JOURNAL	Issues in Mental Health Nursing
CITATION	Långstedt, C., Bressington, D., & Välimäki, M. (2025). Understanding Implementation Fidelity of Physical Health Screening in Mental Health Nursing: A Mixed Methods Study. *Issues in Mental Health Nursing*, *46*(3), 267–279.
DOI	https://doi.org/10.1080/01612840.2025.2464692

Understanding implementation fidelity of physical health screening in mental health nursing: a mixed methods study

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Abstract

Physical health screening for patients with schizophrenia spectrum disorders is suboptimal despite patients' poor physical health and nurses' willingness to conduct assessments. However, this inadequate service provision is poorly understood. The purpose of this study was to describe nurses' adherence to conducting screening with the Finnish Health Improvement Profile and related factors. An explanatory, sequential two-phase mixed-methods design was used. A quantitative method was used to describe nurses' adherence and a qualitative approach to describe moderating factors. The data were collected and analyzed separately and later integrated into one dataset. Generally, screening was implemented as intended regarding content adherence despite very few nurses conducting the screening. Analysis identified four main themes related to adherence. *Comprehensiveness of policy description* included complexity and duration; *strategies to facilitate implementation* included fragmented information, instructions, nurses' fragmented work tasks, management and equipment; *quality of delivery* included preparedness and nurses' confidence and skills; and *participant responsiveness* included nurses' enthusiasm in screening, nurses' engagement in screening, patient willingness to participate, patient's refusal to participate, patient's cognitive capacity and collaborative screening. For successful screening, the utility and feasibility of the screening tool would need to be reevaluated after addressing some of the barriers identified as moderating factors.

Key words Schizophrenia spectrum disorder, severe mental illness, physical health screening, implementation fidelity, mixed methods

Introduction

The importance of physical health screening for patients with schizophrenia spectrum disorders (SSD) has been recognized worldwide (American Psychiatric Association, 2020; Department of Health, & Great Britain. Department of Health, 2006; Kuipers et al., 2014; Schizophrenia. Current Care Guideline, 2024; American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, & North American Association for the Study of Obesity, 2004). Regular physical health screening is recommended in any mental health practice setting for health promotion and to support patients adopt healthy lifestyles (National Institute for Health and Care Excellence [NICE], 2014; Blanner et al., 2015). Typically, health monitoring and appropriate interventions are targeted to address cardiometabolic diseases (De Hert et al., 2011), smoking (Happell et al., 2013), and weight management (American Psychiatric Association, 2020; Schizophrenia. Current Care Guideline, 2024). However, physical health screenings are poorly implemented globally (Castle & Li, 2023; McGinty et al., 2015).

Despite nurses' willingness and capability to conduct physical health screening among patients with SSD in clinical mental health practice (Happell et al., 2023), it is still not a part of regular nursing activities (McGinty et al., 2015; Ilyas et al., 2017; Baller et al., 2015; Brunero & Lamount, 2009; Yeomans et al., 2014; Robson & Gray, 2007; Happell & PLATANIA-PHUNG & Gray et al., 2011). As an outcome, patients with a diagnosis of SSD are less likely to receive general health checks when compared to the general population (Robson & Gray, 2007). However, several factors increase the physical morbidity in this patient population, e.g. illness-related symptoms, unhealthy lifestyle choices and side-effects of antipsychotics (Castle & Li, 2023; Firth et al., 2019). As a consequence, a high prevalence of physical comorbidities has been reported, such as metabolic syndrome (Eskelinen et al., 2015), cardiovascular diseases (De Hert et al., 2018), diabetes (Ward & Druss, 2015), anaemia and hypertension (Nishanth et al., 2017). Mainly due to physical comorbidities, patients with SSD have a 15-20 years shorter life expectancy compared to the general population (Peritogiannis et al., 2022). For identifying current health risks, preventing future health problems and improving life expectancy, implementing physical health screening for patients with SSD is crucial (Castle & Li, 2023).

Understanding the fidelity and related factors in the implementation of physical health screening may help address the suboptimal screening rates (Brown et al., 2023). Implementation fidelity is described as how comprehensively those who deliver an intervention adhere to the intervention protocol as it is originally intended (Carroll et al., 2007). Previous study results related to nurses' implementation fidelity in physical health interventions and related factors are discrepant. In general, nurses are adherent in delivering health care interventions for various types of diseases. It was reported in Morello et al.'s study (2017) that nurses adhered to a nurse-led falls prevention program by completing the falls-risk tool including all seven intervention components each day for 75% of 22,670 patient admissions to the intervention wards. Another study showed that oncology nurses adhered to the Distress Thermometer (DT) protocol by conducting screening for 65% of 2166 inpatients (Götz et al., 2020). On the contrary, a study by Johansson et al. (2008) reported that nurses partly adhered to national and local guidelines concerning peripheral venous catheters; adherence concerning documentation of the dressing was low and varied between 5% and 26.3% of 343 peripheral venous catheters. Different factors have been reported to explain implementation fidelity levels among nurses, such as positive attitudes followed by administrative support, hospital types and safety climate (Oh & Choi, 2019), and nurses' experiences and fears of adverse effects (Jansson et al., 2018). Factors restricting nurses' implementation fidelity have also been reported, such as complexity of participation, staff shortages, difficulties getting patients involved, role ambiguities, knowledge deficit and lack of time, motivation, supplies, education and inappropriate resources (Driscoll & Evans, 2022; Jansson et al., 2018; Smit et al., 2022).

Health screening conducted with high fidelity provides an important base for health promotion activities (Carroll et al., 2007; Allen et al., 2012). To our knowledge, however, no previous studies have been reported that aim to understand how a structured physical health screening intervention has been implemented into mental health settings and which factors explain the findings. Describing whether an intervention has been implemented into daily practices offers a better understanding of the relationship between intervention and its outcomes, how and why an intervention works, and which outcomes can be improved (Carroll et al.,

2007). Therefore, the purpose of this study is two-fold. First, we will describe nurses' adherence to a systematic physical health screening intervention protocol for patients with SSD by using the Finnish Health Improvement Profile (HIP-F) (Werkkala et al., 2020) (i.e. implementation fidelity). Second, we aimed to develop a deeper understanding of nurses' adherence to the health screening intervention protocol by describing the perceived moderating factors, which might be linked to nurses' health implementation fidelity within their daily practice.

