

## RESEARCH ARTICLE

Exploring public perceptions of dementia on Twitter (X):  
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## Abstract

**INTRODUCTION:** Twitter (X) is widely used to reflect individual perspectives. We wished to study social insight regarding dementia using this digital platform.**METHODS:** We conducted a cross-sectional study retrieving tweets containing “dementia” or “#dementia” and their Thai equivalents. English tweets were randomly selected, while all Thai tweets were collected. We identified user types, topics, and sentiments.**RESULTS:** Of 10,062 English and 9511 Thai tweets, general users were the most prevalent in both languages. “Dementia” was used accurately in 39.0% of English tweets and as misinformation in 49.2% of Thai tweets. Stigma was significantly more common in English (38.9%) than in Thai (22.6%) tweets ( $p$ -value < 0.001), and negative perceptions were expressed in 44.2% and 81.3% of English and Thai tweets, respectively ( $p$ -value < 0.001).**DISCUSSION:** Different inappropriate uses of “dementia” were observed. To alleviate negative perceptions, reducing stigmatization is urgently needed in English-speaking communities, whereas in Thailand, appropriate dementia education should be undertaken immediately.

## KEYWORDS

dementia, English, stigma, Thai, Twitter, X

## Highlights

- We found differences in the perceptions of “dementia” between English and Thai tweets.
- Using “dementia” to attack individuals was common among English Twitter (X) users.
- “Misinformation” regarding the term “dementia” was observed among Thai users.

## 1 | BACKGROUND

Dementia affects over 55 million people worldwide, presenting a substantial public health challenge.<sup>1</sup> Beyond the toll on individuals andfamilies, dementia involves a significant social burden, often exacerbated by stigma. Stigma is defined as “labeling, negative stereotyping, linguistic separation, and power asymmetry,”<sup>2</sup> and stigma surrounding dementia can have detrimental consequences that discourage

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people from seeking diagnosis and care, hinder access to services, and isolate individuals and families.<sup>3–5</sup> Understanding public perceptions of dementia, particularly in online spaces, is crucial for informing interventions that challenge stigma and foster inclusivity.

The microblogging platform Twitter (X) offers a valuable resource for studying public perceptions<sup>6,7</sup> because of its accessibility, real-time nature, and potential for large-scale data analysis. Despite the various limitations of social media data (eg, potential biases and limited representativeness), Twitter (X) data can provide unique insights into the public discourse surrounding sensitive topics, such as dementia. Analyzing tweets containing the word “dementia” allows researchers to capture spontaneous expressions of dementia-related attitudes, beliefs, and experiences.

Previous studies have explored public perceptions of dementia on social media, highlighting the potential of this platform for research and intervention. For instance, Creten et al.<sup>8</sup> analyzed Dutch-language tweets containing “dementia” and found evidence of stigma, including negative sentiment and derogatory terms. Similarly, Robertshaw and Babicova<sup>9</sup> examined the content and sentiment of tweets in English associated with dementia and identified the use of the negative emotional tone as a potential indicator of stigma. Although these studies suggest the presence of stigma on Twitter (X), further research is needed to understand its prevalence, forms, and cultural variations. Despite the existence of stigma in all cultures, its expressions and impacts vary across societies.<sup>10,11</sup> Cultural differences significantly influence the specific meanings, practices, and consequences associated with stigma. To the best of our knowledge, no studies have been conducted within the timeframe of the World Health Organization (WHO) Global Action Plan on the Public Health Response to Dementia 2017–2025, which was designed to improve dementia awareness, combat stigma, and optimize care and support for people living with dementia.<sup>12</sup> Examining public perceptions through online discourse following the implementation of the WHO Global Action Plan may provide insights into its impact on current dementia awareness and healthcare services.

The current study explored public perceptions of dementia on Twitter (X) by comparing tweets in English and Thai. By identifying culturally specific patterns in dementia perceptions, we examined the prevalence, nature, and expression of stigma in both languages. Moreover, we sought to investigate how public perceptions of dementia changed during the study period. We anticipated that, following the implementation of the WHO Global Action Plan, Twitter (X) data would reflect a decrease in stigma.

## 2 | METHODS

### 2.1 | Study design

This cross-sectional study utilized data obtained from the Twitter Application Programming Interface for Academic Research, focusing on dementia-related tweets in English and Thai from May 1, 2017 to April 30, 2021. This timeframe aligned with the endorsement of the

### RESEARCH IN CONTEXT

- 1. Systematic review:** We examined tweets containing “dementia” or “#dementia” and their Thai equivalents from 2017 to 2021 to analyze public perceptions in the following three categories: user type, topic, and sentiment of each tweet.
- 2. Interpretation:** General users were the most prevalent user type for tweets in both languages. Stigmatization using “dementia” was commonly found in English tweets, whereas misinformation was a concerning issue in Thai tweets. A higher proportion of Thai tweets expressed negative sentiments regarding “dementia” compared with English tweets.
- 3. Future directions:** To foster a dementia-inclusive society, stakeholders should urgently launch appropriate action plans to address culture-specific issues.

