly agree	22	55
		Disagree	0	0
		Strongly disagree	0	0
8	I am interested in additional training to enhance my skills in fabricating thermoplastic hand splints.	Agree	16	40
		Neutral	1	2.5
		Strongly agree	20	50
		Disagree	2	5
		Strongly disagree	1	2.5
9	If I have opportunity to attend course/train in the fabricating traditional hand splints, I will participate in the training	Agree	8	20
		Neutral	2	5
		Strongly agree	26	65
		Disagree	3	7.5
		Strongly disagree	1	2.5
10	In the workplace, there is need for enhancements or modifications to improve the fabrication of traditional hand splints	Agree	10	25
		Neutral	7	17.5
		Strongly agree	9	22.5
		Disagree	11	27.5
		Strongly disagree	3	7.5
11	In my workplace the materials to fabricate traditional hand splints are not available	Agree	12	30
		Neutral	5	12.5
		Strongly agree	16	40
		Disagree	4	10
		Strongly disagree	3	7.5

and adherence to using these splints mirrors this pattern with the same percentage sometimes seeing compliance.

The use of prefabricated hand splints is more prevalent than

traditional ones, with only 20% of therapists never using them. Referral for fabricating traditional hand splints is deemed unnecessary by 32.5% of therapists, with only 7.5% consistently requiring a referral. The

Table 6: Practice of fabrication traditional hand splints Among occupational therapists.

Question no.	Practice of fabrication traditional hand splints Items	Category	Frequency	Percentage
1	How do you fabricate traditional hand splints within your workplace for your patients?	Always	4	10
		Often	5	12.5
		Rarely	10	25
		Sometime	4	10
		Never	17	42.5
2	How frequently do you prescribe traditional hand splints for your clients who need them?	Always	4	10
		Often	7	17.5
		Rarely	4	10
		Sometime	14	35
		Never	11	27.5
3	How have you noticed differences in client acceptance to traditional hand splints compared to other types of splints?	Always	6	15
		Often	7	17.5
		Rarely	7	17.5
		Sometime	14	35
		Never	5	7.5
4	How have you noticed differences in client adherence to traditional hand splints compared to other types of splints?	Always	7	17.5
		Often	7	17.5
		Rarely	7	17.5
		Sometime	14	35
		Never	5	7.5
5	How frequently do you use prefabricated hand splints with your patients?	Always	3	7.5
		Often	9	22.5
		Rarely	11	27.5
		Sometime	9	22.5
		Never	8	20
6	To what extent are patients referred to you in need of fabrication traditional hand splints?	Always	3	7.5
		Often	8	20
		Rarely	10	25
		Sometime	6	15
		Never	13	32.5
7	How do you refer your patients who need traditional hand splints to another specialist outside your workplace?	Always	6	15
		Often	10	25
		Rarely	4	10
		Sometime	10	25
		Never	10	25
8	How frequently are the materials for fabricating traditional hand splints available in your workplace?	Always	6	15
		Often	5	12.5
		Rarely	8	20
		Sometime	5	12.5
		Never	16	40

frequency of referrals to experts for traditional hand splints is evenly distributed, showing no dominant trend. Accessibility of materials for fabricating traditional hand splints is a significant obstacle, as 40% of therapists never have the necessary resources readily available, while only 15% always have them. Overall, there is a low incidence of fabrication and prescription of traditional hand splints, client acceptance and adherence vary widely, and prefabricated splints are preferred. Referral processes and resource availability pose notable challenges for therapists.

Table 7 and Table 8 shows the relationship between therapists' years of experience and the frequency of fabricating traditional hand splints using a Chi-square test. The null hypothesis stated there is no significant relationship between these variables. The Chi-square value was 24.21, suggesting some association, but the p-value was 0.085, exceeding the 0.05 significance threshold. Therefore, the null hypothesis was not rejected, indicating insufficient evidence of a significant relationship between years of experience and the frequency

of fabricating traditional hand splints (Table 7 and Table 8).

Table 9 examined the correlation between therapists' knowledge of traditional hand splints and their practice of fabricating them using Pearson correlation coefficients. The study found a negative correlation of -0.3, indicating a small inverse relationship, with a p-value of 0.06, which is slightly above the 0.05 significance level. Thus, the null hypothesis was not rejected, suggesting no significant correlation between therapists' knowledge of traditional hand splints and their actual practice of making them.

Table 9 also explored the relationship between therapists' attitudes toward the fabrication of traditional hand splints and their practice of making them. The Pearson correlation coefficient was 0.2, suggesting a weak positive correlation, with a p-value of 0.19. As this p-value exceeds the 0.05 significance threshold, the null hypothesis was not rejected. Therefore, there is no substantial evidence of a significant correlation between therapists' attitudes and their practice of fabricating traditional hand splints.

Table 7: Years of experience and frequency of fabricating traditional hand splints in their workplace Cross tabulation.

							Total
		Always	Often	Rarely	Sometime	Never	
Years of Experience	0-5	3	3	6	3	14	29
	6-10	0	0	2	1	1	4
	11-15	0	2	0	0	1	3
	15-20	0	0	2	0	1	3
	20-25	1	0	0	0	0	1
Total		4	5	10	4	17	40

Table 8: Chi-square analysis between years of experience and frequency of fabricating traditional hand splints.