MATERIALS AND METHODS

Design

An explanatory, sequential two-phase mixed-methods design (Ivankova et al., 2006) was used to address the research objectives, where a qualitative phase followed the quantitative data collection and analysis (Ivankova et al., 2006; Creswell & Creswell, 2017). Both approaches are recommended to assess intervention fidelity (T Mowbray et al., 2003; Bellg et al., 2004). A mixed methods design was used because neither quantitative nor qualitative methods are sufficient with single data sets to offer complete answers to the research questions (Ivankova et al., 2006; Creswell & Creswell, 2017). The screening intervention protocol used in this study was the Finnish Health Improvement Profile (HIP-F) (Werkkala et al., 2020).

In our study, intervention fidelity was assessed from two angles: 1) by describing nurses' adherence to the health screening intervention protocol, and 2) by understanding nurses' experiences of adherence to the protocol within their daily practice from the point of moderating factors (Breitenstein et al., 2010; Palmer et al., 2019). The quantitative method was implemented to describe the proportion of nurses using and adhering to the Finnish Health Improvement Profile (HIP-F) protocol (Werkkala et al., 2020) with SSD patients. While the qualitative approach used semi-structured focus group interviews to describe factors moderating implementation fidelity (Carroll et al., 2007). The quantitative and qualitative data were collected and analyzed separately and later integrated into one data set (Wisdom & Creswell, 2013). The

Good Reporting of a Mixed Methods Study (GRAMMS) was applied in reporting this study (O'cathain et al., 2008).

Theoretical approach

In this study, implementation fidelity is understood based on two key components, as explained by Carroll et al. (2007): adherence and moderating factors influencing adherence (See Figure 1). Adherence is defined as the measure of whether the intervention has been delivered as intended. Measurement of adherence includes the following quantifiable sub-categories: content, coverage, frequency, and duration. The content refers to the components that are delivered. The concept of coverage refers to which level all the eligible participants are invited to participate. Frequency and duration are referred to as the dose of the intervention, i.e. whether intervention components are implemented in accordance with the planned duration and frequency (Carroll et al., 2007).

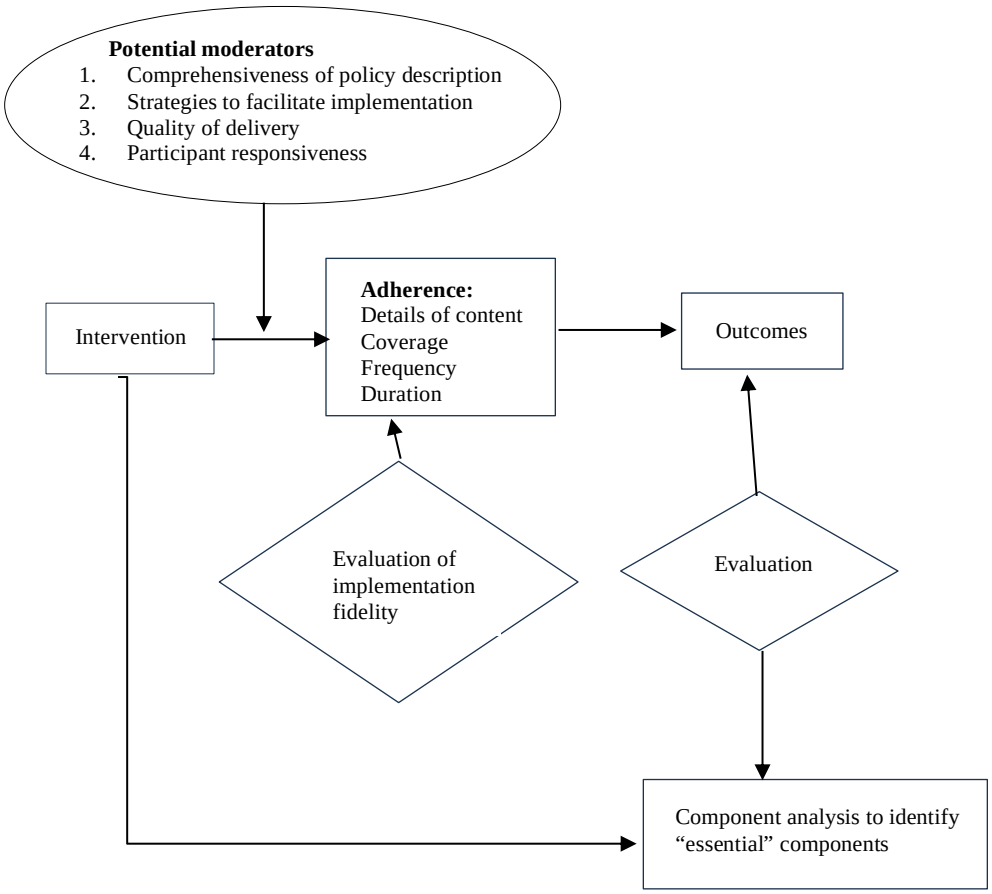

Figure 1. Conceptual framework for implementation fidelity. Carroll, C., Patterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A conceptual framework for implementation fidelity. Implementation science, 2, 1-9.

Moderating factors (participant responsiveness, comprehensiveness of policy description, facilitation strategies and quality of delivery) can negatively or positively influence adherence (Carroll et al., 2007). In this study, participant responsiveness considers both nurses delivering and patients receiving an intervention. The comprehensiveness of policy description includes intervention complexity and to which level the intervention is clearly and adequately described. Facilitation strategies refer to strategies such as training and improving intervention manuals. Quality of delivery incorporates whether an intervention was delivered in a way that can achieve what had been intended. (Carroll et al., 2007.)

