What affects completion of Ecological Momentary Assessments (EMA) in chronic pain research? An individual patient data meta-analysis

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Abstract:

Background: Real-time data collection using ecologically momentary assessment (EMA) offers a granular perspective on patients’ experience of pain and other symptoms. However, EMA can be burdensome to patients and its benefits hinge upon their engagement in the assessments.

Objective: The goal of this paper was to investigate correlates of completion rates in EMA among patients with chronic pain by taking an Individual Patient Data (IPD) meta-analytic approach.

Methods: The present study is based on 12 EMA datasets examining patients with chronic non-cancer related pain ($n = 701$). EMA completion rates were calculated on a daily basis for each patient. Multilevel models were used to test predictors of completion rates at different levels: within-patient (days into the study, daily pain level), between-patient (age, sex, pain diagnosis, person average pain level), and between-study EMA design features (study duration, sampling density, survey length).

Results: Across datasets, an EMA completion rate of 85% was observed. The strongest results were found for a between-patient factor, age: younger respondents reported lower completion rates than older ones. One within-patient factor was associated with completion rates: over the course of studies, completion rates declined. These two factors interacted in that younger participants showed a more rapid decline in EMA completion over time. Also notable was the absence of significant effects for many other hypothesized factors including gender, chronic pain diagnoses, pain intensity levels, or measures of study burden.

Conclusion: Many factors thought to influence EMA completion rates in chronic pain studies were not confirmed. However, future EMA research in chronic pain should take note that study
length and younger age can impact the quality of the momentary data and devise strategies to maximize completion rates across different age groups and study days.

**Key words:** ecological momentary assessment, experience sampling, chronic pain, compliance rate, completion rate, IPD meta-analysis

**Conflict of Interest:**

A.A. Stone is a Senior Scientist with the Gallup Organization and a consultant with IQVIA and Adelphi Values, Inc. The remaining authors have no conflict of interest to declare.

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Introduction

Ecological momentary assessment (EMA) [1] (also known as experience sampling) has been widely accepted as a gold standard of pain measurement. This is mainly due to its ability to capture real-time data that reflect the dynamics of patients’ experiences in their natural environment. With EMA, pain researchers can collect intensive longitudinal data, which are conducive to answer research questions about momentary pain experiences and how they relate to patients’ behaviors, emotions, and attitudes [1, 2]. The methodology involves prompting participants several times per day to answer questions about their current pain and symptoms, which facilitates coverage of people’s experiences under a full range of momentary contexts and circumvents potential recall bias as people report on their experiences in the moment. EMA often leverages digital tools (e.g., smartphone, wristwatch, and pager) for sending notifications to participants throughout the study to complete the momentary ratings. The quality of these data hinges upon adequate completion rates for the sampling protocol [3]. In other words, true representativeness of patients’ real-time experiences can only be achieved if participants respond to and complete the carefully-timed repeated assessments. Identifying which factors might facilitate or reduce EMA completion rates is an important concern for researchers in the field. Following May and others [4], we use the more neutral term “completion” because the previously used terms such as compliance and adherence connote that the participants are always aware of prompt notifications [1].

In an effort to understand which factors are associated with completion rates in EMA studies, Sokolovsky et al. [5] outlined a conceptual model with four major antecedent categories. Broadly, they are features related to participants, constructs that are being examined, study protocol, and momentary/temporal contexts of participants’ experiences. Prior studies utilizing
EMA examined potential predictors, including gender [5-7], personality traits [8], temporal features (e.g., time of day) [7, 8], substance use [5, 6], and physical activity [9]. Evidence from these investigations suggests that being male, engaging in behaviors that draw attention away from participation (e.g., drinking alcohol, exercising), and longer participation in the protocol, are associated with lower EMA completion rates.

The findings of this prior research are based on non-patient samples including college students, healthy adults, and drug/tobacco users. For patients with chronic pain, we only know of two original studies that have examined factors associated with EMA completion rates. Aaron and colleagues [10] examined completion rates among patients with temporomandibular disorder (TMD). They found that nearly 50% of the missing reports were due to the participant being unable to hear the alarm. Overall, demographic and medical characteristics were not related to the number of missed EMA surveys, but there was suggestive evidence that participants with higher negative mood and higher stress had lower completion rates. Although the completion issue was not the main focus their study, Okifuji and others [11] thoroughly reported EMA response rates and their correlates. They found that missing response rates increased over the 30-day study. However, they found no differences between low completers (>30% missing) and high completers (<30% missing) on individual characteristics (e.g., age, pain, and fatigue).

