



# Internet interventions for parents of young children: A cross-sectional study of health, social, and welfare professionals' attitudes to their use

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## ABSTRACT

**Background:** Despite the increasing popularity of internet-based parent support interventions (IPSI[s]), little is known about attitudes that might promote or prevent the uptake of such interventions among professionals working in prenatal, infant and child services for children under 5 years of age.

**Objective:** This cross-sectional study aimed to investigate attitudes towards IPSIs. We also wanted to identify predictors of attitudes to determine which professionals may be willing to use IPSIs in their work and to what extent attitudes related to efficacy and comfort predicted whether professionals would use IPSIs.

**Methods:** Between May and September 2018, 1 910 leaders and practitioners of prenatal, infant, and child services were recruited to a cross-sectional web-based survey either through: (a) a course database, (b) an official mailing list to infant and child health services, (c) social media or (d) other recruitment channels. Attitudes toward internet-based parenting interventions were measured by the Computer-Assisted Therapy Attitudes Scale.

**Results:** Participants were generally positive about using IPSIs. Professionals' belief in IPSIs efficacy and their comfort in using them, was associated with younger age, higher education, previous experience with IPSIs, and being a top-level manager. They were also more likely to believe IPSIs were efficacious if they had internet access at work and worked in well-baby clinics, and more comfortable using IPSIs if they were male. Higher scores on both the Efficacy and Comfort sub-scales were associated with more likely use of IPSIs, if such programs were available.

**Conclusion:** Participants' perceived efficacy and level of comfort with using IPSIs matters in terms of how likely they are to use IPSIs in their work. Prior experience with IPSIs predicted both efficacy and comfort, suggesting that exposure might be important to bridge the gap between expressed attitudes and actual use of IPSIs in practice.

## 1. Introduction

From the age of 3 years, it is estimated that 15–20 % of children have a reduced functioning due to symptoms commonly associated with anxiety, affective, and behavioral disorders (Norwegian Institute of Public Health, 2018), and approximately 7 % of pre-school and school-aged children have symptoms that are compatible with a psychiatric diagnosis (Heiervang et al., 2007; Kessler et al., 2012; Wichstrøm et al., 2012). Social, emotional, and behavioral problems often emerge early and, if left untreated, the child may carry with him or her such problems into adolescence and young adulthood. Therefore, primary prevention and early intervention in terms of parent support or training programs,

wherein the purpose is to strengthen parenting and parent–child relationship, can be highly beneficial for improving developmental trajectories (Perrin, Leslie, & Boat, 2016). Regrettably, the need for mental health services exceeds the capacity of primary and secondary health-care, and many children are left undertreated. In the United States, less than half of children with a mental disorder are offered treatment (Merikangas et al., 2010). A study from Germany have reported similar findings, were less than half of children and adolescents with identified mental health problems received treatment (Ravens-Sieberer et al., 2008). In Norway, 7 % of children are diagnosed with mental health disorders, but only 5 % receive treatment (Norwegian Institute of Public Health, 2018).

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Although there is a clear need to allocate more resources to child mental health services, labor market projections suggest a future shortage of relevant professions (e.g., public health nurses) that play a crucial role in providing these services (Hjemås et al., 2019). Professional labor unions and healthcare services already report concerns about the lack of health professionals in key positions and downsizing of services (De Rosa, 2019; Tønset, 2019). Thus, relying only on traditional modes of intervention delivery is unlikely to meet the demand for infant and child mental health services. In this regard, dissemination and implementation of internet interventions with evidence of effectiveness for prevention and treatment can be expected to have several positive consequences.

Therapist-assisted and unguided Internet-based interventions have been found to be effective, with therapist-assisted interventions generally showing larger effect sizes in adults, older children, and adolescents (Grist, Croker, Denne, & Stallard, 2019; Koelen et al., 2022). An early study from the United Kingdom demonstrated that the capacity of services to treat depression increased by 50 % after implementing therapist-assisted internet-based treatment (Wright et al., 2005). Experiences with therapist-assisted Internet-based treatment in Sweden, Australia, the Netherlands, and several other countries, including *eMeistring* in Norway, have since confirmed the findings of the British study, in which each therapist can treat 3–4 times as many patients compared to those who offer face-to-face treatment (Elvsaas et al., 2018). Furthermore, Internet-based treatment can also reduce the use of other healthcare services, thereby reducing costs (Chaudhry et al., 2006; Krishna, Boren, & Balas, 2009; Olthuis et al., 2018), as well as patient travel time and expenses (Elvsaas et al., 2018).

