

## Original Research Article

# Impacts of Tai Chi on Empathy Levels in Healthcare Professionals: A Quasi-Experimental Study

## ABSTRACT

**Background:** Healthcare professionals may struggle with empathy, which can affect patient care. It is possible that Tai Chi, which includes physical activity and mindfulness, could potentially impact empathy levels. The purpose of this study was to investigate the impact of Tai Chi on empathy levels in healthcare professionals, using the Toronto Empathy Questionnaire.

**Materials and Methods:** Five females 18-60 years of age who were employed as healthcare workers in the United States for at least six months were asked to complete asynchronous virtual Tai Chi sessions for 30 minutes, two times a week, for 5 weeks. Each Tai Chi virtual session included safety reminders, a warm-up, cool-down, and different Tai Chi moves integrated into a sequence of movements. The Toronto Empathy Questionnaire was utilized to assess the participants' empathy levels pre- and post-intervention. Participants completed weekly progress logs to track engagement.

**Results:** Based on the weekly progress logs, participants completed an average of 8 asynchronous virtual Tai Chi sessions over 5 weeks. Participants demonstrated an average increase of 4.2 points on the Toronto Empathy Questionnaire pre- to post-intervention (mean pretest TEQ score = 48.2; mean posttest TEQ score = 52.4). The participants' average scores on the TEQ posttest averaged 3.47 points above the typical female score range.

**Conclusion:** Results suggest the potential value of Tai Chi for enhancing empathy levels in healthcare professionals. Future studies should integrate larger sample sizes, and qualitative approaches to data collection focused on participants' perspective regarding their displayed empathy levels. Another suggestion is synchronous Tai Chi sessions, which could increase participant accountability.

*Keywords: Empathy, Healthcare Professionals, Mindfulness, Physical Activity, Tai Chi, Toronto Empathy Questionnaire*

## 1. INTRODUCTION

Empathy is defined as "the ability and tendency to share and understand others' internal state"[1]. Empathy is identified as an essential skill for healthcare professionals. It has been described as a fundamental value that drives healthcare professionals and helps them to understand their patients' points of view [2]. Unfortunately, healthcare professionals may struggle with experiencing empathy towards their patients; for example, approximately 70 percent of healthcare professionals physicians have reported difficulty experiencing empathy towards their patients at some point during their careers [3]. This is critical, as research has found that healthcare professionals who exhibit empathy during practice achieve better therapeutic results with their patients [4].

There is little research investigating techniques to improve empathy levels among adults in the general population. Limited A review of literature completed by Sharma, Madaan, and Petty focusing on the impacts of physical activity highlighted potential benefits that could be directly on outcomes that focused on exploring the impact of physical activity highlighted potential benefits that could be directly on outcomes that

may be related to empathy. Specifically, the authors reported that engagement in physical activity can produce emotional benefits such as decreased anxiety, depression, and negative emotions, as well as improved self-esteem in healthy adult populations and adults with emotional disorders [5]. These changes in emotional benefits, in turn, may allow individuals to be more self-aware, so they can be more conscious of their actions towards others [6]. It is possible that, by increasing self-awareness, healthcare professionals could better understand the appropriate skills required to display empathy towards their patients.

Previous studies have also investigated the effects of mindfulness-based activities on similar outcomes. Mindfulness is defined as a person's ability to be present in the moment [7]. Studies on adults within the general population have demonstrated that engagement in mindfulness-based activities results in a decrease in stress and anxiety, as well as increases in empathy, compassion, and social behaviors that are focused on helping others [8]. In regard to health care professionals, Silver et al. (2018) explored the impact of mindfulness activities on empathy and concluded that genetic counselor health professionals' empathy levels increased after engaging in mindfulness-based activities, such as yoga, deep breathing, and meditation [9]. It has been suggested that these types of mindfulness-based activities promote enhanced empathy by helping healthcare professionals become more aware of their own thoughts and experiences in real-time. With this awareness, professionals may be able to more consciously and effectively attend to patients' experiences and understand their perspectives during difficult times [10-11].

Tai Chi is a practice that is based in both physical activity and mindfulness, as it combines graceful motions with controlled breathing [12]. Research on adult populations of nurses and health professionals, along with pre-healthcare college students, has found there are many benefits of participation in Tai Chi including increased productivity, reduction in general and work-related stress, improvement in sleep and overall mental wellbeing, and a greater desire to be "competent, successful, and compassionate" in one's profession [13-16]. The psychological benefits of Tai Chi, such as stimulating one's desire to be more compassionate, suggest that Tai Chi may also have the ability to improve empathy. However, the impacts of engagement in Tai Chi (which incorporates both physical activity and mindfulness), on empathy levels is still unclear. A previous pilot study by Burgstahler and Stenson exploring the impact of guided mindfulness and meditation on anxiety levels of pre-healthcare college students suggested that future researchers investigate the effects of mindfulness on empathy and compassion, since these skills are essential in emotionally-demanding occupations in healthcare [17].