WHO Global Action Plan on the Public Health Response to Dementia 2017–2025 by Member States at the 70th World Health Assembly in May 2017, enabling the observation of potential early stages of the WHO's action plan implementation on dementia.<sup>12</sup> This study was approved by the Human Research Ethics Committee, Faculty of Medicine Ramathibodi Hospital, Mahidol University (approval number: COA. MURA2023/207).

### 2.2 | Data collection and processing

Tweets containing the words “dementia,” “#dementia,” and their Thai equivalents (“สมองเสื่อม” and “#สมองเสื่อม”) were retrieved. We utilized the methodology described previously<sup>13</sup> to retrieve and preprocess tweets. Briefly, we employed the tweepy package (version 4.12.1) to gather the tweets from May 1, 2017 to April 30, 2021, excluding retweets. The texts were preprocessed by removing non-letters, @usernames, and hyperlinks, followed by the removal of duplicate tweets. Because the number of English tweets significantly exceeded the Thai tweets, we employed random sampling using the NumPy package (version 1.21.2) to select a subset of English tweets that were equal in number to the Thai tweets each month to ensure a balanced dataset for analysis.

### 2.3 | Tweet analysis

Tweets were manually analyzed to identify the user type, topic, and sentiment featured and expressed in each tweet. To establish reliability, the first 480 tweets (10 tweets from every month) in each language were simultaneously analyzed by three researchers (S.S., internist; T.C., geriatrician; P.P., linguist). Interrater reliability was performed with

**TABLE 1** User types in English and Thai tweets and their definitions.

User types	Definition	Tweets, n (%)	
		English (n = 10,062)	Thai (n = 9,511)
Patient	Dementia patients (in tweets, the dementia patients use “I,” “me,” or “my” to address himself/herself)	28 (0.3)	0 (0)
Care partner	Family members, relatives, friends, informal, and formal carers for dementia patients	782 (7.8)	145 (1.5)
Health personnel	Physicians, nurses, and allied health professionals	602 (6.0)	115 (1.2)
Health organization	Hospital, clinic, and medical institution	122 (1.2)	66 (0.7)
Residential / long-term care service	Residential or long-term care setting with provision of social welfare	277 (2.8)	5 (0.1)
Researcher	Academic or scientific researcher	115 (1.1)	0 (0)
NGO	Non-profit organization that operates independently of government	660 (6.6)	11 (0.1)
Government	Governing body of nation, state, or community	206 (2.1)	59 (0.6)
Intergovernmental organization	Organization composed of sovereign states	1 (0)	1 (0)
Media	Press and publications	353 (3.5)	359 (3.8)
Commercial entity	Corporation, business, or enterprise	274 (2.7)	58 (0.6)
General user	A person who used Twitter not in aforementioned categories	6,642 (66.0)	8,692 (91.4)

substantial agreement shown in Table S1. Subsequently, the remaining tweets were reviewed by S.S.

Each tweet was analyzed regarding the syntactic structure of sentences and semantic patterns expressed in tweets. The categorization methodology was applied in a predefined stepwise manner (Figure S1). We first classified “users” into two main groups: those with direct experiences (including patients, care partners, and health personnel) and those with indirect experiences (eg, general users and others), based on both tweet bio and the context of the tweets. The definitions for each user type are described in Table 1. For “topics,” only those with direct experience may contribute to the “personal experience” and also all other topics, which consisted of advertisements, advocacy, public health or policy, information, stigma, joke, figurative expressions, misinformation, and unidentified. For tweets categorized under information, further subcategories were created to reflect general or medical information, where the latter included risk, prevention, symptoms, diagnosis, treatment, and research about dementia. In addition, we also classified stigma into forms of weaponization and ridicule. The most relevant topic was selected in cases where a tweet contained multiple topics. Examples of tweets in both languages according to each topic are shown in Table 2. “Sentiment” was categorized as positive, neutral, or negative based on content and context judgment.

## 2.4 | Dementia-related tweet outcomes

Primary outcomes included the frequency and type of stigmatized tweets in both languages. A previous analysis categorized tweets based on the four dimensions of stigma outlined by McNeil et al.<sup>14</sup> in

their study of epilepsy-related stigma: metaphorical, personal experience, informative, and joke/ridicule. Building on this framework, Oscar et al.<sup>15</sup> later expanded the categorization to six dimensions by separating joke and ridicule and adding a dimension to identify the source (individual or organization). Later, Creten et al.<sup>8</sup> proposed a seventh dimension, “politics,” based on their observations of tweets using dementia-related keywords to target political figures in 2019. Modifying Creten et al.’s<sup>8</sup> approach, we separated the stigma categories into weaponization (using dementia-related terms to target specific individuals) and ridicule (using these terms more generally for mocking). We also used the term “misinformation” to describe a unique phenomenon found in our study, defined as information, that is, false but not created with the intention of causing harm.<sup>16</sup> Secondary outcomes composed of topic and sentiment analysis in both English and Thai and also trends of tweets over 4 years of the study period.