However, it is unclear whether the same is true for parents of young children. With the growing reliance on the Internet for information, resources, and social support among parents, the popularity of internet-based parent support interventions (IPSI[s]) has increased (Størksen et al., 2022). IPSIs are a form of psychological self-help interventions delivered over the Internet rather than face-to-face. They can be fully automated or include assistance that is reduced to take just a few minutes, either digitally or face-to-face, compared to traditional interventions. Regardless of the level of professional assistance, parents are responsible for implementing new strategies and making any necessary changes. Implementing therapist-assisted IPSIs in prenatal, infant, and child services can be a cost-effective, convenient, and effective way to provide support to parents and families, which can have a positive impact on child development and well-being. Although the evidence base for these interventions is not yet as robust as for other forms of interventions (Sanders & Kirby, 2012), systematic reviews have shown favorable outcomes of technology-based interventions for child mental and health behavior problems such as anxiety, depression, disruptive behaviors, and somatic conditions (Baumel et al., 2016; Cushing & Steele, 2010; Pennant et al., 2015; Rooksby, Elouafkaoui, Humphris, Clarkson, & Freeman, 2015; Välimäki, Anttila, Anttila, & Lahti, 2017). A recent review concluded that internet interventions with or without guidance can result in more appropriate parent behaviors and produce outcomes in parent behavior that are comparable to face-to-face treatment (Nøkleby et al., 2019). Additionally, internet-based prevention and treatment can give easy access to help and support at an early stage, for problems parents otherwise may not have sought help. Therefore, implementing therapist-assisted IPSIs may offer a way to expand access to child mental health services while addressing the workforce shortage, and IPSIs can be an effective way to provide support to parents and families, improving parental knowledge, attitudes, and practices, as well as child behaviors (Breitenstein et al., 2014).

Although there are benefits to internet-based services, there are always barriers to adopting new treatments. Becker and Jensen-Doss (Becker & Jensen-Doss, 2014) have focused on therapists' practical (i.e., capability to deliver the internet intervention) and attitudinal (i.e., willingness to deliver) barriers to internet-based interventions. They argued that therapists must have adequate access to technological tools

required to engage with the delivery of internet interventions. This requires access to computer equipment, skills needed to use the equipment, and willingness to adopt the technology in treatment. Their research has suggested that most practicing therapists have both the resources and the skills needed to engage with computer-based therapies (Becker & Jensen-Doss, 2013). Thus, they argued that it is important to give more attention to attitudinal implementation barriers; as negative attitudes toward internet-based practices among professionals can limit their uptake and effectiveness (e.g., Jensen-Doss, Hawley, Lopez, & Osterberg, 2009; Nelson & Steele, 2007).

There is limited research on infant and child professionals attitudes toward internet interventions with evidence of effectiveness, although a few studies are available. One of these studies showed that obstetricians can be skeptical toward the use of e-health solutions (Grassl et al., 2018). On the other hand, mental health workers for children and young people appear cautiously positive (Fleming & Merry, 2013; Stallard, Richardson, & Velleman, 2010), particularly in the prevention and treatment of mild to moderate mental health problems (Stallard et al., 2010; Vigerland et al., 2014). However, despite the increasing popularity of IPSIs, there is a lack of knowledge about attitudes that could promote or prevent the uptake and use of such interventions among professionals working in services for young children.

Given this knowledge gap, the overall aim of this study was to investigate attitudes towards therapist-assisted IPSIs among professionals working in prenatal, infant, and child services for children under 5 years of age. Furthermore, we wanted to identify predictors of attitudes to determine which professionals may be willing to use IPSIs in their work, and if there are differences in attitudes among (a) leaders, middle managers, and practitioners, and between (b) daycare centers (i.e., institution that provides supervision and care of infants and young children during daytime, particularly so that parents can hold jobs), well-baby clinics (WBC; i.e., a universal child-health service for preventive monitoring, health education and advice for parents of babies), municipal child welfare services (CWS; i.e., public agency responsible for child protection), and child and adolescent mental health clinics (CAMHS; i.e., services that provide specialist mental health treatment and care to children and adolescents). The predictor variables of interest included age, sex, education, service, job level, internet access at work, experience with internet-based self-help interventions, and time spent in direct contact with clients. Lastly, the study aimed to examine whether attitudes toward internet interventions predicted whether professionals would use IPSI's in their work, if IPSI's were available.

## 2. Method

### 2.1. Study design and participants

This study was conducted as a cross-sectional survey and approved by the Norwegian Centre for Research Data ([www.sikt.no](http://www.sikt.no); project no.: 60041). Between May and September 2018, participants were recruited through either (a) the Regional Centre for Child and Adolescent Mental Health (RBUP), Eastern and Southern Norway, ([www.r-bup.no](http://www.r-bup.no)) course database, (b) an official mailing list to infant and child health services ([www.pedlex.no](http://www.pedlex.no)), (c) social media or (d) other recruitment channels (e.g., labor unions). All registered e-mail addresses received study invitation. Those invited to participate were 16 years or older. Administrative staff were excluded from this study.

A total of 5 050 e-mail addresses were extracted from the course database based on participation in educational and course activities for leaders and clinical staff working with parents and children aged 0–5 years. Due to ethical considerations, participants registered in the course database (a) before January 2013, and (b) with a private e-mail address, were not invited to participate in the study ( $n = 1361$ ; 28.7 %). Thus, 3602 (71.3 %) unique and eligible participants received a study invitation.