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.215 ^a	16	.085

Table 9: Correlations between scores of knowledge, attitudes and practices.

Variable	Pearson Correlation	P-value
Knowledge-Attitude	-0.004	0.98
Knowledge-Practice	-0.298	0.062
Attitude-Practice	0.210	0.193

Table 10: Spearman's correlation between therapists' confidence in hand splint fabrication practice.

		Practice score	Confidence
Spearman's rho	Practice score	Correlation Coefficient	1.000
		Sig. (2-tailed)	.028
		N	40

Table 11: Spearman's correlation between thermoplastic material availability and hand splint fabrication by therapists.

		Practice score	Attitude question 11
Spearman's rho	Practice score	Correlation Coefficient	1.000
		Sig. (2-tailed)	.067
		N	40

Table 10 investigated the correlation between therapists' confidence in their abilities and their practice of fabricating hand splints using a Spearman's rho test. The test yielded a correlation coefficient of -0.028 and a p-value of 0.8. This near-zero correlation value and high p-value indicate no significant relationship. Thus, the null hypothesis was not rejected, showing insufficient evidence to establish a correlation between therapists' confidence and their practice of fabricating hand splints.

Table 11 examined the influence of the availability of thermoplastic materials on the fabrication of traditional hand splints by therapists, using a Spearman's rho test. The correlation coefficient was 0.067 with a p-value of 0.68, suggesting a very weak positive association that lacks statistical significance. Therefore, the null hypothesis was not rejected, indicating that the availability of thermoplastic materials does not significantly influence the practice of fabricating traditional hand splints by occupational therapists.

Discussion

This study aimed to identify the facilitators and barriers influencing occupational therapists in the West Bank who work in rehabilitation centers, hospitals, and clinics in fabricating traditional hand splints for patients with hand-physical conditions. The findings revealed that the therapists' ye/ars of experience did not significantly influence the frequency of fabricating traditional hand splints, as indicated by a chi-square test (p=0.085). This suggests that experience alone may not determine whether therapists engage in splint fabrication, aligning

with a 2023 study that also found no significant correlation between years of experience and the frequency of custom orthotic fabrication. The study highlighted that even newer therapists might fabricate hand splints as frequently as more experienced ones [16].

The research found a slight negative correlation (r=-0.3, p=0.06) between knowledge of traditional hand splints and their fabrication, indicating that increased knowledge did not necessarily lead to more frequent practice. This unexpected finding suggests that other factors, such as institutional constraints, may hinder therapists from applying their theoretical knowledge in practice. The results resonate with a 2022 study that emphasized the need for bridging the gap between clinical service and academic education in hand-splinting practice, highlighting that practical application often depends on the skills and knowledge gained through hands-on experience with various patient conditions [17].

The study also examined the relationship between therapists' attitudes toward traditional hand splints and their fabrication practices. Although a weak positive correlation was found (r=0.2, p=0.19), the link was not statistically significant, indicating that positive attitudes alone are insufficient to encourage action. This finding underscores the need for a supportive environment, proper practical training, and skill development to translate positive attitudes into actual practice. This aligns with the 2022 study that suggested enhancing educational curricula to better equip graduates with the necessary skills to meet clinical demands [18].

The correlation between therapists' confidence in their abilities and their practice of hand splint fabrication was found to be extremely weak ($r=-0.028$, $p=0.8$), suggesting that confidence does not always result in action. This raises concerns about whether confidence pertains specifically to splint production or if other factors, such as institutional policies, administrative barriers, workloads, and material availability, play a role. Despite the lack of statistical significance, the findings are consistent with previous research that highlighted the importance of regular practice, training workshops, and adherence to guidelines in building therapists' skills and confidence [19].

Lastly, the availability of thermoplastic materials was weakly associated with the practice of fabricating traditional hand splints ($r = 0.067$, $p=0.68$). Although the correlation did not reach statistical significance, the positive trend suggests that improved access to materials could lead to more frequent fabrication of hand splints. This result supports the idea that practical resources are essential for implementing theoretical knowledge and skills in clinical settings. The study also explored the mixed reception of online education in teaching hand splint fabrication, with many therapists valuing remote learning but expressing concerns about its effectiveness in hands-on skill acquisition.

Overall, the findings highlight the need for targeted training programs, adequate resources, and a supportive environment to enhance the practice of fabricating traditional hand splints among occupational therapists. Institutions should consider investing in materials and promoting positive attitudes through continuous education and professional development to bridge the gap between theoretical knowledge and practical application.

Conclusion

This study explored the factors that facilitate and hinder occupational therapists in the West Bank in fabricating traditional hand splints for patients with hand-physical disorders. The findings revealed no significant link between therapists' years of experience and the frequency of splint fabrication, suggesting that experience alone does not determine this practice. A slight negative correlation was found between knowledge and practice, indicating institutional constraints might prevent knowledge from translating into action. Confidence also showed a weak correlation with practice, highlighting the influence of external factors. Additionally, while material availability showed a weak positive correlation, hands-on training and a supportive environment were identified as crucial for encouraging fabrication practices. Despite a strong belief in the efficacy of traditional splints, barriers such as limited practical knowledge, material availability, and a preference for pre-made splints were noted.

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