## 2.5 | Statistical analyses

Frequency and percentage values were used for data description. The proportions were presented using binomial exact estimation. To examine the disparity between two proportions, a two-sample, two-sided proportion test was applied. For subgroup analysis of selected user types, care partners, health personnel, NGOs, and media were chosen due to the likelihood of being crucial change agents to help foster a dementia-inclusive society. This analysis was performed using chi-squared or exact test. We set the significance level at 0.05. All statistical analyses were conducted using STATA software, version 18.0.

**TABLE 2** Examples of English and Thai tweets (and their English translation).

Topics	English tweets	Thai tweets	
		Thai language	Their English translation
Personal experience	Found dad. Sat in the blood test area when his appointment is tomorrow. I hate dementia.	แล้วตอนนี้ยา คือ ผู้ป่วยสมองเสื่อมที่นอนติดเตียงเพราะล้ม แล้วคิดว่าตัวเองเดินได้ ล้มอีกรอบคราวนี้แขนหัก ไปกันใหญ่ ช่วงที่ยาเป็นใหม่ๆ พ่อกับแม่ตาโหลมาก ไม่ได้นอนเลย เพราะยาไม่นอน	Now, Grandma is a dementia patient who is bedridden because she fell and stubbornly thought that she could walk and fell again. This time her arm was broken. In the early phase, my father and mother's eyes were very hollow, they didn't get sleep at all because grandma didn't sleep.
General information	Restaurant employs waiters with dementia and they'll probably get your order wrong via @Hxxxxxxx	คณะแพทยศาสตร์ศิริราชพยาบาล ม. มหิดล จัดอบรมผู้ดูแลผู้ป่วยสมองเสื่อม	Faculty of Medicine Siriraj Hospital, Mahidol University organizes training for caregivers of patients with dementia.
Medical information			
Risk	DRINKING too much alcohol can increase the risk of developing types of dementia, including Alzheimer's disease...	“อ้วน” เสี่ยง “สมองเสื่อม”	“Obesity” risks “dementia”
Prevention	Stroke prevention may also reduce dementia #Medical #Brain	ป้องกัน สมองเสื่อมได้ไง	How to prevent dementia?
Symptom	Nedergaard: almost all patients with frontotemporal dementia have sleep disturbances. Keynote @XXX. Neuroscience Day 2017	ระวัง นี่คือ 10 สัญญาณเตือนบ่งบอกความเสี่ยงภาวะสมองเสื่อม	Watch out. Here are 10 warning signs of dementia.
Diagnosis	A MOCA cutoff score of 23/30 yielded the best diagnostic accuracy for cognitive impairment like #dementia	https://XXX ของดีโดยคนไทย เพื่อสังคมผู้สูงวัย ดังไกลระดับโลก โปรแกรมช่วยตรวจหาภาวะสมองเสื่อม สุดยอดเยี่ยม	https://XXX. Good stuff by Thai people for the elderly society, the worldwide famous, program to help detect dementia. Excellent.
Treatment	Antipsychotics do help some people with dementia have a significant improvement in quality of life. #UKDC2017	“ลองให้ดนตรี ช่วยดูแลผู้ป่วยสมองเสื่อม ผู้ป่วยสมองเสื่อมถึงแม้จะมีอาการในระยะปานกลางหรือระยะรุนแรง จนไม่สามารถพูดสื่อสารได้แล้ว ก็ยังมีการตอบสนองต่อดนตรี และสื่อสารกับผู้ดูแลได้มากขึ้น	Try letting music help take care of dementia patients. Dementia patients, although moderate to severe symptoms or uncommunicable, still respond to music and communicate more with caregivers.
Research	Synergistic interaction between amyloid and tau predicts the progression to dementia.	ส่องผลวิจัย สมองเสื่อมจากแรงกระแทกหรือฟุตบอลในอนาคตอาจไม่มีการโหม่ง?	Look at the results of the research on dementia from tackle force. Or, future football may not have heading?
Public health/ policy	One out of nine Americans aged 45+ say they have a thinking decline. This may be a harbinger of future problems indicating burden of #Dementia and what public health officials should address now.	“เสนอแก้ “กฎหมายยุติมวยเด็ก” พบผลวิจัยเสี่ยงสมองเสื่อม—คลิปรายงานพิเศษ”	“Proposal to amend ‘the law to end child boxing’ research results found dementia risk – a special report clip”
Advocacy	#Dementia is a diagnosis not a definition. Incredible courage in this article (love the hair!) #DementiaAwarenessWeek	กรมการแพทย์ แนะนำดูแลผู้ป่วยสมองเสื่อมควรดูแลด้วยความเข้าใจ อดทน และใจเย็น ผู้ดูแลต้องหมั่นดูแลสุขภาพตนเองให้แข็งแรง ออกกำลังกายสม่ำเสมอ พักผ่อนให้เพียงพอ ไม่เครียด เพื่อพร้อมที่จะดูแลผู้ป่วยให้มีสุขภาพดีและมีความสุข #สายด่วน1111 #กรมการแพทย์	The Department of Medical Services recommends caring for dementia patients with understanding, patience, and calmness. Caregivers must take care of their health, exercise regularly, rest adequately, and not stress to be ready to care for patients and make them healthy and happy. #Hotline1111 #Department of Medical Services