The official mailing list contained 7345 e-mail addresses to relevant

child health, social, and welfare services. This included the following primary care services; leaders and clinical staff in (1) municipal and (2) state child welfare services, (3) daycare centres, (4) family counselling services, (5) district medical officers, (6) leading public health nurses, (7) municipality psychologists, and (8) educational and psychological counselling services. The following secondary care services were also included; (1) leaders and (2) clinical staff in child and adolescent mental health clinics, and (3) maternity wards in hospitals.

The study was promoted on Facebook in 14 relevant professional groups, with a total of 16,555 group members. These members were, however, not unique (i.e., a participant may be member of more than one group). In addition, three national labor unions (i.e., the Norwegian Midwife Association, Norwegian Association for Clinical Pedagogy, and the Norwegian Psychologist Association) were contacted via email and/or telephone and encouraged to send study information and consent to its member list per email or promote the study on their website.

## 2.2. Data collection and measures

Prior to data collection, the web-based survey was pilot tested independently by six professionals sampled from our study population. However, no changes were needed based on their feedback. Data were collected between May and September 2018. Participants were provided with written study information and informed that participation was voluntary. When informed consent was obtained, participants completed the online survey, which took, on average, 20 min. Participants who did not complete the survey received one weekly reminder for up to two consecutive weeks.

Participants were requested to fill in background information (i.e., age, gender, and education), after which they were presented with a brief written introduction, defining, and explaining the practical use of self-directed internet-based interventions (see [Textbox 1](#)).

Professionals' attitudes toward internet-based parenting interventions were measured using the *Computer-Assisted Therapy Attitudes Scale* (CATAS; [Becker & Jensen-Doss, 2013](#)). The scale has a two-factor structure with Efficacy (i.e., the belief in its efficacy) and Comfort (i.e., the comfort in using it) subscale for each measure. CATAS includes eight items, rated on a 5-point Likert scale (1) *strongly disagree*, (2) *disagree*, (3) *neither agree nor disagree*, (4) *agree*, (5) *strongly agree*. Negative items were reversely scored, with higher scorings indicating more positive attitudes. In this study, the terms "computers" and "therapy" were replaced with "internet-based interventions" and "practice" for all items.

To assess job level, participants were asked to check the description that best fitted their current position: (1) *top manager* (e.g., service leader), (2) *middle manager* (e.g., team- or project leader), (3) *employee* (e.g., caseworker or therapist), or (4) *other position* (i.e., *self-employed*).

Participants were also asked to provide information about where

they worked. Responses were coded into five health, social and welfare services: (1) *daycare centre*, (2) *WBC*, (3) *municipal CWS*, (4) *CAMHS*, and (5) *other services* (i.e., private practice or neonatal intensive care unit). Furthermore, participants were asked how much of their time they usually spent in direct contact with pregnant women, children 0–5 years and their parents; (1) *1–20 %*, (2) *21–40 %*, (3) *41–60 %*, (4) *61–80 %*, or (5) *81–100 %*.

To explore participant's experience with internet-based self-help programs, they were asked "Do you currently use, or have you previously used, internet-based self-help programs?" Responses were coded as: (1) "Yes, I use/have used internet-based self-help programs for my own part/in my work with patients or both" (2) "No, I have never used internet-based self-help programs". Participants were also asked if they had access to internet at work coded as (1) *Yes* or (2) *No or limited due to firewalls*.

Lastly, participants were asked "If internet-based self-help programs were available to you, would you use them with your users/patients"? Responses were coded as (1) *No, definitely not* (2) *Maybe* or (3) *Yes, definitely*. Participants could also respond *Not sure/I don't know/Not relevant*, which was treated as missing.

## 2.3. Statistical methods

Descriptive analyses were applied to summarize participant characteristics and missing data. Histograms for CATAS-Efficacy and CATAS-Comfort subscales were examined for normal distribution, and for acceptable range. Descriptive analyses were used to examine attitudes towards IPSIs among professionals working in prenatal, infant and child services for children under 5 years of age. Means and standard deviations for the different CATAS items were calculated while Cronbach's alpha was used to examine the internal consistencies of subscales.

Regression analysis was conducted using ordinary least squares (OLS) to identify predictors of attitudes to determine which professionals may be willing to use IPSIs in their work, as well as differences in attitudes among (a) leaders, middle managers, and practitioners, and between (b) daycare centers, WBC, CWS and CAMHS. All predictors (i.e., age, sex, education, service, job level, internet access at work, experience with internet-based self-help interventions and time spent in direct contact with clients) were first examined individually, using univariate regression and excluding cases analysis by analysis. The predictors were then tested simultaneously using multivariate regression analysis.

Ordinal logistic regression was conducted to examine to what extent the CATAS-Efficacy and CATAS-Comfort subscales would predict professionals use of IPSIs with patients, if available. The proportional odds assumption was investigated by test for parallel lines. If deviations from the proportional odds assumption were indicated, separate analysis for each dichotomization was performed. The statistical package SPSS

### Textbox 1

Brief textual information about internet-based interventions adapted and translated from Norwegian.