While prior research has shown that activities involving physical activity or mindfulness can impact aspects of empathy and mental health, no research has explored the effects of Tai Chi, which incorporates both physical activity and mindfulness, on the empathy levels of healthcare professionals. Therefore, the purpose of this quasi-experimental study was to determine the impact of Tai Chi on empathy levels in healthcare professionals, as measured by the Toronto Empathy Questionnaire (TEQ).

## 2. MATERIAL AND METHODS

### 2.1 Study Development

Prior to implementing this study, approval was gained from the researchers' university (Saginaw Valley State University) Institutional Review Board (IRB) to conduct the current research study (Approval number 1922723-2). Informed consent was obtained from all participants. Throughout the study, the researchers adhered to the university IRB guidelines, policies, and procedures.

The final population consisted of five female healthcare professionals, including two occupational therapists, a physical therapy technician, an audiologist, and a pharmacist. Individuals were considered healthcare professionals if they had received formal healthcare education and training and provided direct patient care services. All participants were employed in a healthcare profession in the United States. Participants were aged 18 years or older and had reliable internet access. Healthcare professionals who were actively participating in a Tai Chi program within the month prior to the study were excluded from participation in the study. Healthcare professionals who had any physical restrictions during the study that limited participation in slow, controlled movements were also excluded from participation in the study.

This study utilized a quasi-experimental approach with a one-group pretest-posttest design to obtain quantitative data regarding participants' self-reported empathy levels prior to the beginning of, and following the completion of, an asynchronous online Tai Chi program. Participants were recruited via flyers posted at the researchers' places of employment (healthcare settings) and in-person distribution of flyers to personal contacts. Information about the study and links to study enrollment documents were also posted on the researchers' personal social media pages.

All eligible participants who completed the informed consent process completed an electronic demographic questionnaire and pretest assessment with the Toronto Empathy Questionnaire (TEQ), engaged in the asynchronous virtual five-week Tai Chi intervention, and completed an electronic posttest assessment with the TEQ at the location of their choosing. Participants were emailed at the beginning of each week with links to the week's virtual Tai Chi video (posted on YouTube) and weekly progress log (managed through Microsoft Forms). The weekly progress logs were used to track participants' completion of Tai Chi sessions each week. Participants were emailed the link to the TEQ posttest at the conclusion of the five-week Tai Chi intervention.

Participants were asked to complete the asynchronous virtual Tai Chi videos twice a week, for five weeks, for a total of ten sessions. The researchers provided Tai Chi sessions based on the teachings and programs of Tai Chi Practitioner Dr. Lam, who addresses individual health improvement through his expert Tai Chi teachings [18]. The participants received an email from the researchers each week containing a link to access a researcher-developed, pre-recorded Tai Chi video on YouTube to complete that week. Participants were asked to complete each week's 30-minute Tai Chi video two times. Both standing and seated versions of movements were available in all Tai Chi videos to meet the physical and safety needs of all participants. At the beginning of each video, safe Tai Chi practice was emphasized through education on ideal environmental conditions, such as good lighting and avoiding unlevel flooring, as well as prioritizing comfort during all movements.

Participants were instructed to complete the TEQ posttest no longer than one week after they finished the final Tai Chi session at the end of week five. Data from the pre- and post- tests was analyzed to determine the impact of the Tai Chi intervention on participant empathy levels. Data from the weekly progress logs was analyzed to determine the average number of virtual Tai Chi sessions that were completed by participants.

## **2.2 Measures**

The Toronto Empathy Questionnaire (TEQ) was used to measure empathy levels pre- and post- intervention; this assessment quantifies empathy into scores on a range from 0 to 64. Higher scores indicate higher levels of self-reported empathy. The TEQ utilizes a Likert scale format that awards points based on the individual's answer; it can be completed in approximately 10 minutes [19]. It is a standardized measure that assesses empathy in 16 items and has been proven to be a reliable and valid measure for various groups, including both male and female college students, as well as undergraduate and medical students [20-22]. The TEQ is available on online platforms and is free for public use; no additional training is required for implementation [19]. The researchers received approval to administer the TEQ in an electronic format from the author of the TEQ. The TEQ was transferred directly into a Microsoft Form with the exact same wording as the original format to allow researchers to collect participants' responses in a virtual format.