(Continues)

**TABLE 2** (Continued)

Topics	English tweets	Thai tweets	
		Thai language	Their English translation
Advertisement	Fighting dementia with diet, exercise, and best supplements: 7xx-xxx-xxx6	ผลิตภัณฑ์เสริมอาหารบำรุงสมอง พื้นฟูความจำ ช่วยเรื่องสมองอ่อนล้าและสมองเสื่อม ช่วยกระตุ้นระบบประสาทให้ทำงานอย่างมีประสิทธิภาพ	Brain-nourishing dietary supplements restore memory and help with brain fatigue and dementia. Stimulates the nervous system to work efficiently.
Stigma			
Weaponization	@rxxxxxxxxxxxxp You are an ignorant child. Please resign and seek treatment for your dementia, you fucking coward.	@Axxxxxxxxr แก่ยังไม่พอสมองเสื่อมอีก...เหอ	@Axxxxxxxxr, not only old, but you have dementia...heh.
Ridicule	15% of Sxxxxxxxxxxxxe probably has dementia https://t.co.XXXXXXXXXX	จะไม่ถือสาอีกแก่สมองเสื่อม	Not going to mind an old hag with dementia.
Misinformation	I moved off campus at 20 and I'm not even 27 yet must be the dementia.	เมื่อหัวโขกกำแพงดังมาก ผมสมองเสื่อมแล้ว	Just now, my head banged against the wall so loud. I have dementia.
Joke	Grandma: I think I have that thing what's it called when you can't remember things? I think I have diversity! Mom: ...you mean dementia? Me: grandma...what do you think diversity means? Grandma: it's a movie!	ช่วงนี้สมองเสื่อมมากอะ ขนาดโดนเพื่อนสปอยหนังยังลืมว่ามันสปอยอะไรไว้ 555	These days, my brain is so demented. Even if a friend spoiled a movie, I still forget what the spoiler is, hahaha.
Figurative	It's like an old grandpa deciding which kid is going to be the beneficiary, based on the state of his dementia that day.	ขึ้นชื่อเรื่องขี้ลืม ขี้ลืมเหมือนคนสมองเสื่อมจำพวกอัลไซเมอร์ เกลียดตัวเองตรงนั้นมาก ก็ครั้งแล้วที่เตือนรอนเพราะความขี้ลืม	Well-known for being forgetful, like Alzheimer's dementia, so I hate myself here. How many times have I suffered because of forgetfulness?

### 3 | RESULTS

A total of 10,062 English and 9,511 Thai tweets were examined in the study. The English tweets accounted for 0.22% of all English tweets during the study period (4,641,937 tweets). In both languages, most tweets were from general users (6,642 [66.0%] in English and 8,692 [91.4%] in Thai). Regarding user types, care partners, health personnel, and NGOs more commonly originated from English than Thai tweets (care partners: 782 [7.8%] vs 145 [1.5%]; health personnel: 602 [6.0%] vs 115 [1.2%]; NGOs: 660 [6.6%] vs 11 [0.1%], respectively). Details for other user types are provided in Table 1.

#### 3.1 | Topic analysis and stigmatized tweets

The most common themes in English tweets were general information (3,927 [39.0%]), followed by stigma (3,910 [38.9%]) and medical information (925 [9.2%]), whereas in Thai tweets, there was a significantly lower proportion of general information (768 [8.1%]),  $p < 0.001$ , and stigma (2,147 [22.6%]),  $p < 0.001$  compared to English tweets. However, we found misinformation was the most prevalent (4,683 [49.2%]) in Thai, but only 179 [1.8%] examples of it were found in English ( $p < 0.001$ ) (Figure 1 and Table 3).

Among the tweets expressing stigma, weaponization was the dominant subcategory in both languages (3,492 [89.3%] in English and 1,299 [60.5%] in Thai), followed by ridicule (418 [10.7%] in English and 848 [39.5%] in Thai) (Table 3).