**Experience and knowledge of internet-based self-help programs** Internet-based interventions are often developed by researchers and clinicians, and usually consist of 6–12 sessions on a weekly basis. In online guidance, parents learn about the challenges they face, receive exercises and weekly homework assignments. Internet interventions use standard internet technology and, usually, does not require any special equipment. Content is interactive and based on recognized theories and methods in psychology, which are often used by professionals in their work with pregnant women, parents and children. One of the most common approaches is cognitive behavioral therapy, but psychodynamic and other approaches are also used. Internet-based self-help programs does not require any prior knowledge or expertise. Professionals are trained over 2–4 days and receive ongoing supervision from qualified personnel with expertise within the relevant problem area. Guidance of professionals takes place over time, often on an 'as-needed' basis. Your task as a professional is to support parents in carrying out the internet program and solve challenges along the way (e.g., low motivation and adaptation of tasks and exercises to the family's own situation). This takes place either online or in combination with consultations, included as part of the ordinary healthcare service. With online guidance or treatment, professionals will spend an average of 10–20 minutes per family per consultation. Please answer the following questions based on the information you have now received about internet-based self-help programs.

version 23 (SPSS Inc., Chicago) was used for all analyses.

### 3. Results

#### 3.1. Participants

In total, 2884 prenatal, infant and child services leaders and professionals were recruited. Participants with missing information on all items of the Computer-Assisted Therapy Attitudes Scale (CATAS;  $n = 974$ , 33.8 %) were excluded, resulting in a final study sample of 1910 participants.

Participants were mostly middle-aged women who had completed 1–3 years of college or university education (see Table 1). Most reported working in daycare centers, and that they were employees. Nevertheless, almost 30 % were top-level managers. Among the participants, 32.2 % of the men held top-level positions, while 29.3 % of the women reported occupying such roles. Most top-level manager were in the age range of 41–60 years old (74.1 %).

Participant in the “Other” category were excluded from analyses of job level. The number of participants identifying neither as a top-level, mid-level manager, or practitioner was too low for any meaningful analysis and not of main interest for our research purposes ( $n = 5$ , 0.3 %).

#### 3.2. Attitudes toward internet-based parent support intervention

The first aim of this study was to examine attitudes towards IPSIs among professionals working in prenatal, infant and child services. Overall scale scores and mean item values on the CATAS are provided in Table 2. Mean Efficacy sub-scale scores indicated that, overall, professionals held neutral to positive attitudes regarding the perceived efficacy of IPSIs (see Table 2). Furthermore, mean Comfort scores suggested that most professionals were comfortable with the idea of using IPSIs. According to the original study (Becker & Jensen-Doss, 2013), the Cronbach’s alpha for the Efficacy and Comfort subscales were 0.86 and 0.64, respectively. In the present study, the internal consistency of the translated CATAS questionnaire ranged from good to acceptable for the Efficacy ( $\alpha = 0.81$ ) and Comfort ( $\alpha = 0.67$ ) subscales.

#### 3.3. Predictors of perceived efficacy

We also wanted to identify predictors of perceived efficacy and

**Table 1**  
Characteristics of child health, social and welfare professionals ( $n = 1\ 910$ ).

Variables	
<b>Sex, <math>n</math> (%)</b>	
Male	121 (6.3)
Female	1 789 (93.7)
<b>Age (years), mean (SD)</b>	46.0 (9.9)
<b>College/University education (years), <math>n</math> (%)</b>	
≤ 1–3 years	1 322 (69.2)
≥ 4–5 years	588 (30.8)
<b>Services, <math>n</math> (%)</b>	
Daycare center	836 (43.8)
Well-baby clinic	454 (23.8)
Municipal child welfare service	224 (11.7)
Infant and child mental health service	80 (4.2)
Other services	316 (16.5)
<b>Job level, <math>n</math> (%)</b>	
Top manager (e.g., service leader)	562 (29.4)
Middle manager (e.g., team leader or project leader)	470 (24.6)
Employee (e.g., caseworker or therapist)	873 (45.7)

**Table 2**  
CATAS item means and standard deviations.

Sub-scale items	<i>M</i>	<i>SD</i>
<b>Comfort</b>	3.6	0.63
I feel apprehensive about using internet-based interventions during practice	3.4	0.86
I am afraid that if I begin to use internet-based interventions in practice, I will become dependent upon them and lose some of my own skills	3.8	0.78
The challenge of learning about internet-based interventions in practice seems overwhelming to me	3.7	0.80
<b>Efficacy</b>	3.3	0.59
If given the opportunity and training, I would like to use internet-based interventions in practice	3.5	0.81
Using internet-based interventions in practice will interfere with rapport	3.2	0.91
My clients will be more likely to drop out of treatment if I use an internet-based intervention as part of my practice	3.3	0.81
My clients would find it engaging to learn new skills using internet-based interventions	3.3	0.65
I believe that using internet-based interventions in practice will lead to better outcomes for my clients	3.2	0.71