Setting

In Finland, the Ministry of Social Affairs and Health [MSAH] (2024) regulates the mental health services for patients with SSD by overseeing the national planning, guidance and evaluation of mental health care (Finnish Institute for Health and Welfare, 2024a). Wellbeing services provide mental health treatment and rehabilitation for patients with SSD, in both primary health care and specialized heath care. Specialized health care services provide inpatient and outpatient treatment, depending on patients' needs. Outpatient clinics treat patients with SSD, who can manage their daily SSD symptoms and are not in need of acute inpatient treatment (Finnish Institute for Health and Welfare, 2024a; Ministry of Social Affairs and Health, 2024.) In Finland, healthcare operations are supervised by the National Supervisory Authority for Welfare and Health (2024) and Regional State Administrative Agency (2024). In addition, healthcare organizations are obliged to supervise their operations themselves (Contact Point for Cross-Border Health Care, 2024).

This study was conducted in five specialized psychiatric outpatient clinics in Southern Finland. These clinics are part of the largest hospital area in Finland. Approximately 2,300 adult patients (minimum age of 18 years) with a diagnosis of schizophrenia spectrum disorder [ICD-10 (WHO, 2004), are treated in these clinics annually. Nurses in these clinics have regular meetings with their patients depending on patients' individual treatment and rehabilitation plans. Nurses' roles and responsibilities in the treatment of patients with SSD are based on the Current Care Guideline for the treatment of

schizophrenia (Schizophrenia. Current Care Guideline, 2024) and professional obligations described by Health Care Act (2010) and the Act on Health Care Professionals (1994). These emphasize the holistic approach to care, including physical health promotion (Finnish Institute for Health and Welfare (2024a; 2024b). According to the Finnish Nurses Association's ethical instructions (2024), nurses are responsible for implementing evidence-based interventions following professional guidelines, developing education and promoting scientific knowledge. The goal of the professional activity of a health care professional is to maintain and promote health, prevent diseases, and heal the sick and relieve their suffering (National Supervisory Authority for Welfare and Health, 2024). In outpatient treatment, patients should be monitored for their symptoms, such as SSD symptoms, assessment of side-effects of medication and physical health screening, e.g. measuring body mass index (BMI), glucose and weight. Patients should also be provided with health promotion, such as advice on healthy nutrition, smoking cessation and activity and psychoeducation regarding SSD and the management of the disease. Practically, these tasks are taken care of by nurses. Furthermore, nurses collaborate with a multi-professional team and organize further physical health care for their patients if needed. (Schizophrenia. Current Care Guideline, 2024.) However, before conducting this study, these clinics did not have a structured screening tool in use by nurses to assess patients' physical health. Assessment of physical health status was fragmented and depended on individual nurses (Långstedt et al., 2024).

In the current study, these clinics were selected for their representativeness of nurses as the study population. Nurses at the clinics have regular meetings with their patients and therefore represent an ideal population for conducting physical health screenings for patients with SSD to assess the implementation fidelity (NICE, 2014). Nurses at the clinics also have different backgrounds related to age, gender, education and length of working experience, offering a broader perspective on factors influencing adherence to physical health screenings.

Population and recruitment

All nurses (N=47) in five outpatient clinics formed the study population and were asked to conduct physical health screening for their eligible patients. The eligibility criteria for patients were having a diagnosis of schizophrenia or other psychosis (F20-29) [ICD-10] (WHO, 2004). Out of these 47 nurses, 16 conducted screening with HIP-F. Conducting the screening was voluntary, and no explanation for refusal was requested (Finnish National Board on Research Integrity TENK, 2019). These 16 nurses were further invited to participate in the interviews. To generate encompassing data to describe the study phenomenon, a purposive sampling method was used (Hennink et al., 2019). For the nurses' recruitment, a researcher (CL) regularly visited the study clinics and held information meetings online or face-to-face. She provided written and oral information about the aim of the study, rights, confidentiality, and voluntariness as well as the possible harms of the study to participants (i.e. the time spent on the study) (Finnish National Board on Research Integrity, 2019). During information meetings (two organized in each of the five clinics), nurses were invited to join the focus group interviews. If they expressed their willingness to participate in the interviews, their informed consent was collected and a time for the focus group interviews was scheduled. Nurses were eligible for inclusion if they had a professional nursing qualification (mental health nurse, a registered nurse) (National Supervisory Authority for Welfare and Health, 2024), permanent employment or long-term temporary work, and worked at the clinical practice as a patient primary nurse. Nursing students were excluded.

Data collection tools

Tool for the quantitative data

In the first phase, the quantitative data were collected with HIP-F questionnaire form between December 2021 and October 2022. All nurses on the study clinics had been asked to conduct a single physical health screening with the HIP-F during patients' out-patient visits and to complete the HIP-F forms by self-reporting the results of the screening. The HIP-F was originally developed in the UK (White et al., 2009; Hardy et al., 2015) and validated in Finland (Werkkala et al., 2020) to support nurses to work with patients to profile their physical health state. The HIP-F is gender specific and measures 27 (28 for female) aspects of physical health e.g. BMI, smoking status and sleep (Werkkala et al. 2020). Based on discussions

between the patient and nurse, measuring health parameters or data recorded from the patient's medical records, the result is first marked on column 'level'. Depending on cut-off points or international/national recommendations the result will be marked green (healthy) or red (action required). If the parameter is marked as 'red', the final column provides evidence-based recommended actions for health promotion. (White et al., 2009; Hardy et al., 2015.) (Supplement 1). The following outcomes were assessed to indicate nurses' adherence level:

Content: To assess how the content of HIP-F tool was completed, each of the 27 (28) health parameters (see Table 1 and Table 2, Supplement 1) was assessed a) whether the result or level of the health parameter was filled in (yes, no), and b) whether 'the traffic light' (green or red) had been used to assess patient health level (yes, no).

Coverage: Coverage was assessed by calculating the proportion of HIP-F screening conducted compared with the total number of eligible patients in the clinics.