In addition to these original research, there have been attempts to synthesize the available evidence on EMA completion rates using meta-analytic procedures. Morren and colleagues [12] reviewed completion rates reported in published EMA pain research. The studies consisted of patients with chronic pain, healthy individuals with pain complaints, or individuals experiencing an episode of acute pain. Based on those papers that reported completion rates (36 of 48 studies), the authors found relatively high completion rates on average (83%). The results of their study
also revealed that higher average age, shorter EMA survey length, participation manuals, alarm functions, and the presence of financial incentives were associated with higher average completion rates. A more recent review of studies of patients with chronic pain [4] found that, of those that reported completion rates (less than 70%), their average was 86%. While these reviews generally inform the current state of EMA completion rates in pain research, their findings are limited by the reliance on published study-specific information; this is especially of concern given that the conceptualization and quality of reporting of EMA completion rates varies widely across studies (see [4]).

The present study attempts to overcome these limitations by conducting an Individual Patient Data (IPD) meta-analysis [13-15]. We utilize the raw data of many EMA studies on chronic pain to examine factors associated with EMA completion rates. There are several advantages to the use of IPD meta-analysis. First, availability of the raw data allows for the examination of predictors for individual patients that are not reported in the published article or only reported as summary statistics (e.g., mean age). This avoids potential biases that can result when inferences about individuals are made from group level summary data (“ecological fallacy”). Second, with IPD meta-analysis it is possible to standardize outcome definitions across studies (e.g., completion rates). Third, IPD affords the examination of changes in completion rates over time, which is of particular relevance for EMA data given the demanding nature of this particular methodology [11].

In this paper, we follow Sokolovsky et al.’s conceptual model and examine whether a) features of the study protocol (study-level predictors), b) participant-level features (person-level predictors), c) temporal features (within-person changes over time), and d) the construct under investigation (i.e., pain intensity) are associated with completion rates in patients with chronic
pain. Combining the strengths of raw data availability and meta-analytic methods allows us to examine multiple predictors from different levels (i.e., day, person, and study).

Based on prior related literature, we expected that participant characteristics, specifically being male and of younger age, would be associated with lower completion rates [5-7, 12]. We also explored whether chronic pain diagnosis would relate to EMA completion rates. To date, it is unclear whether disease characteristics of specific pain diagnoses (e.g., pain fluctuations in fibromyalgia [16]) might impact EMA completion. At a study level, researchers may try to manage the amount of burden by balancing the study duration (number of days), sampling intensity (number of prompts per day), and questionnaire length (number of EMA items per assessment). Morren and colleagues [12] looked at one of these EMA design features (i.e., diary length) and found a negative relationship with completion rates. We expected that EMA questionnaire length as well as longer study duration and higher sampling density would be associated with lower completion rates. We further expected that completion rates would decrease over time [11], due to participant fatigue or lowered motivation in the later phase of the study. Finally, we examined whether patients’ pain intensity would predict completion of EMA assessments. Experiencing high levels of pain intensity have been found to occupy patients’ attentional resources [17]. Recent studies have shown that chronic pain is associated with lower cognitive performance, including attention, information processing speed, and mental flexibility [18, 19]. Thus, we expected that completion rates would be lower (a) on days at which participants reported greater pain (vs. days with lower pain), (b) for patients reporting greater average pain levels (vs. patients with lower average pain), and (c) for studies comprised of patients reporting greater pain (vs. studies of patients with lower pain).
**Methods**

*Data acquisition*

The data for this study were drawn from a larger study utilizing secondary data analyses of pre-existing EMA datasets for purposes of characterizing momentary pain experiences in patients with chronic non-cancer related pain. To be included, studies needed to have at least 30 adult patients (studies investigating pediatric patients were excluded), and had to administer a minimum of 3 EMA pain intensity prompts per day for at least 4 days with a fixed or random assessment schedule, assessed via electronic diaries, smart phones, or interactive voice responses. Studies using paper diaries were excluded because of well-known problems (e.g., back-filling, forward-filling) that can undermine the validity of estimated completion rates [20, 21]. Observational studies and clinical trials were included (clinical trials were limited to no-intervention/baseline assessment periods). EMA pain assessments needed to focus on the monitoring of momentary pain intensity; excluded were studies utilizing EMA exclusively as an intervention trigger (e.g., just-in-time adaptive interventions [22]).