## **2.2 Statistical Methods**

Information gathered from the demographic questionnaire, including healthcare profession in which the participant was trained, age, gender, length of employment, employment status, and healthcare practice setting, was summarized in table format. Results from the Toronto Empathy Questionnaire pretest and posttest were summarized using the mean. Furthermore, the researchers used the mean to determine the average number of Tai Chi sessions completed by participants.

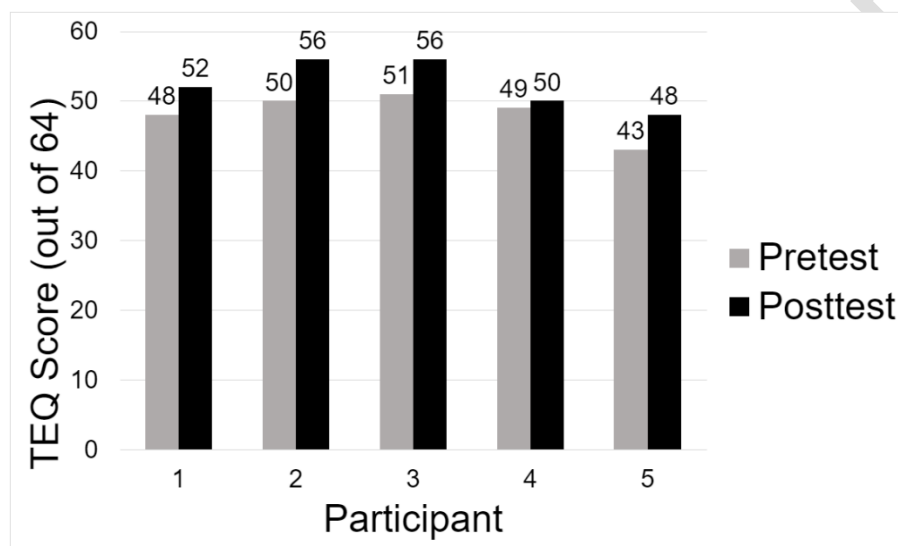
## **3. RESULTS AND DISCUSSION**

### **3.1 Results**

The analysis data set included a total of five participants that completed the demographic questionnaire, the Toronto Empathy Questionnaire (TEQ) pretest, five weekly progress logs, and the TEQ posttest. Refer to Table 1 for a summary of information gathered from the participant demographic questionnaire (Table 1). The average number of total virtual Tai Chi sessions completed by participants (as calculated from the weekly progress logs) was 8 out of 10 sessions. The average participant score on the TEQ pretest was 48.2 out of 64 points (SD = 3.11 points), and the average participant score on the TEQ posttest was 52.4 out of 64 points (SD = 3.58 points). Each of the five participants demonstrated improvement in TEQ scores (Figure 1), with an average increase of 4.2 points. The participants' average scores on the TEQ pretest fell within the typical female score range (44.62 to 48.93 points) and the participants averaged 3.47 points above the typical female score range for the TEQ posttest [18].

**Table 1.** Participant demographics

Participant Number	Healthcare profession	Age	Gender	Length of employment in health care	Employment status	Current healthcare practice setting
1	Occupational Therapist	51-60 years	Female	21+ years	Part time	Acute care
2	Occupational Therapist	41-50 years	Female	21+ years	Full time	Inpatient rehabilitation
3	Audiologist	21-30 years	Female	1-5 years	Full time	Private practice
4	Pharmacist	21-30 years	Female	6-11 months	Full time	Acute care
5	Physical Therapy Technician	18-20 years	Female	6-11 months	Part time	Outpatient



**Figure 1. Toronto Empathy Questionnaire (TEQ) Pretest and Posttest Scores. Numbers along x-axis represent participant numbers.**

### 3.2 Discussion

All five healthcare professional participants in this study exploring the impact of a virtual Tai Chi program on empathy experienced an increase in empathy levels from pre- to post- intervention. Participants experienced an average score increase of 4.2 points on the Toronto Empathy Questionnaire (TEQ) after completing a five-week virtual Tai Chi program. Additionally, the participants averaged 3.47 points above the typical female score range on the TEQ posttest. The findings of the current study align with the results of existing literature. Prior studies that incorporated health education and training interventions, including communication skill-based training, empathy skill-based training, as well as mindfulness-based training, were found to moderately increase empathy levels, which supports the potential effectiveness of targeted interventions on empathy levels [23]. Furthermore, qualitative studies have found that empathy training enhances practitioners' professional identity and development, improves understanding and awareness of patient experiences, and improves practitioner-patient relationships [24]. In future research, Tai Chi could be considered as another approach for empathy training, since it contains both mindfulness and physical activity, which have separately shown to impact empathy levels in prior research [8-12, 23].