Frequency: Frequency was assessed by calculating a) the number of completed filled forms out of all filled forms and b) which empty items were identified.

Duration: Duration was assessed by time estimation spent on each screening activity as reported by nurse participants.

Tool for the qualitative data

To understand nurses' adherence to the health screening intervention, moderating factors linked with nurses' adherence were explored using semi-structured group interviews. Qualitative data were collected between October and December 2022. During interviews, nurses were asked two semi-structured questions (supplemented by additional exploratory questions as appropriate) as follows:

1) What factors were related to the delivering of HIP-F screening?

2) How did these factors associate the delivering of HIP-F screening?

Data collection

In the quantitative data collection, nurses were guided to implement physical health screening for their patients, as follows: 1) to assess all measurable health parameters in HIP-F profile (e.g. waist circumference, temperature etc.); 2) to extract information regarding laboratory tests from patient records; and 3) to discuss with patients about the topic of screenings, its results, and any lifestyle or personal habits that require improvement depending on each items results. The results were guided to be marked first on the level column in the HIP-F form and further score the result as 'green' or 'red' (see example on Table 2, Supplement 1) as intended from the developers (White et al., 2009; Hardy et al., 2015). Nurses' physical health screening fidelity levels were estimated based on how well nurses had filled each item or conducted specific steps in the form. Frequency was measured on how completely nurses had filled forms out of all filled forms and which item had been left unfilled. Duration was measured based on the nurses' interview answers.

For the qualitative data collection, interviews were conducted by one researcher (CL). After providing written consent, nurses shared their background information (age, gender, education, work experience in mental health care). To facilitate discussion in focus groups, participants were presented the HIP-F form. Nurses were asked to give their responses to the two semi-structured questions focusing on factors related to delivering the HIP-F screening (Côté & Turgeon, 2005; Persch & Page, 2013). The researcher guided focus group interviews and encouraged participants to interact with each other (Krueger, 2014).

Ethical issues

Ethical permission to conduct the study was obtained from the university hospital after being approved by the Helsinki University Hospital Regional Committee on Medical Research Ethics (reference: HUH/1556/2021). Participants received written and oral information regarding the study and gave their

written informed consent to participate. During the study, ethical principles according to harm avoidance, self-determination, data protection, privacy and ethical considerations (Finnish National Board on Research Integrity TENK, 2019, FINLEX, 2001) were considered and all methods were conducted following the Declaration of Helsinki (World Medical Association, 2001). In reporting qualitative results, confidentiality was ensured in the quotations by using codes instead of participants' names.

Data analysis

Quantitative data analysis

Participant characteristics were described (e.g. age, gender) using frequencies, percentages, means and standard deviations. 'Content' was analyzed by calculating the proportion (n, %) of 'yes' responses in level column and 'green' or 'red' column. Mean item adherence was formed by calculating the item level adherence and item area adherence (Borrelli et al., 2005). Implementation fidelity was categorized using criteria in previous literature as follows: 80%–100% adherence as 'high' fidelity, 51%–79% as 'moderate' fidelity and 0%–50% as 'low' fidelity (Perepletchikova & Kazdin, 2005; Garbacz et al., 2014). Quantitative data were analyzed using descriptive statistics and for all analyses, the IBM Statistical Package for the Social Sciences (SPSS) 24 Windows were used (Abu-Bader, 2021).

Qualitative data analysis

The audio-recorded interviews were analyzed with framework-driven deductive content analysis (Elo & Kyngäs, 2008) according to the Conceptual Framework for Implementation Fidelity (CFIF) (Carroll et al., 2007). A deductive approach was chosen because the structure of our analysis was operationalized on the basis of previous knowledge of implementation fidelity (Kyngäs & Vanhanen, 1999). Interviews, original transcriptions, and the whole data analysis were conducted in the Finnish language. The analysis process included three main phases; preparation, organizing and reporting, according to Graneheim and Lundman (2004).

First, in the preparation phase, a sentence was selected as a unit of analysis (Graneheim & Lundman, 2004; Kyngäs, 2020). CL transcribed all interviews verbatim and familiarized herself with the overall data by carefully reading the transcripts several times to become immersed in the data (Elo & Kyngäs, 2008). The analysis was guided by research questions and content-appropriate sentences that described the nurses' perceptions of factors that moderated the implementation fidelity. These text excerpts were extracted from the data and only the manifest content was analyzed (Graneheim & Lundman, 2004; Guthrie et al., 2004). Second, in the organizing phase, a structured categorization matrix was developed, and the data were coded and further categorized based on defined moderating factors (Carroll et al., 2007) by one researcher (CL) (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004). In case of any discrepancies the codes were reorganized after feedback from two other authors (MV, DB). Third, in the reporting phase, the contents results were described i.e. the meaning of the categories (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004). CL translated study participants' quotations from Finnish to English and MV as another bilingual researcher checked for equivalent meaning. The English versions were then used to illustrate the findings (thematic categorization affecting fidelity). Numbers in parenthesis represent identification codes of the interviews and nurse participants.

Data integration to develop a holistic picture of the results from both data sets, was undertaken after the completion of separate data analysis in the interpretation phase during the discussion of the outcomes of the study (Ivankova et al., 2006; Greene et al., 1989; Guetterman et al., 2015). The results from the qualitative analysis were connected to the quantitative results in the discussion part (Ivankova et al., 2006) to explore which potential moderating factors may have associated the adherence and overall implementation fidelity (Persch & Page, 2013). Study findings from both phases were assessed regarding convergence, offering complementary information or appearing in contradiction to one another (Greene et al., 1989). Data integration was used to present quantitative, qualitative and further integrated findings, such as differences and similarities, by merging the results and discussing the integrated results of two-level analysis (Guetterman et al., 2015).

RESULTS

Nurses' characteristics

Quantitative component

Out of 47 nurses in the five study clinics, 16 (34%) nurses (14 registered nurses, 2 mental health nurses) in four clinics conducted physical health screening for their patients. Their mean age was 49.63 years (SD 5.83) and the ages varied between 41 and 61 years. Nurses' average length of work experience was 21.72 years (SD 8.15) and their individual length of working experience varied from 1.5 to 38 years.