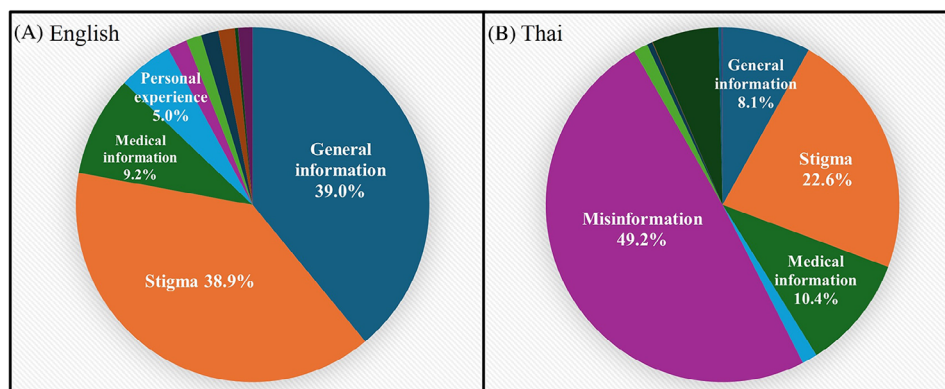
#### 3.2 | Sentiment analysis

Only 3.3% of tweets in both languages expressed a positive view (328 and 315 tweets in English and Thai, respectively, with a  $p$  value of 0.84). A significantly higher proportion of Thai tweets expressed negative sentiment (7,731 [81.3%]) compared with English tweets (4,448 [44.2%]);  $p < 0.001$  (Figure 2).

#### 3.3 | Dementia-related tweet trends

From 2017 to 2021, the number of dementia-related English tweets gradually increased, with a prominent peak in 2020 (1,858,288 tweets in 1 month). We observed a similar gradual increase in dementia-related Thai tweets but without a prominent peak (Figure 3). The proportion of dementia-related English tweets containing stigma ranged from 22.3% to 61.9%, with a peak occurring in 2020, whereas the





**FIGURE 1** Percentage of topic analysis according to English (A) and Thai (B) tweets. Other topic analysis for English tweets: misinformation 1.8%, advocacy 1.6%, public health or policy 1.5%, advertisement 1.4%, unidentified 1.3%, and <1% for jokes and figurative expressions. For Thai tweets: jokes 6.1%, personal experience 1.4%, advertisement 1.3%, and <1% for advocacy, figurative expressions, public health or policy, and unidentified.

**TABLE 3** Topic analysis comparing between English and Thai tweets.

Topic	English tweets n = 10,062 (%)	Thai tweets n = 9,511 (%)	p value
General information	3,927 (39.0)	768 (8.1)	<0.001
Stigma	3,910 (38.9)	2,147 (22.6)	<0.001
Weaponization	3,492 (34.7)	1,299 (13.7)	
Ridicule	418 (4.2)	848 (8.9)	
Medical information	925 (9.2)	991 (10.4)	0.004
Personal experience	500 (5.0)	137 (1.4)	<0.001
Misinformation	179 (1.8)	4683 (49.2)	<0.001
Advocacy	164 (1.6)	44 (0.5)	<0.001
Public health/policy	150 (1.5)	5 (0.05)	<0.001
Advertisement	136 (1.4)	124 (1.3)	0.770
Joke	32 (0.3)	580 (6.1)	<0.001
Figurative expression	10 (0.01)	25 (0.3)	0.007
Unidentified	129 (1.3)	7 (0.07)	<0.001

proportion of dementia-related Thai tweets containing stigma ranged from 12.9% to 30.1%, reaching their highest rate in 2021.

### 3.4 | Subgroup analysis of selected user types

English-speaking care partners expressed stigmatized dementia-related tweets more than Thai care partners (62 [7.9%] vs 0, respectively). The latter showed more sharing of personal experience (119 [82.1%] compared to English care partners 448 [57.3%]). However, Thai care partners expressed higher negative sentiments than English care partners (62 [42.8%] vs 168 [21.5%], respectively) (Tables 4 and 5).