comfort, respectively, to determine which professionals may be willing to use IPSIs in their work, and if there are differences in attitudes between among (a) leaders, middle managers, and practitioners, and between (b) daycare centers, WBC, CWS and CAMHS. Several variables predicted scores on the Efficacy sub-scale (see Table 3). Univariate regression analysis showed that higher scores on the Efficacy scale were associated with younger age, higher education, internet access at work, and previous experience with internet-based self-help programs. Additionally, there were systematic overall differences between services. Participants from well-baby clinics held more positive attitudes regarding the perceived efficacy of IPSIs compared to participants working in daycare, CWS, and other services. There was also a difference between top managers and middle managers, with middle managers holding more negative attitudes toward the perceived efficacy of IPSIs. When examined simultaneously, all these variables remained significant predictors of Efficacy scores. Additionally, in the multivariate regression model, top level managers were associated with higher CATAS Efficacy score as compared to both employees and middle managers. Despite several significant relationships, the beta coefficients indicated rather small and modest effects of predictors on participants’ perceived efficacy (Table 3).

#### 3.4. Predictors of comfort

Univariate regression analysis showed that several variables predicted how comfortable professionals were with the idea of using IPSIs (see Table 4). Higher scores on the Comfort sub-scale were associated with younger age, being male, higher education, previous experience with internet-based self-help programs, and less time spent in direct contact with clients. Additionally, there were systematic overall differences between both service and job level. Participants working in daycare held more negative attitudes compared to participants in WBC, CWS, and other services. Regarding job level, there was a systematic difference between top and middle managers (i.e., top managers were more positive). When predictors were examined simultaneously, all variables except time spent in direct contact with clients, remained significant predictors of Comfort scores. Additionally, a few more differences were identified between the different services and job levels in the multivariate regression model. Participants working in daycare and employees in general, held more negative attitudes than participants working in CAMHS and top managers, respectively. As with perceived efficacy, the beta coefficients, however, indicated small effects of predictors on participants’ perceived comfort with IPSIs (Table 4).



**Table 3**  
Predictors of CATAS Efficacy.

Predictor variable	Univariate model			Multivariate model		
	Coef.	95 % CI	p	Coef.	95 % CI	P
<b>Age (years)</b>	-0.003	(-0.006, -0.001)	0.014	-0.006	(-0.008, -0.003)	<0.001
<b>Sex</b>						
Male vs. female	0.079	(-0.029, 0.188)	0.152	0.082	(-0.027, 0.191)	0.140
<b>College/university education (years)</b>						
≤ 1–3 years vs. ≥ 4–5 years	-0.066	(-0.124, -0.009)	0.023	-0.044	(-0.106, 0.018)	0.163
<b>Service</b>			0.023			0.005
CAMHS vs Other	0.071	(-0.073, 0.216)	0.333	0.109	(-0.036, 0.254)	0.142
Daycare vs Other	0.008	(-0.069, 0.084)	0.846	-0.025	(-0.122, 0.071)	0.607
WBC vs Other	0.111	(0.026, 0.195)	0.010	0.117	(0.031, 0.203)	0.008
CWS vs Other	0.005	(-0.096, 0.106)	0.923	-0.009	(-0.112, 0.094)	0.861
CAMHS vs Daycare	0.064	(-0.071, 0.199)	0.355	0.134	(-0.017, 0.285)	0.083
WBC vs Daycare	0.103	(0.036, 0.171)	0.003	0.142	(0.057, 0.227)	<0.001
CWS vs Daycare	-0.003	(-0.089, 0.084)	0.954	0.016	(-0.088, 0.121)	0.763
CAMHS vs CWS	0.066	(-0.084, 0.216)	0.387	0.118	(-0.036, 0.272)	0.134
WBC vs CWS	0.106	(0.012, 0.200)	0.028	0.126	(0.026, 0.226)	0.013
CAMHS vs WBC	-0.040	(-0.179, 0.100)	0.578	-0.008	(-0.151, 0.135)	0.909
<b>Job level</b>			0.051			0.010
Middle managers vs Employees	-0.053	(-0.119, 0.013)	0.117	-0.010	(-0.085, 0.064)	0.785
Employees vs Top managers	-0.037	(-0.099, 0.026)	0.248	-0.111	(-0.199, -0.022)	0.014
Middle managers vs Top managers	-0.090	(-0.162, -0.017)	0.015	-0.121	(-0.202, -0.040)	0.004
<b>Internet access at work</b>						
No/Limited due to firewall vs. yes	-0.096	(-0.176, -0.016)	0.019	-0.111	(-0.193, -0.029)	0.008
<b>Experience with internet-based self-help programs</b>						
Yes vs. No	0.208	(0.118, 0.298)	<0.001	0.186	(0.095, 0.277)	<0.001
<b>Time spent in direct contact</b>			0.453			0.599