Qualitative component

Altogether 15 nurses (13 registered nurses and 2 mental health nurses) joined in the qualitative interviews. The mean age of the nurses was 49.47 years (SD 5.99, range 43 - 61 years). Their average length of work experience was 21.73 years (SD 8.18) and their individual length of working experience varied from 1.5 years to 38 years.

Nurses' adherence in HIP-F intervention

Coverage

Out of approximately 2,300 patients who were registered in out-patient clinics during the data collection period (eleven months) and could be potentially screened using HIP-F instrument, 20 patients (about 0.87%) were screened by nurses with the HIP-F. Of the screened patients', 12 (60%) were female and 8 (40%) were male.

Frequency

Out of all 20 filled HIP-F forms, 20% (n=4) were completely filled. The frequency of empty items in filled forms was highest for glucose (n=6), BMI (n=4), lipid levels (n=4) and temperature (n=4). More detailed frequency of completely unassessed items can be seen in Table 1.

Table 1. Frequency of empty items in 20 filled HIP-F forms

Item	%	(n)
Glucose	30.0%	(6)
BMI	20.0 %	(4)
Lipid levels	20.0 %	(4)
Temperature	20.0 %	(4)
Prostate and testicles	25.0%	(2)
Waist circumference	5.0%	(1)
Pulse	5.0%	(1)
Cervical smear	8.3%	(1)
Exercise	5.0%	(1)
Alcohol intake	5.0%	(1)
Safe sex	5.0%	(1)
Sexual satisfaction	5.0%	(1)

Content

Most components of the HIP-F screening were found to be implemented with a moderate level of fidelity. Items for pulse and blood pressure were implemented with high adherence and marked in the green or red area. The waist circumference item was scored as green or red with high adherence, but the assessment value was not found in all forms. Items for BMI, temperature, lipid levels, glucose and alcohol intake had been implemented with moderate fidelity. Items for cervical smear, prostate and testicles, menstrual cycle, safe sex, bowels and sexual satisfaction in turn, had been implemented with low implementation fidelity. As illustrated in Table 3, most items had been marked as green or red, but the measured result was missing, which lowered the overall implementation fidelity (Table 2).

Table 2. Implementation fidelity (content adherence) on Finnish Health Improvement Profile (HIP-F) for 20 patients

Content	Item level adherence % (n)	Item area adherence % (n)	Item mean adherence %	Level of fidelity
BMI	65.0 (13)	85.0 (17)	75.0%	Moderate
Waist circumference	75.0 (15)	95.0 (19)	85.0%	High
Pulse	80.0 (16)	95.0 (19)	87.5%	High
Blood pressure	95.0 (19)	100 (20)	97.5%	High
Temperature	60.0 (12)	85.0 (17)	72.5%	Moderate
Liver function tests	30.0 (6)	85.0 (17)	57.5%	Moderate
Lipid levels	70.0 (14)	75.0 (15)	72.5%	Moderate
Glucose	55.0 (11)	70.0 (14)	62.5%	Moderate

Cervical smear (f)	25.0 (5)	55.0 (11)	40.0%	Low
Prostate and testicles (m)	5.0 (1)	35.0 (7)	20.0%	Low
Menstrual cycle (f)	30.0 (6)	65.0 (13)	47.5%	Low
Sleep	40.0 (8)	100 (20)	70.0%	Moderate
Teeth	35.0 (7)	95.0 (19)	65.0%	Moderate
Eyes	25.0 (5)	100 (20)	62.5%	Moderate
Feet	25.0 (5)	100 (20)	62.5%	Moderate
Breast (f, m)	15.0 (3)	90.0 (18)	52.5%	Moderate
Smoking status	45.0 (9)	90.0 (18)	67.5%	Moderate
Exercise	15.0 (3)	90.0 (18)	52.5%	Moderate
Alcohol intake	60.0 (12)	75.0 (15)	67.5%	Moderate
Diet: 5 portions a day	20.0 (4)	90.0 (18)	55.0%	Moderate
Diet: fat intake	25.0 (5)	90.0 (18)	57.5%	Moderate
Fluid intake	25.0 (5)	90.0 (18)	57.5%	Moderate
Caffeine intake	25.0 (5)	85.0 (17)	55.0%	Moderate
Cannabis use	20.0 (4)	90.0 (18)	55.0%	Moderate
Safe sex	10.0 (2)	90.0 (18)	50.0%	Low
Urine	15.0 (3)	90.0 (18)	52.5%	Moderate
Bowels	10.0 (2)	90.0 (18)	50.0%	Low
Sexual satisfaction	5.0 (1)	95.0 (19)	50.0%	Low

BMI = body mass index, f= female, m= male

Duration

All screenings were conducted once and completed during one scheduled meeting. Time spent on screenings was not explicitly tracked, but nurses reported during interviews that the screenings took approximately 30-60 minutes.

Nurses' description of moderating factors for intervention fidelity

Altogether, four recorded group interviews were conducted with two to six participants in each interview (totally 14 nurses). One nurse was individually interviewed, since the other one who had previously consented withdrew. After the fifth interview, the data had reached the code and meaning saturation as no new entities, information or concepts emerged from the discussion (Hennink et al., 2019). One of the nurses' interviews occurred via Microsoft Teams meeting and four interviews were conducted in clinic meeting rooms. The interviews lasted around 25 minutes (range 25 to 56 minutes). During the first two interviews, the data were evaluated as relevant, and as no clarification was required, the questions were used in all subsequent interviews. No field notes were made during the interviews.

Altogether four main themes encompassing 15 framework-based subthemes were found regarding factors that moderated nurses' adherence in conducting screening. Theme one, Comprehensiveness of policy description included themes intervention *complexity* and *duration.* Theme two, Strategies to facilitate implementation consisted of themes *fragmented information, instructions, nurses' fragmented work tasks, management and equipment*. Theme three, Quality of delivery included themes *preparedness* and *nurses' confidence and skills.* Theme four, Participant responsiveness, consisted of themes *nurses' enthusiasm in screening, nurses' engagement in screening, patient willingness to participate, patient's refusal to participate, patient's cognitive capacity and collaborative screening.* A summary of themes and their relating exemplary quotes is described on Table 3.