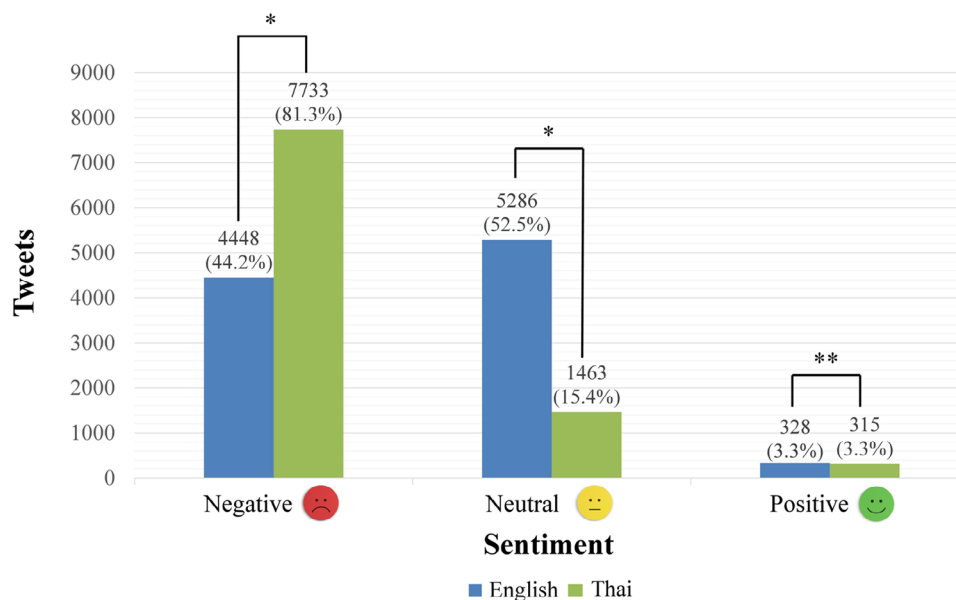
For health personnel, we also observed trends similar to those in care partners. Higher stigmatized dementia-related tweets were seen in English health personnel (58 [9.6%]) versus Thai (4 [3.5%]), whereas

a larger proportion of tweets related to their personal experience were observed in Thai health personnel (17 [14.8%]) versus English (42 [7.0%]). Surprisingly, misinformation was found among Thai health personnel (7 [6.1%]), but we did not see this phenomenon in English (0). Lastly, a higher proportion of negative sentiment-related tweets was also seen in Thai (23 [20.0%]) than in English health personnel (74 [12.3%]).

The NGOs significantly contributed to the advocacy-related tweets (66 [10.0%] in English and two [18.2%] in Thai) and expressed non-negative tweets in both languages. Thai media shared a substantial amount of medical information (185 [51.5%]) and advocacy-related tweets (9 [2.5%]). Moreover, they also contributed to higher positive sentiment on dementia-related tweets compared to English media (45 [12.5%] vs 4 [1.1%], respectively). More details on topic and sentiment analysis involving all user types can be found in Tables S2 and S3.

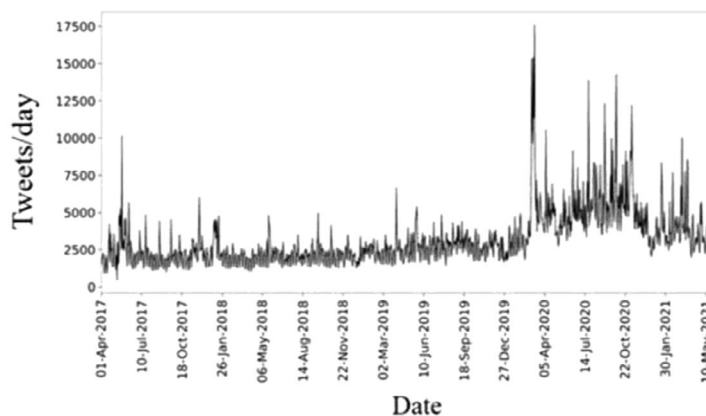
## 4 | DISCUSSION

The current study used data from dementia-related tweets in English and Thai to reveal insights into public perceptions of dementia; interest in user types, topic analysis, particularly regarding stigma, and sentiment analysis. Although general users were the most prevalent user type in both languages, substantial differences in user type were found between English and Thai tweets. Notably, English tweets exhibited a higher proportion of contributions from NGOs (6.6%) and care partners (7.8%) compared with Thai tweets (0.11% and 1.5%, respectively). The higher prevalence of NGOs in English tweets potentially suggests that a more established network of dementia advocacy organizations exists in English-speaking countries. This disparity offers insights into the landscape of dementia support and advocacy within these communities. Furthermore, the higher proportion of care partners contributing to English tweets may reflect a higher level of online engagement among care partners in English-speaking communities than in Thai-speaking communities. This result may have occurred