**Table 3 (continued)**

Predictor variable	Univariate model			Multivariate model		
	Coef.	95 % CI	p	Coef.	95 % CI	P
<b>with clients</b>						
1–20 % vs. 81–100 %	0.046	(-0.030, 0.122)	0.231	0.037	(-0.052, 0.125)	0.414
21–40 % vs. 81–100 %	0.032	(-0.049, 0.113)	0.445	0.005	(-0.085, 0.094)	0.918
41–60 % vs. 81–100 %	0.051	(-0.033, 0.135)	0.236	0.010	(-0.079, 0.100)	0.823
61–80 % vs. 81–100 %	0.077	(-0.007, 0.160)	0.071	0.061	(-0.024, 0.146)	0.158

**3.5. Availability**

The final aim of this study was to examine to what extent attitudes toward internet IPSIs would predict whether professionals would use IPSI's in their work, if IPSI's were available. The results showed that higher scores on both the Efficacy and Comfort sub-scales were associated with a greater likelihood of using IPSIs if these were made available. Specifically, for the Efficacy sub-scale, an increase in one unit was associated with an odds ratio of 19.16 (95 % CI: 14.03–26.18,  $p < .001$ ), while for the Comfort sub-scale, an increase in one unit was associated with an odds ratio of 3.89 (95 % CI: 3.14–4.82,  $p < .001$ ). This suggests that individuals who reported higher levels of efficacy and comfort with using IPSIs would be more likely to use them. There was no evidence for deviation from the proportional odds assumption for the Comfort sub-scale ( $p = .263$ ). However, for the Efficacy scale, there was evidence for deviation from the proportional odds assumption ( $p = .002$ ). Separate logistic regression analyses showed a stronger relationship when comparing yes/maybe with no (OR = 51.81, 95 % CI: 23.30–115.21,  $p < 0.001$ ) than when comparing yes with no/maybe (OR = 14.82, 95 % CI: 10.54–20.83,  $p < 0.001$ ). The deviation from the proportional odds assumption for the Efficacy scale implies that the effect of this predictor variable may not be constant across different categories of the outcome variable. The greater association observed when comparing yes/maybe with no suggests that participants who were undecided about using IPSIs were more likely to be influenced of their Efficacy scale scores compared to those who were already firm in their decision against using IPSIs. Overall, this suggests that there are still many professionals who have not fully clarified whether they would use IPSIs even if they consider them to be effective.

**4. Discussion**

In this study, we examined the attitudes towards IPSIs among professionals working with young children within health, social and welfare services, and we identified predictors of attitudes. Moreover, we investigated to what extent attitudes related to perceived efficacy and comfort could predict whether professionals would use IPSIs.

The results showed that participants overall held neutral to positive attitudes toward the perceived efficacy of IPSIs and seemed comfortable with the idea of using IPSIs in their work. Employees working in daycare were least comfortable with the idea of IPSIs. Across professions, males were more comfortable using IPSIs, which is consistent with a meta-analysis that found males to still hold more favorable attitudes toward technology use than females, although differences were small (Cai et al., 2017). This may not be due to gender differences per se, but rather due to differences in experience with technology. Several predictors were found to be significantly associated with professionals' belief in IPSIs perceived efficacy and comfort, such as younger age, higher education, previous experience with internet-based self-help programs, and top manager positions. Additionally, professionals who had internet access at work and worked in well-baby clinics were also more likely to believe in the efficacy of IPSIs. Most of the beta coefficients were rather small,

**Table 4**  
Predictors of CATAS Comfort.

Predictor variable	Univariate model			Multivariate model		
	Coef.	95 % CI	p	Coef.	95 % CI	p
<b>Age (years)</b>	-0.007	(-0.010, -0.004)	<0.001	-0.009	(-0.012, -0.006)	<0.001
<b>Sex</b>						
Male vs Female	0.144	(0.027, 0.260)	0.015	0.124	(0.009, 0.239)	0.035
<b>College/ university education (years)</b>						
≤1–3 years vs. ≥4–5 years	-0.180	(-0.241, -0.119)	<0.001	-0.134	(-0.199, -0.068)	<0.001
<b>Service</b>						
CAMHS vs Other	-0.005	(-0.159, 0.150)	<0.001	0.010	(-0.143, 0.164)	0.003
Daycare vs Other	-0.143	(-0.225, -0.062)	<0.001	-0.179	(-0.280, -0.077)	<0.001
WBC vs Other	-0.043	(-0.133, 0.048)	0.352	-0.019	(-0.111, 0.072)	0.679
CWS vs Other	-0.014	(-0.122, 0.094)	0.800	-0.027	(-0.135, 0.082)	0.630
CAMHS vs Daycare	0.139	(-0.006, 0.283)	0.060	0.189	(0.029, 0.349)	0.021
WBC vs Daycare	0.101	(0.029, 0.173)	0.006	0.159	(0.069, 0.249)	<0.001
CWS vs Daycare	0.130	(0.037, 0.222)	0.006	0.152	(0.042, 0.262)	0.007
CAMHS vs CWS	0.009	(-0.152, 0.170)	0.910	0.037	(-0.126, 0.200)	0.655
WBC vs CWA	-0.029	(-0.130, 0.072)	0.573	0.007	(-0.098, 0.113)	0.890
CAMHS vs WBC	0.038	(-0.111, 0.188)	0.616	0.030	(-0.121, 0.181)	0.699
<b>Leader</b>						
Middle managers vs Employees	-0.070	(-0.141, 0.001)	0.036	0.039	(-0.039, 0.118)	<0.001
Employees vs Top Managers	-0.030	(-0.097, 0.037)	0.386	-0.185	(-0.278, -0.092)	<0.001
Middle managers vs Top managers	-0.100	(-0.177, -0.022)	0.012	-0.146	(-0.231, -0.060)	<0.001
<b>Internet access at work</b>						
No/Limited due to firewall vs. yes	-0.027	(-0.113, 0.059)	0.540	-0.065	(-0.152, -0.022)	0.142
<b>Experience with internet-based self-help programs</b>						
Yes vs no	0.220	(0.124, 0.316)	<0.001	0.178	(0.082, 0.274)	<0.001
<b>Time spent in direct contact with clients</b>						
1–20 % vs. 81–100 %	0.108	(0.027, 0.189)	0.004	0.040	(-0.053, 0.134)	0.395