Table 3. Qualitative thematic categorization affecting fidelity and exemplary quotes

Moderating factors and themes	**Exemplary quotes**
Comprehensiveness of policy description	
Intervention complexity	*Also, perhaps more important, is that item sleep, here it is in green like that, seven to eight hours, but in red for less than three hours or more than eight hours, i.e. between three and seven hours, so it's nothing?* (Interview 1, nurse 4)
Duration	*If the average meeting lasts forty-five minutes, I would say that it took a half an hour.* (Interview 2, nurse 5)
Strategies to facilitate implementation	
Fragmented information	*It should be well introduced, the information somehow came so fragmented.* (Interview 2, nurse 5)
Instructions	*Well, the final version should be like if there were these additional instructions, so they must be clear and large so that you can cover them quickly.* (Interview 2, nurse 5)
Nurses' fragmented work tasks	*I think our work is just like a patchwork, that there are so many little things, that there should be such a clear structure and practices, that things would be done.* (Interview 2, nurse 6)

Management	*It's a bit about the management also, the nurse manager should remind us every now and then, it should be clear.* (Interview 2, nurse 5)
Equipment	*Working thermometers would be great.* (Interview 1, nurse 2)
Quality of delivery	
Preparedness	*It probably requires repetition, regular repetition, that it came quickly and it took quite a lot of time to first understand what needs to be done.* (Interview 2, nurse 5)
Nurses' confidence and skills	*Well, for me somehow, when asking quite a lot about these physical or somatic things, which of course is extremely important, somehow, even though I know that it belongs comprehensively to the whole of a person, when this work has been so for decades to that mental health, so that, that as for monitoring the physical side…somehow it feels really challenging …that maybe a nurse from the somatic side is more qualified to ask those things, somehow precisely or expertly.* (Interview 5, nurse 13)
Participant responsiveness	
Nurses' enthusiasm in screenings	*It's a bit different from what we usually do, so it's quite nice to do too.* (Interview 1, nurse 2)
Nurses' engagement in screenings	*Once a week it crosses my mind, yes, again, but no oh…but I just can't remember.* (Interview 5, nurse 12)
Patient's willingness to participate	*At least those for whom we made screenings, they were completely involved in making this when they had been asked in advance if they would want to participate.* (Interview 1, nurse 1)
Patient's refusal to participate	*But, sometimes our patients are in such a bad shape that they don't agree to participate.* (Interview 4, nurse 9)
Patient's cognitive capacity	*Taking into account that they are not even capable in the eating section, they do not realize that if we are talking about a lack of cognition, it is also related to the fact that they do not understand, for example, what is healthy food, evaluating it based on the discussion.* (Interview 3, nurse 8)
Collaborative screening	*Yes, and the fact that our patients are sensitive and suspicious of all surveys that somehow the fact that the discussion is held so openly is still easier.* (Interview 5, nurse 13)

Comprehensiveness of policy description

Some nurses found that the complexity of HIP-F affected adherence. Some nurses described that the HIP-F was challenging to conduct, and some items were difficult to assess.

Vegetables and portions… but it's quite difficult to evaluate them, I guess it would have been found somewhere, but...and the fat intake was such that I don't know that if the quality is more important than the quantity or how you say it, that maybe it's too detailed. (Interview 5, nurse 10)

Strategies to facilitate implementation

Nurses experienced that the information regarding the HIP-F screening was presented in a fragmented way. For example, nurses experienced that research information was given during scheduled general clinic meeting times, and no separate time had been arranged for them on behalf of the clinic. Participants also stated that their work tasks in the clinic are unstructured and that clinical supervisors should provide regular reminders so that physical health screening, such as HIP-F, is done properly. During the interviews, some nurses realised they had not read the instructions for assessment on the HIP-F form during the screenings. One nurse perceived that poor equipment influenced the implementation of HIP-F and one nurse reported difficulties in calculating the BMI value. Having to manage other work pressures, screening was perceived by nurses as too time-consuming, requiring additional work, and hence not prioritized.

So now I haven't done it, sometime back then a long time ago I did it, but now this time I haven't done it because there is so much else that you forget it. (Interview 2. nurse 6)

Quality of delivery

The nurses felt that they were not sufficiently prepared to perform the screening and they would have needed more time to familiarize themselves with the screening procedures. Nurses did not report educational needs for discussion with patients but experienced a lack of confidence in how to assess some items.

I just got this one observation when it says this caffeine intake and here it says milligrams per day, so I wouldn't know how to answer this. (Interview 2, nurse 6)

Participant responsiveness

Some of the nurses experienced HIP-F screening to be a change to usual work tasks, which influenced the implementation positively. Several nurses reported that they conducted the screening late and often had difficulties to remember. Further, nurses described, that factors related to patients, such as willingness or refusal to participate and cognitive ability largely impacted the implementation of screenings. Nurses stated, that talking beforehand about the screening with patients and conducting the HIP-F together with patients promoted patients' willingness to be screened for their physical health and the implementation of screenings. Some items were experienced as challenging to assess due to sensitiveness and patients' possible suspicious responses to sensitive questions, e.g. the item relating to prostate and testicles checking.

That maybe I did ask someone, but they didn't agree, but no, it has slipped my mind quite effectively, in this everyday routine. (Interview 5, nurse 11)

Discussion

To our knowledge, this mixed-methods study is the first to describe nurses' adherence to complete a systematic physical health screening tool for patients with SSD and the perceived factors moderating nurses' adherence in health screening intervention protocols in daily practice. We used the Finnish Health Improvement Profile (HIP-F) (Werkkala et al., 2020) as an instrument and utilized the Conceptual Framework for Implementation Fidelity (CFIF) (Carroll et al., 2007) to understand the extent of adherence and implementation fidelity and related factors. We described how adherent nurses were to conduct systematic physical health screening intervention for patients with SSD and the moderating factors.