Eligible datasets were identified through a systematic literature search conducted in October 2016 using PubMed and Web of Science databases with the following search terms: ["Ecological Momentary Assessment" or "Experience Sampling" or "Electronic Diary" or "Electronic Diaries" or "Electronic Interview" or "Electronic Interviews" or "Interactive Voice Response" or "Intensive Diaries" or "Ambulatory Monitoring" or "Ambulatory Assessment") and "Pain"). As shown in Figure 1, the search identified 685 unique articles (additionally, 11 articles were identified through other sources). Reviews of the article abstracts and (if potentially eligible) full texts identified 20 eligible databases reported in 37 of the articles. Individual patient data were received for 10 of these 20 databases (9 datasets were not received and 1 dataset was
not included because if provided only partial data without information on demographic predictor variables). One database consisted of 3 sub-studies with different EMA sampling designs and these were separated into 3 datasets; thus, 12 independent datasets were included in the analyses.

**Figure 1.** Flow diagram describing the identification of databases.

**Analysis Strategy**

Completion rates were calculated as the percent of EMA prompts completed (relative to the number of prompts received) for each person and day of the study. For EMA protocols with a fixed sampling scheme (6 studies), we set the number of prompts received equal to the number of prompts intended by the protocol (and reported in respective articles). For EMA protocols
with a random sampling scheme (4 studies), we obtained the specific number of executed prompts from the datasets, because they could vary across days (this was especially the case when studies allowed the number of momentary prompts to vary based on patients’ waking hours). Given the proportional nature of the completion rates, we tested our models with both the original and arcsine-transformed scores [23]. In this paper, we report the results based on the original completion rates because the analyses yielded nearly identical results.

To examine changes in completion rates over time, study day was coded as a within-person (day-level) predictor variable. In terms of patient-level predictors of EMA completion rates, age and sex were taken directly from the databases. Patients’ chronic pain diagnosis was coded as osteoarthritis, rheumatoid arthritis, fibromyalgia, or other diagnoses. The following features of the EMA protocol were coded as study-level predictors of EMA completion rates: Study duration was coded as the total number of days of the EMA protocol; EMA sampling density was coded as the average number of EMA prompts received per day; and EMA survey length was coded as the number of EMA items presented at each prompt.

We utilized the momentary pain intensity ratings available in each dataset to examine whether EMA completion rates were associated with pain intensity at the day-, person-, or study-level. The number of scale points used to measure momentary pain differed across studies (range = 5-101), and we converted the pain ratings so that all were on a 101-point scale. For the conversion, we used the following equation: New Ratings = 100 * (Original Rating + 0.5) / (Number of Scale Points). Because momentary pain ratings were not assessed at the time of the missed EMA prompts, the analyses were based on averages of nonmissing pain ratings, following previous analyses by Aaron et al. [10]. Specifically, study- and person-level averages of all available pain ratings were calculated to examine whether studies and/or patients who on
average reported greater pain levels showed lower (or higher) completion rates. Additionally, daily average pain levels were computed for each patient (and within-person centered) to examine whether day-to-day variations in pain within a given patient were related to daily completion rates.

Subsequently, our multilevel models incorporated day-level \textit{(Level 1)}, person-level \textit{(Level 2)} and study-level \textit{(Level 3)} predictors of EMA completion rates. Specifically, a model without predictors (Step 1) was followed by analyses on the day-level \textit{(Level 1)} examining changes in daily completion rates over time (i.e., over the course of EMA sampling protocols; Step 2). Step 3 added patient-level \textit{(Level 2)} predictors including age, sex, and chronic pain diagnosis. Step 4 added study-level \textit{(Level 3)} predictors: study duration, EMA sampling density, and EMA survey length. In the final step (Step 5), day-, patient-, and study-level averages of pain intensity were added as predictor variables of completion rates on each of the three levels. Analyses were conducted using maximum likelihood parameter estimation in Mplus version 8 [24].