**Table 4 (continued)**

Predictor variable	Univariate model			Multivariate model		
	Coef.	95 % CI	p	Coef.	95 % CI	p
21–40 % vs. 81–100 %	0.140	(0.053, 0.226)	0.002	0.068	(-0.027, 0.162)	0.159
41–60 % vs. 81–100 %	0.148	(0.058, 0.238)	0.001	0.073	(-0.021, 0.168)	0.129
61–80 % vs. 81–100 %	0.114	(0.025, 0.203)	0.012	0.078	(-0.012, 0.167)	0.089

and significant mostly because of the large sample size, but these findings suggest that certain characteristics may influence professionals' acceptance and adoption of IPSIs. Higher scores on both the Efficacy and Comfort sub-scales were associated with more likely use of internet-based self-help programs, if such programs were available.

Overall, professionals' attitudes toward IPSIs were neutral to positive, with respect to both the perceived efficacy and comfort of IPSIs, with mean comfort scores being slightly higher than efficacy scores. These are encouraging results, indicating that employees and service leaders seem receptive and open to use IPSIs. Our findings are in line with previous results showing that professionals are cautious, but generally positive towards the use of internet-based interventions with children, particularly in the prevention and treatment of mild-to-moderate mental health problems (Stallard et al., 2010; Vigerland et al., 2014). It is noteworthy, however, that only 182 out of 1910 participants in our study had previously utilized an IPSI. This suggests that IPSIs are either unavailable, that professionals are unaware of these interventions, or that they are reluctant to use them. Other factors may be that IPSIs are not relevant to the specific needs or professional interests of the respondents, or that IPSIs are not convenient to use, which could also contribute to low utilization rates.

Research suggests that despite a general positivity towards such interventions, there are several barriers to the adoption of new treatments by professionals into their daily practice (Feijt et al., 2018). Barriers include a lack of technological knowledge, lack of availability of software as well as absence of therapeutic relationship, professional support, and poor motivation from the patient (Stallard et al., 2010). Research also suggests that health professionals are concerned that the use of these tools will not necessarily lead to better outcomes for their clients (Jensen-Doss et al., 2009). Other barriers such as lack of time, a top-down implementation approach, and restriction of autonomous decision-making have also been identified as important barriers (Finne, 2020). These issues should be addressed to facilitate uptake in clinical settings. Knowledge of therapist barriers to the use of IPSIs should also be used to inform future training and parent support tools to maximize their benefit (Becker & Jensen-Doss, 2013).

While our study found that age, educational level, and gender predicted perceived efficacy and comfort of internet interventions, all of which are relative stable and may present challenges in accessing and utilizing IPSIs, we also found that exposure to internet interventions predicted both perceived efficacy and comfort. This suggests that exposure might be an important measure to bridge the gap between expressed attitudes and actual use of IPSIs in practice. Other studies have also provided evidence for the importance of exposure and training in increasing professionals' comfort and willingness to use internet interventions in their practices (O'Mahen et al., 2014; Richards et al., 2016).

Our results revealed that top managers found IPSIs both more efficacious and would be more comfortable with using them compared to employees and middle managers. Previous research has highlighted that top-level managers found internet-based interventions more useful than employees for several infant and child mental health problems (Storksen et al., 2020). The reasons for these differences between occupational levels are not fully understood. It is worth noting that a higher percentage of men held top-level positions compared to women in our

study, but this difference is relatively small and may not be statistically significant. Furthermore, most top-level managers were in the age range of 41–60 years old, suggesting that experience, rather than gender, may be a more important factor in determining their perceived efficacy and comfort with IPSIs. It is also possible that educational levels may be a contributing factor, with higher levels of education potentially leading to greater comfort with technology and a more positive attitude towards IPSIs. Top-level managers may have a broader perspective on the benefits and potential impact of such interventions on the organization as a whole, whereas employees and middle managers may have a narrower focus on their clinical role and responsibilities, which could also be factors contributing to the differing attitudes towards IPSIs. Additionally, potential motivational differences between top-level managers and employees could explain these findings as top-level managers may believe IPSIs can increase capacity and reach, and therefore, be cost-effective. Overall, a complex interplay of factors likely contributes to the observed differences in attitudes towards IPSIs across occupational levels.