The main finding of this study is that nurses did not sufficiently carry out their task of screening the patients' physical health status. During eleven months, only less than 1% of the patients were screened using the new instrument. This means that nurses' adherence in this study to conduct HIP-F assessment was alarmingly low. According to the Finnish Nurses Association's ethical instructions (2024), nurses are responsible for implementing evidence-based interventions under professional guidelines, developing education and promoting scientific knowledge. However, it is possible that nurses in our study were not aware of or committed to this ethical guideline. Another reason might be insufficient management and support, which enabled nurses to neglect screening procedures and prevented them from achieving the required standards of care (Reader & Gillespie, 2013; Schizophrenia. Current Care Guideline, 2024). Furthermore, nurses' low adherence might also be explained by insufficient administrative support, since efficient support from management has previously been reported to increase nurses' positive attitudes towards implementation fidelity, which plays a major role in adherence (Oh & Choi 2019; Jacobson et al., 2008; Coyne et al., 2016). Moreover, despite the researcher's regular support offered to nurses, engaging in the research might not have increased their motivation towards screening patients' physical health (Hicks, 1996). This may be due to a low appreciation and negative attitude towards nursing research, although nursing research is important and crucial to advance and promote optimal nursing profession (Tingen et al., 2009). Finally, reasons for low levels of adherence may also relate to nurses' poor knowledge regarding health items and their assessment (Driscoll & Evans, 2022). If nurses themselves do not have adequate knowledge of physical health issues among patients with SSD and appreciate the relevance of items to be screened (Werkkala et al., 2020; Långstedt et al., 2024), nurses may not perceive screening to be important (Schizophrenia Current Care Guideline, 2024). However, insufficient screening adherence may significantly worsen health outcomes in this patient population, where an already high prevalence of physical comorbidities has been reported (De Hert et al., 2011). Without regular monitoring these conditions may lead to severe complications, poor quality of life and further premature deaths (Lawrence & Kisely, 2010). Delays in detecting and treating preventable illnesses and conditions can result in more serious diseases and increased costs (De Hert et al., 2011). Low screening adherence also

increases these existing health disparities between persons with SSD and the general population, which is completely against the aim of the mental health strategy in Finland (Finnish Institute for Health and Welfare, 2024b).

In addition, for integrating mental health and physical health services, physical health screenings are crucial. Low adherence undermines the holistic approach, without addressing the critical physical health issues (Firth et al., 2019). Improving screening adherence is important to reduce physical comorbidities, enhance the quality of life in this vulnerable patient population, and decrease health care costs (De Hert et al., 2011).

Nurses' professional and ethical obligations for addressing physical health needs of persons with SSD is defined in national guidelines (e.g. Schizophrenia. Current Care Guideline, 2024) and legal frameworks (Health Care Act, 2010; Act on Health Care Professionals, 1994). While the obligations are not explicitly mandated by law, they are integral in providing qualitative, comprehensive care and align with professional standards and demands for evidence-based practices (Health Care Act, 2010; Act on Health Care Professionals, 2024). However, nurses' low screening adherence in this study may reflect knowledge gaps, institutional barriers or competing priorities which have been identified as barriers for implementation fidelity in previous studies (Driscoll & Evans, 2022; Jansson et al., 2018; Smit et al., 2022). Nurses in this study mentioned improvement ideas for organization and management, such as appropriate equipment for screening, clear structure and practice, and support from management e.g. in the form of a reminders to conduct screenings. Administration and management play a critical role in ensuring compliance. Institutional support, education and monitoring are necessary to tackle barriers. Effective strategies, for example providing adequate resources and equipment, following guidelines (Schizophrenia. Current Care Guideline, 2024) and Mental health strategy (Finnish Institute for Health and Welfare, 2024b) and integrating physical health screening into mental health services are essential in improving screening adherence and promoting holistic care for patients with SSD (NICE, 2014; Lawrence & Kisely, 2010).

Our study findings revealed that comprehensiveness of policy description, strategies to facilitate implementation and quality of delivery were the most prominent moderating factors related to implementation fidelity. This was reflected by moderate content adherence, but low coverage and frequency adherence. Overall, the moderate fidelity of HIP-F screening was influenced by a range of factors, positively or negatively; findings which are consistent and relatively comparable with previous fidelity studies in mental health contexts (Higgins et al., 2018; Fockens et al., 2018). Comprehensiveness of policy description, such as complexity, was found to have strongly influenced nurses' adherence to screening, which has also been reported earlier (Bragstad et al., 2019; Driscoll & Evans, 2022; Higgins et al., 2018). Comprehensiveness of policy description was associated in the content and coverage adherence and strategies to facilitate implementation was related mostly in frequency, content and coverage adherence. Furthermore, similarly to earlier studies, the frequency of HIP-F items completed was observed to vary based on the complexity, difficulties in assessment, instructions and nurses' preparedness and confidence (Nurjono et al., 2020; Johnson & Fry, 2013; Driscoll & Evans, 2022).

Nurses perceived that strategies designed to facilitate implementation were weak, such as fragmented information regarding the HIP-F. However, the instructions available on the HIP-F form for assessment of each item had not been used (Corrigan et al., 2000) and these were only noticed by some participants during the interviews. Nurses also experienced that their work is fragmented and successful screening requires more time from educators, clear instructions for screening and support from management, such as reminders (Higgins et al., 2018; Fockens et al., 2018). Previous studies outline that without leadership nurses may experience feelings that demands on them are often impossible to achieve, which can have negative impacts on consumers in health care (Dallender & Nolan, 2002; Foster et al., 2003). Furthermore, our study revealed that lack of supplies was associated with screening adherence, which is in line with previous study findings (Jansson et al., 2018; Driscoll & Evans, 2022).