\textbf{Results}

\textit{Sample and design characteristics}

Characteristics of the participants and studies are summarized in Table 1. Overall, our analyses included 12 independent datasets (10 studies) involving 7956 study days from a total of 701 patients. Study duration ranged from 4 to 28 days. The number of prompts per day ranged from 3 to 12 prompts. The number of items, on average, was 23.67 (SD = 17.26, range = 6-63). Patient sample sizes ranged from 22 to 115 (M = 58.41; SD = 28.53) across the studies, with a quarter of the patients diagnosed with osteoarthritis. The mean age was 48 years (SD = 13.08, range = 19-80) and the majority were female patients (67%). The patient-level average of momentary pain intensity was 42.00 (SD = 20.54, range = 2-93).
Findings for the tested multi-level model of EMA completion rates are summarized in Table 2. An initial step without predictor variables showed an average completion rate of 85%; however, significant random effects showed that the completion rates varied significantly across days, patients, and studies. We calculated intra-class correlation (ICC) coefficients, which indicate the proportion of variation in completion rates that can be attributed to reliable differences between patients and studies. The ICC for patient-level differences was .15 and the ICC for study-level differences was .27. These results indicate that 42% of the total variance in completion rates is due to differences between patients and studies. The remaining 58% of the
variance is attributed to the effects of within-person (i.e., day-level) factors as well as measurement error. The distribution of average daily completion rates by individuals is presented in Figure 2. Daily completion rates were below 70% for 13% of the patients, below 80% for 27% of the patients, and below 90% for 60% of the patients. We next move to the investigation of predictors from different levels.

**Table 2. Three-Level Multilevel Model of Predictors of EMA Completion**

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>88.61</td>
<td>16.26</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Level 1 (day)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study day</td>
<td>-2.29</td>
<td>.32</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Daily average pain</td>
<td>-23</td>
<td>.20</td>
<td>.25</td>
</tr>
<tr>
<td>Level 2 (patient)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (linear)</td>
<td>1.77</td>
<td>.24</td>
<td>.002</td>
</tr>
<tr>
<td>Age (quadratic)</td>
<td>-62</td>
<td>.24</td>
<td>.009</td>
</tr>
<tr>
<td>Female sex</td>
<td>-1.29</td>
<td>1.14</td>
<td>.26</td>
</tr>
<tr>
<td>Diagnosis (OA)</td>
<td>.23</td>
<td>1.84</td>
<td>.90</td>
</tr>
<tr>
<td>Diagnosis (RA)</td>
<td>.99</td>
<td>2.17</td>
<td>.65</td>
</tr>
<tr>
<td>Diagnosis (FM)</td>
<td>.64</td>
<td>1.76</td>
<td>.72</td>
</tr>
<tr>
<td>Age × Study day</td>
<td>.56</td>
<td>.23</td>
<td>.02</td>
</tr>
<tr>
<td>Patient average pain</td>
<td>.03</td>
<td>.24</td>
<td>.89</td>
</tr>
<tr>
<td>Level 3 (study)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration (number of days)</td>
<td>.26</td>
<td>.36</td>
<td>.48</td>
</tr>
<tr>
<td>Density (prompts per day)</td>
<td>-16</td>
<td>1.06</td>
<td>.88</td>
</tr>
<tr>
<td>Lengths (number of items)</td>
<td>-17</td>
<td>.16</td>
<td>.27</td>
</tr>
<tr>
<td>Study average pain</td>
<td>-.57</td>
<td>3.78</td>
<td>.88</td>
</tr>
</tbody>
</table>

| Random Effects |          |     |       |
| Level 1 (day) |          |     |       |
| Within-person residual | 257.12 | 4.47 | <.001 |
| Level 2 (patient) |    |     |       |
| Intercept | 105.61 | 9.20 | <.001 |
| Slope (study day) | 3.39 | 1.56 | .03   |
| Slope (daily average pain) | 3.59 | 1.02 | <.001 |
| Level 3 (study) |    |     |       |
| Intercept | 58.46 | 25.09 | .02   |
| Parameters |         | 23  |       |
| -2Log Likelihood | 67872.34 |     |       |
| AIC | 67918.35 |     |       |
| BIC | 68078.85 |     |       |

*Note. SE = standard error; a Study day was coded in weekly units; b Daily pain was within-person centered; c Patient-level pain was within-study centered; d Age was centered at 50 years.*
Changes in completion rates over time

We found a significant linear decline in daily completion over time ($b = -2.29$, $p < .001$); on average, completion rates decreased by approximately 2.0% per week of EMA sampling. Model-estimated rates of change in completion rates at the different levels of analysis are presented in Figure 3. Although the rates of decline in completion rates varied significantly ($p = .03$) across studies (see Table 2), this variance in rates of change was not very pronounced, such that consistent declines were observed in all studies.
Figure 3. Percent of daily prompts completed by patients and studies.