Some studies have emphasized the importance of contextual factors of daily practice such as level of knowledge and training, available time, and resources, perceived social norms, forces within the current care system, and the design and usability of the technological tools (Carper et al., 2013; Kivi et al., 2015; Topooco et al., 2017). These factors will most certainly vary between different infant and child services (e.g., whether a service has allocated time during working hours to invest in professional development), and, in this way, the organizational context of a health professional also exercises a significant influence (Feijt et al., 2018). In line with this, our results showed that professionals were more likely to believe IPSIs were efficacious if they worked in well baby clinics and least comfortable with the idea of using IPSIs if they worked in daycare. In contrast to other services, daycare staff work primarily and directly with the children, and not the parents. Daycare staff may also experience greater practical barriers to the use of computers and internet (e.g., much of the working hours are spent outdoors with children).

Higher perceived efficacy and comfort emerged as important predictors of more likely use of IPSIs, albeit perceived efficacy was a stronger predictor for intended use than comfort. This provides preliminary support for a relationship between attitudes and use of IPSIs. In one study, the researchers argued that given the potential link between attitudes and computer-based training, as well as the low reported rates of use, developing effective marketing strategies may be a particularly important step to increase use (Becker & Jensen-Doss, 2014). This assumes an availability of internet interventions which, in turn, can increase the experience with such a treatment modality. Availability and prior experience (or lack thereof) have been identified as important to the uptake and use of internet interventions (Carper et al., 2013), and were central to findings in the current study. However, although availability, exposure to, and experience with IPSIs, may be a prerequisite, it is likely insufficient to translate internet interventions into sustainable changes in practice (Friesen, Hadjistavropoulos, & Pugh, 2014). It is therefore worth considering whether there is a need for further research, particularly qualitative research, to delve deeper into specific barriers that may exist and require further exploration. This may inform the development of tailored implementation strategies that address the identified barriers and promote the adoption and sustained use of IPSIs in prenatal, infant and child services.

#### 4.1. Strengths and limitations

One strength is the large sample comprised of employees and leaders from all major infant and child health, social, and welfare services. Nevertheless, a selection bias may have occurred due to how participants were recruited (i.e., via email or social media), as those who experience greater practical barriers to the use of computers and the internet at work may have had reduced possibilities to participate.

However, it is important to bear in mind that selection bias does not necessarily influence results much when associations between variables are investigated (Nilssen et al., 2009). While the study provides significant information about attitudes just prior to the emergence of the SARS-CoV-2 outbreak, it is important to consider that the amplified adoption of digital solutions due to the pandemic could have potentially affected the perceived attitudes of professionals who work with young children in health, social, and welfare services regarding IPSIs. As a result, it may be beneficial to conduct a new study.

Despite its strengths, our study has some limitations. Due to the cross-sectional design of this study, we are limited in drawing causal conclusions. Additionally, our study's reliance on self-report also limits us to participants' opinions and perceptions only. Another limitation is that the internal consistency was 0.67 for the CATAS Comfort scale. This means that the items are related to each other, but there may be some degree of inconsistency or error in the scale which may have influenced our results. In our study, out of 1910 participants, only 182 had previously utilized an IPSI. We cannot exclude the possibility that this may be due to some participants not fully understanding the question or that the question did not apply to all participants equally. Additionally, we acknowledge that many professionals have limited experience with IPSIs, which may have made it challenging for them to provide accurate responses regarding the efficacy and comfort of these interventions. This is an important limitation to consider when interpreting the results of our study. Although we acknowledge that the sample size of male participants in our study is small, comprising only 6.3 % of the total sample, we note that, for example, the proportion of women working in Norwegian daycare in 2021 was 89.9 % (Statistics Norway, 2023), suggesting that our sample is only slightly underrepresented. Although this may limit the generalizability of our findings to male workers, we believe that our study still provides valuable insights into the experiences of child health, social and welfare professionals. Furthermore, it is worth noting that we conducted a national, rather than an international study so the results may not be applicable to countries with widely different health, social and welfare systems. A final limitation may be that even the provision of brief textual information about e-mental health services can influence peoples' attitudes toward IPSIs (Apolinário-Hagen et al., 2018; Casey, Joy, & Clough, 2013), which may have affected participants' evaluations in our study.

#### 4.2. Conclusion

Peoples' perceived efficacy of internet interventions and their level of comfort with using them, are related to how likely they are to use internet interventions in their work. In this study, younger age, higher education, and gender, predicted efficacy and comfort. However, previous exposure to internet interventions predicted both efficacy and comfort, suggesting that exposure might be an important measure to bridge the gap between expressed attitudes and actual use of internet interventions in practice. It is important to note that the study's findings should be interpreted with caution, considering the small effect sizes observed.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Data availability

The data that has been used is confidential.

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