We found that factors related to quality of delivery, 'preparedness' and 'nurses' confidence and skills' were linked to nurses' adherence conducting screenings. Our study reveals that nurses were confident in assessing several health items, which can be seen in partly high-fidelity results, but found some sensitive items difficult to discuss with patients (Hughes et al., 2018). This has also been reported in previous HIP studies (Thongsai et al., 2016; Werkkala et al., 2020), although patients mostly do not report any challenges to be asked questions about sensitive topics (Långstedt et al., 2024). The frequency of screening BMI and temperature were low and some items relating to potentially sensitive issues (i.e. cervical smear, prostate and testicles and sexual satisfaction), had been implemented with overall low implementation fidelity, which may be explained with nurses' previously reported lack of confidence and skills (Mwebe, 2017; Happell et al., 2013; Jansson et al., 2018). However, some items such as BMI, temperature and alcohol intake had been implemented with moderate fidelity despite them being common areas of concern requiring regular assessment. This may be partially explained by previous studies highlighting that nurses' lack of preparation to conduct physical health screening negatively affects quality of delivery (Smit et al., 2022; Higgins et al., 2018). Being well positioned to support patients' physical health may not be sufficient to complete structured interventions and nurses might need more educational preparation to effectively perform this role with adequate skills (Happell & Platania-Phung & Scott, 2011; Blegen & Severinsson, 2011). For successful screening, symptom identification and clinical skills are necessary to combine physical health screening in mental health practice (Happell et al., 2012).

In our study**,** participant responsiveness presented a substantial factor influencing coverage fidelity, both hindering and facilitating adherence. Our results revealed, as reported in some earlier studies, that recruiting issues were related both to challenges of professionals not inviting patients to participate in screening and nurses' difficulties to remember to conduct the screenings (Jørgensen et al., 2014). Challenges in getting patients involved in studies (Driscoll & Evans, 2022; Smit et al., 2022; Higgins et al., 2018) and recruitment of patients with SSD to participate in trials are well-known (Deckler et al., 2022). This has also been recognized in previous HIP studies; nurses, who voluntarily participate in studies, administrate the HIP for only a small group of out-patients because nurses consider the HIP to be

unfeasible to be used in routine care (White et al., 2018; Brown et al., 2020; Långstedt et al., 2024). However, the opposite results have been reported with in-patients where the HIP has been completed with large numbers of patients (Brown et al., 2020) and where patients perceive the HIP to be acceptable in focusing on their physical health needs (Bressington et al., 2014). In our study, and in some earlier studies, collaboration between nurses and patients was found to increase adherence to screening protocols (Happell et al., 2012) as well as promote the adoption of more varied work tasks (Dallender & Nolan, 2002).

Strengths and limitations of the study

The strengths and limitations regarding this study arise from the study design. There were no previous studies or specific models available for assessing adherence to this particular intervention. Therefore, the research team had to design a plan for the assessment of adherence, particularly in terms of data collection and analysis (Borrelli et al., 2005).

In the qualitative part, the researcher was present during the interviews which may have affected the nurses' responses (Schonfeld & Mazzola, 2012). The researcher had experience working with persons with SSD and a deep understanding of the research topic, which may have encouraged the participants to express their thoughts. However, bias may have occurred because of the researcher's strong pre-assumptions and a lack of openness to the topic, which may have reduced the credibility of the study. The choice of potentially biased researcher was not intentional, and these possible biases were considered during the whole study, particularly during data collection and analysis. To mitigate the biases' influence, we used open-ended interview questions and allowed participants to openly express their perceptions regarding factors related to implementation fidelity. Furthermore, the small number of participants in focus groups is likely to have limited the group discussion. Regardless of these limitations, the strengths of our study are the use of mixed-methods design, adapting the CFIF framework (Carroll et al., 2007), developing an adherence scoring system, combining the quantitative and qualitative methods and integrating the results. Some quantitative results were combined with qualitative interview findings, adding strength to the study in terms of

producing a deeper understanding of the studied phenomena. The trustworthiness of the study was strengthened by describing the analysis process and results in sufficient detail and by supporting these observations with direct quotations of interview data. To increase the study reliability, the analysis process was defined in detail and tables were used to demonstrate the links between data and results. To facilitate transferability, we described carefully the context, selection and participant characteristics, data collection and analysis process. Internal validity was strengthened through dialogue among co-authors (Graneheim & Lundman, 2004.).

Conclusions

Our study results demonstrate that nurses' adherence to conduct physical health screening for patients with SSD was alarmingly low and several moderating factors were associated with adherence to the protocol. The HIP-F can generally be delivered as intended by nurses in clinical mental health practice. However, for successful screening, the utility and feasibility of the screening tool would need to be reevaluated after addressing some of the issues identified as moderating influences.

Implications for practice

Our findings regarding nurses' adherence can be used to 1) identify risk factors for non-adherence in implementing interventions, 2) design interventions to improve nurses' adherence; and 3) increase the understanding of factors related to adherence in physical health screening within clinical practice. For successful physical health screening the factors related to nurses' implementation fidelity can be taken into consideration by those who develop screening practices in clinical settings. Findings related to moderating factors can also be used to further develop interventions, supporting resources and recruitment strategies. Furthermore, our findings can be used to inform the development of curriculums in nursing education and planning of supervision for nursing staff to ensure they have the adequate skills and confidence to implement interventions in clinical mental health practice.

Acknowledgements

The authors would like to thank all the nurses and consumers who helped make this study possible.

Funding

Helsinki University Hospitals (HUH) Nursing Research Center (NRC) and HUH Funding, Psychiatry supported this study by granting a paid research period for the first author (CL).

Disclosure of interest

The authors report there are no competing interests to declare.

Data availability statement

All data generated during and/or analyzed during the study are not publicly available due to privacy and ethical restrictions.

Notes on contributors

CL designed the study, collected the data, contributed to data input, analyzed the data, and contributed to the writing of the manuscript and all tables. MV led the study design, data analysis, and writing of the manuscript. DB contributed to the study design, the data analysis, and writing of the final manuscript. All the authors have read and approved the final manuscript.

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