**Patient Characteristics.**

Age showed a curvilinear relationship with completion rates ($b_{age,\text{linear}} = 1.77$, $p = .002$; $b_{age,\text{quadratic}} = -.62$, $p = .009$). As shown in Figure 4, completion rates were highest among older patients (60+ years of age), with younger patients showing less completion. We also found that the linear term of age significantly moderated the magnitude of changes in completion rates over time, $b = .56$, $p = .02$. Younger patients had steeper declines over time than older patients (see Figure 5). Other patient characteristics—gender and chronic pain diagnosis—were not significant predictors in the model.
Figure 4. Scatter plot of average daily completion rates by age. An overlaying line graph represents average completion rates by patient age groups. For example, an average of the first group, patients in 20s, is indicated at age 25.
Figure 5. The cross-level interaction effect between age and study day.

Study Design Characteristics

The fourth model examined a series of study design features. However, study duration, sampling density, and survey length were not significantly related to the study-level averages of completion rates.

Pain

Pain intensity levels did not significantly relate to day-to-day variation in completion rates within-patients, differences in completion rates between patients, or study level differences in completion rates.

Discussion

The collection of real-time data with EMA offers a fine-grained perspective on patients’ experiences of pain and other symptoms, but the method can be burdensome and its benefits hinge upon completion of the assessments according to the prescribed protocol. The goal of this paper was to investigate correlates of EMA completion rates among patients with chronic pain using an IPD meta-analytic approach. Pooling data from 701 patients from 10 studies, we found an average EMA completion rate of 85%. Although this rate may seem high, the finding is consistent with other work in chronic pain [4, 12]. The results revealed lower completion rates among younger compared to older patients. We also observed declining completion rates over the duration of study protocols. The rate of this decline was moderated by respondent age, such that younger patients showed a faster decline in completion rates than older patients.

The age effect may be due to elderly patients having fewer competing demands in their daily lives, for example, due to retirement, compared to younger patients. In fact, evidence suggests that younger respondents are more prone to inattention and carelessness in completing online surveys than older respondents [35], perhaps because younger generations are more likely
to engage in multitasking, limiting their attention to study participation [36]. In previous research, the effect of individual age on EMA completion rates had not been explored. We contend that this is due to a narrow age range in typical EMA studies with smaller sample sizes. Age effects may only be detectable by pooling data across a large number of patients with a wider age range, as in the present study.

We also found a decline in completion rates over time. Although we were unable to test potential psychological mechanisms underlying this effect, we speculate that patients experienced increasing survey fatigue or loss of motivation over the study days. Researchers should be aware that the longer the EMA assessment period, the more taxing it may be, yielding increasing rates of missing EMA data over time, particularly for younger patients. This could be especially problematic when examining changes in pain over time is of interest (e.g., in a clinical trial), since systematic changes in the rates of missing values may introduce bias in estimated rates of change in patients’ pain. Based on similar findings, Okifuji et al. [11] recommend limiting the period of EMA assessments to one week, but this may not always be desirable, for example, when evaluating responses to changes in treatment or adjustment to new medications using EMA. Research is needed to identify feasible ways to ensure sustained patient engagement in EMA assessments over time, including the use of monetary or motivational incentives, close participant-researcher interactions over the course of the study, or the use of emerging data collection strategies aimed at reducing participant burden, such as “microinteraction-based” EMA (a method developed to answer few EMA items very quickly) [37] or “measurement burst” designs (multiple brief EMA assessment periods repeated over time) [38].