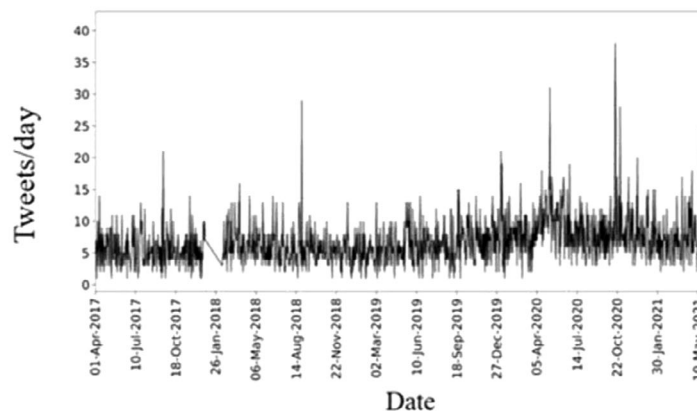


**FIGURE 2** Percentage of sentiment analysis in English and Thai tweets. \* $p < 0.001$ , \*\* $p = 0.838$ .

### English Tweets



### Thai Tweets



**FIGURE 3** Trend of dementia-related tweets between May 2017 and April 2021.

**TABLE 4** Topic analysis according to selected user types.

Topic	Care partner			Health personnel			NGOs <sup>a</sup>			Media		
	English, n = 782 (%)	Thai, n = 145 (%)	p value	English, n = 602 (%)	Thai, n = 115 (%)	p value	English, n = 660 (%)	Thai, n = 11 (%)	p value	English, n = 353 (%)	Thai, n = 359 (%)	p value
General information	223 (28.5)	10 (6.9)	<0.001	340 (56.5)	20 (17.4)	<0.001	497 (75.3)	4 (36.4)	<0.001	237 (67.1)	148 (41.2)	<0.001
Stigma	62 (7.9)	0 (0)		58 (9.6)	4 (3.5)		0 (0)	0 (0)		3 (0.8)	0 (0)	
Medical information	22 (2.8)	6 (4.1)		130 (21.6)	62 (53.9)		72 (10.9)	4 (36.4)		98 (27.8)	185 (51.5)	
Personal experience	448 (57.3)	119 (82.1)		42 (7.0)	17 (14.8)		1 (0.2)	0 (0)		0 (0)	0 (0)	
Misinformation	0 (0)	0 (0)		0 (0)	7 (6.1)		0 (0)	1 (9.1)		2 (0.6)	8 (2.2)	
Advocacy	9 (1.2)	6 (4.1)		11 (1.8)	2 (1.7)		66 (10.0)	2 (18.2)		2 (0.6)	9 (2.5)	
Public health/policy	10 (1.3)	0 (0)		10 (1.6)	0 (0)		10 (1.5)	0 (0)		4 (1.2)	4 (1.1)	
Advertisement	4 (0.5)	1 (0.7)		4 (0.7)	0 (0)		11 (1.7)	0 (0)		5 (1.4)	5 (1.4)	
Joke	0 (0)	1 (0.7)		1 (0.2)	2 (1.7)		0 (0)	0 (0)		0 (0)	0 (0)	
Figurative expression	1 (0.1)	2 (1.4)		0 (0)	1 (0.9)		0 (0)	0 (0)		0 (0)	0 (0)	
Unidentified	3 (0.4)	0 (0)		6 (1.0)	0 (0)		3 (0.5)	0 (0)		2 (0.6)	0 (0)	

<sup>a</sup>Non-governmental organizations.

because of better access to online resources and support groups in English compared with Thai.

For topic analysis of English tweets, general information about dementia accounted for the highest proportion of dementia-related tweets (39.0%). This finding is consistent with previous English and Dutch analyses of Twitter (X) data, in which informative data were the most common topic, ranging from 17.0% to 21.1%.<sup>8</sup> Conversely, the dominant topic in Thai tweets was misinformation (49.2% vs 1.8% in English), which was only observed in the current study. Contrasting findings between the two languages may suggest the presence of more informed discussion and a higher level of awareness and education regarding dementia in English-speaking communities compared with Thai communities. We speculate that the lack of genuine understanding of dementia may contribute to and perpetuate stigma in the future in Thailand. Increasing awareness of this issue among Thai stakeholders is urgent. Additionally, an organized and practical care plan for dementia should be developed, which may start by providing appropriate education in schools and extending to communities.

Stigma was expressed in a higher proportion of English dementia-related tweets (38.9%) than in Thai tweets (22.6%). This result may have been influenced by cultural factors, such as dementia not being commonly used as an insult in Thailand. For English tweets, compared with previous studies,<sup>8,15,17</sup> the percentage of dementia-related tweets involving stigma gradually increased over time, from 16.9% in 2017 to 38.9% in 2021, which contrasted with what we hypothesized when we started this study. Additionally, the results revealed that weaponization emerged as the dominant subcategory of stigma, suggesting that "dementia" was used as a tool for insulting or socially excluding others in everyday life. For instance, the term was used in a weaponizing way during the heated 2020 US election, highlighting how Twitter (X) users used stigmatizing language to discredit political opponents. Immediate actions are also needed to raise awareness to stop using "dementia" for negative purposes in English-speaking countries.