The current study was guided by the Self-Awareness Theory, which was developed by Duval and Wicklund to study how individuals' daily behaviors, perceptions, and opinions of the environment change based upon their level of awareness of self. The Self-Awareness Theory suggests that as individuals obtain increased awareness of their thoughts and personal standards of correctness, they will become more aware of others' feelings, thoughts, and emotions. These changes in emotional benefits, in turn, may allow individuals to be more self-aware, so they can be more conscious of their actions towards others [6]. By increasing self-awareness, an individual can better understand the appropriate skills required to display empathy towards others. Therefore, in the healthcare field, healthcare professionals may acquire the expertise to better display empathy towards their patients. In this study, participants who engaged in Tai Chi, which involves practicing mindfulness while performing physical activity, experienced an increase in empathy levels as measured by the Toronto Empathy Questionnaire. Therefore, the results of the current study were consistent with the theoretical perspective used to guide the study.

The findings of the current study expand upon the body of knowledge regarding interventions that may be used to address empathy levels. Prior research found that engagement in physical activity has been found to produce emotional benefits such as decreased anxiety, depression, and negative emotions, as well as improved self-esteem [5]. Furthermore, mindfulness-based interventions resulted in a decrease in stress and anxiety, along with increases in empathy, compassion, and social behaviors that are focused on helping others [8,9]. In the current study, participants engaged in Tai Chi, which integrates components of both physical activity and mindfulness [25]. The results of the current study provide preliminary evidence to suggest that Tai Chi could potentially be used to help enhance empathy levels in healthcare professionals.

While all participants had an increase in empathy scores post-TEQ from pre-TEQ, there were differences in the empathy change scores between participants. Participants also varied in levels of employment status within differing healthcare settings. For example, the participant with the largest amount of improvement was the participant employed full time as an audiologist in a private practice setting, and the smallest amount of improvement was seen in the participant employed part time as an occupational therapist in an acute care setting. A deeper exploration of potential differences in the outcomes of Tai Chi within various healthcare professions, settings, and employment statuses should be a focus of future research.

There are limitations to this study. First, the authors conducted a one-group pretest-posttest design with a small sample size; as such, this study did not include a comparison or control group. Healthcare professionals included in the study were employed in the state of Michigan as either an occupational therapist, pharmacist, audiologist, or physical therapy technician. In addition, all participants identified as female. Future research on the impacts of Tai Chi on empathy levels among various healthcare professions and genders within diverse settings would be beneficial for determining the extent of effectiveness across contexts. By increasing the number of participants, future researchers may also run tests of significance.

Second, since the participants completed the TEQ pretest and TEQ posttest, there may be a concern that participants provided higher scores at the posttest session due to the TEQ "priming" the participants as to what to expect or gain from participation in the research study. Future research may also benefit from including a qualitative analysis, including an interview with the participants to explore how and why empathy levels increased, and examples of how increased empathy levels were displayed.

Third, as the study took place as an asynchronous virtual program, participation was self-reported in weekly progress logs. Therefore, the authors are unable to affirm whether participants were truthful in documenting their participation in the virtual Tai Chi program. Future research may benefit from conducting the Tai Chi sessions in a synchronous, in-person format to confirm participation levels.

Finally, although the student researchers were certified in Tai Chi for Arthritis and Fall Prevention through the Tai Chi for Health Institution, they are not identified as "Master Trainers", and their teachings displayed in the virtual Tai Chi sessions may have impacted the participants' scores [26]. Future research may benefit from integrating Tai Chi sessions led by Tai Chi Practitioners with greater experience levels.

#### **4. CONCLUSION**

This study is one of the first to suggest that empathy levels among health care professionals may improve following participation in Tai Chi sessions. The combination of mindfulness and physical activity may be impactful to increasing empathy levels in healthcare workers. Recent studies reported the impact of mindfulness on increasing empathy, compassion, and social behaviors towards helping others [8-11]. The findings of this study suggest the value of Tai Chi on enhancing empathy levels as evidenced by the increase in scores on the Toronto Empathy Questionnaire by all five

participants. Future research should integrate larger and more diverse sample sizes, qualitative data collection, and synchronous Tai Chi sessions led by Master Trainers.

## CONSENT

All authors declare that written informed consent was obtained from the participants for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

## ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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