Analyses did not support several a priori hypotheses. We did not find gender differences in EMA completion rates. In fact, previous findings of lower completion rates among males were
primarily based on healthy samples [5-7], whereas, studies on chronic pain did not find this pattern [10, 11]. In addition, we found no evidence that either day-to-day variations in pain intensity or differences in pain intensity levels between participants or studies were systematically associated with EMA completion. This finding is important in view of the framework by Sokolovsky et al. [5], which emphasizes the need for understanding effects of target behaviors or states under study on EMA completion rates. Specifically, if higher pain levels were associated with a lower likelihood of responding to EMA surveys, this could severely undermine the validity of EMA data collected to monitor patients’ pain in everyday life. An important caveat of our analyses is that they were necessarily based on averages of pain from EMA reports that were not missed by patients; given that pain levels for missed EMA prompts are not known, the possibility that EMA prompts are more likely missed when patients are in higher (or lower) pain at the time of the prompt cannot be excluded. Our findings may also be due to the salience of pain experiences in the study samples. That is, participating in research where pain is of immediate relevance and intrinsic importance might have contributed to patients’ motivation to complete the momentary assessments even in times of high pain intensity.

This perspective also aligns with the fact that we did not find differences in EMA completion rates by chronic pain diagnosis. The characteristics of the chronic pain experience can vary substantially between diagnoses. For example, prior research has shown that patients with fibromyalgia experienced greater daily variability and overall higher levels of fatigue compared to patients with rheumatoid arthritis and osteoarthritis [39]. In addition, patients with fibromyalgia have been shown to experience greater cognitive dysfunction, including memory impairments and mental confusion, compared to patients with other rheumatic diseases [40]. One could speculate that the pronounced fatigue and cognitive difficulties in patients with
fibromyalgia could contribute to lower completion rates more so than for other pain diagnoses. However, the present research found EMA completion rates to be comparable between the conditions suggesting that more complex symptomatology per se might not preclude patients’ engagement in the momentary assessments.

At the study level, we did not find associations between design features related to participant burden (study duration, sampling density, number of EMA survey items) and completion rates, which was surprising. Given the intensive nature of EMA protocols, participant burden has often been viewed as a major contributing factor to noncompliance [5, 12]. One possibility is that other study design factors (e.g., frequent contacts with participants to keep them motivated) are more important than load for continued engagement in EMA protocols, and these should be studied in future research. Additionally, despite the sizeable number of participants included in the analyses, IPD meta-analysis can suffer from low statistical power at the highest (between-study) level of analysis, which may have limited our ability to detect effects based on study-level design features [41].

**Limitations and future directions**

A limitation of our results is potential selectivity bias, in that we were able to include 10 out of 20 eligible datasets. Including upwards of 90% of eligible studies in IPD meta-analyses has been suggested as an ideal target [42], even though in practice many IPD meta-analyses include less than 80% of eligible datasets [43]. To evaluate the potential for selection bias in the data available for the present analyses, we examined the pooled average completion rate reported for eligible studies that were not included in the analyses; out of 10 studies, 7 provided average completion rates in published reports. The weighted average completion rate in these studies was
78.2%, suggesting a potential upward bias of completion rates in the data that were available for our analyses.

When calculating completion rates, we relied on a fixed number of EMA prompts unless studies employed a variable prompting schedule based on patients’ waking hours. In doing so, we assumed that each participant in those studies consistently received the same number of prompts. However, this assumption may have sometimes been violated, considering the potential for malfunctioning of data collection devices or limitations in their configuration capability (i.e., prompting during sleep). Thus, some of the calculated daily completion rates may have underestimated participants’ actual completion rates.

Our study is also limited by the number and types of predictor variables that were consistently available across the different datasets. Additional predictors such as negative affect, disability status, and stress levels were not consistently available, but are undoubtedly candidates for understanding EMA completion in chronic pain. Lastly, our findings may not generalize to patients with other illnesses or healthy populations.

Conclusion

In summary, our IPD meta-analysis found no evidence to suggest that EMA completion rates in chronic pain differ by medical diagnoses, gender, EMA study design features related to participant burden, or variations in pain levels across days, patients, or studies. These findings support the use of EMA data collection methods for the fine-grained assessment of patients’ pain and other experiences. Future EMA research in chronic pain should take note that study length and younger age can impact the quality of the momentary data and devise strategies to maximize EMA completion rates across different age groups and study days.
References