Sentiment analysis revealed a small proportion (3.3%) of positive sentiment in both languages. However, Thai tweets exhibited a significantly higher proportion of negative sentiment (81.3%) compared to English tweets (44.2%), suggesting that a huge problem regarding public perception of dementia exists in Thailand. Whereas the negativity in English tweets largely involved stigma, the negativity expressed in Thai tweets appeared to be associated with the high prevalence of both misinformation and stigma. Our results also revealed a persistent increase in dementia-related tweets in both languages over time, confirming the massive impact of dementia around the world.

For the potential change agents, Thai care partners tended to express more negative views (42.8% vs English 21.5%) than in English, especially through their personal experience. Interestingly, we found no stigmatizing language tweets originating from Thai care partners. This finding might reflect a unique Thai culture in which family members take care of loved ones with dementia in their own homes.<sup>18</sup> However, they might sometimes be overwhelmed with the burden of taking care of those with dementia. We speculate that education on dementia care and appropriate support systems might alleviate the negativity emerging from these individuals in Thai society.



**TABLE 5** Sentiment analysis according to selected user types.

Sentiment	Care partner			Health personnel			NGOs <sup>a</sup>			Media		
	English, n = 782 (%)	Thai, n = 145 (%)	p value	English, n = 602 (%)	Thai, n = 115 (%)	p value	English, n = 660 (%)	Thai, n = 11 (%)	p value	English, n = 353 (%)	Thai, n = 359 (%)	p value
Positive	82 (10.5)	16 (11.0)	<0.001	45 (7.5)	6 (5.2)	0.071	42 (6.4)	1 (9.1)	0.537	4 (1.1)	45 (12.5)	<0.001
Neutral	532 (68.0)	67 (46.2)		483 (80.2)	86 (74.8)		616 (93.3)	10 (90.9)		344 (97.5)	290 (80.8)	
Negative	168 (21.5)	62 (42.8)		74 (12.3)	23 (20.0)		2 (0.3)	0 (0)		5 (1.4)	24 (6.7)	

<sup>a</sup>Non-governmental organizations.

We found that health personnel in both languages still expressed stigma, with a higher proportion in English than in Thai (9.6% vs 3.5%). To create a dementia-inclusive society, health personnel, a crucial change agent, may start at their workplace and contribute to their communities. We hope our findings will raise the awareness of health personnel on this sensitive issue. NGOs could also play an important role in alleviating dementia stigmatization through campaigns and networking. These organizations might be more active on social media, raising awareness and promoting positive narratives about dementia. With a substantial number of NGOs in English-speaking countries, it might be possible in this way to implement programs aimed at promoting reduced stigmatization in society. But for Thailand, we still need to draw the attention of our NGOs to work on dementia-related topics, as this will become a massive health problem soon. Regarding the unique aspects of Thai culture, both conventional mass media and digital media should be engaged as important change agents to rapidly increase knowledge and awareness of dementia in Thai society. To summarize, our findings highlight that cultural beliefs and social structures have a significant influence on the perception of dementia,<sup>19</sup> suggesting that a “one-size-fits-all” approach is unlikely to be effective across diverse cultural contexts.<sup>20,21</sup>

The current study explored public perceptions of dementia on social media by comparing English and Thai tweets. The results confirmed that understanding cultural variation and unique social circumstances is a crucial first step in creating a dementia-inclusive society. We analyzed the outcomes through a multidisciplinary lens combining medical personnel and a social science expert, which enabled a deeper understanding of this complex phenomenon. This study also benefitted from manual coding for stigma detection, which can be more sensitive than automated methods, and the development of a new category for identifying misinformation. Furthermore, we examined trends over 4 years, which, to the best of our knowledge, is the longest data collection period of any study on this topic. This approach provided insights into how the conversation around dementia and stigma might be evolving.

The current study has several limitations that should be considered. The absence of user demographic data (eg, country, gender, age) restricted our ability to understand how these factors might have influenced the outcomes. Moreover, since we did not have sufficient information on user identification, caution should be exercised when interpreting outcomes involving user types.

Next, the English tweet samples might not be fully representative because of their limited size. Finally, the inherent ambiguity of tweet context can lead to misinterpretations, although the involvement of three reviewers helped to ensure the reliability of the interpretation.

Future studies could build on the current findings by incorporating user demographics to gain more precise data and help plan specific interventions for each cultural context. The development and training of automated machine learning for analyzing larger datasets may be valuable for investigating a more comprehensive range of data. By addressing these limitations and pursuing further research, it may be possible to extend the current understanding of how cultural factors influence social media discourse surrounding sensitive topics like dementia. This knowledge could then inform strategies for promoting positive online communication and advocating for social change.

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## CONFLICT OF INTEREST STATEMENT

All authors have no conflicts of interest to declare. Author disclosures are available in the [Supporting Information](#).

## CONSENT STATEMENT

All retrieved tweets were posted publicly on Twitter (X). Any personally identifiable information was removed to ensure anonymity and protect the identity of Twitter users. Consent was not necessary.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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