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IBSc in Forensic Psychiatry, Criminal Behaviour and Law

Physical Health: A Service Evaluation of Cardiometabolic Health Monitoring in Forensic Patients Diagnosed with Severe Mental Illness

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Abstract

Background – Patients with severe mental illness have been widely reported to be at an increased risk of premature mortality due to physical health problems. The most common causes of these are known to be cardiovascular disease and diabetes. Rigorous monitoring of metabolic status and cardiovascular risk, using the QRISK®3 tool, has been recommended by the National Institute for Health and Clinical Excellence (NICE) to better manage this sub-population and reduce their mortality.

Method – Patient information stored on the electronic clinical records was accessed by the Clinical Record Interactive Search (CRIS) tool and formed the basis of the participant data. This information was used to carry out a first-phase audit assessing the monitoring of smoking status, diabetic status, cholesterol/HDL ratio, systolic blood pressure and body mass index (BMI). The results of the audit were further analysed on SPSS, examining the effects of certain demographic and clinical variables.

Results – Smoking status was monitored most successfully, with 107 (78%) of the patients found to have had this documented within the window period, and did not differ significantly for any of the demographic or clinical variables. Diabetes status was monitored better in the female population, $X^2 = 8.388$, (df=1), p=0.004. Those who were admitted to hospital during the window period were associated with higher levels of monitoring of cholesterol/HDL ratio: $X^2 = 76.47$, (df=24), p<0.001, systolic blood pressure; $X^2 = 76.47$, (df=24), p<0.001, and BMI; $X^2 = 75.23$, (df=31), p<0.001.

Conclusions – Out of the five variables of interest, smoking status was the only one to be monitored in keeping with the Trust's policy standards. Mental health service-providers need to urgently raise awareness among staff and service-users, addressing the current disparity in monitoring practices within the team and neglect of physical health care.

Contents

Glossary of Abbreviations

NICE – National Institute for Health and Clinical Excellence

CRIS – Clinical Record Interactive Search

BMI – Body mass index

SMI – Severe mental illness

CVD – Cardiovascular disease

MI – Myocardial infarction

CHD – Coronary heart disease

CQUIN – Commissioning for Quality and Innovation

TIA – Transient ischaemic attack

SCFT – Southwark Community Forensic Team

SLAM – South London and Maudsley

ePJS – Electronic Patient Journey System

UKPDS – United Kingdom Diabetes Prospective Study

BRC – Biomedical Research Centre

ROSE – Research outcome and service evaluation

List of Tables

Introduction

Severe mental illness (SMI) encompasses a range of diagnoses, including schizophrenia, schizoaffective disorder and bipolar disorder (1, 2). These complex disorders commonly present with psychosis (3), causing significant disability, and they exist throughout a patient's lifetime (2). With this in mind, it is recognised that there is a significant association between SMI and physical comorbidity and mortality (4, 5). Cardiovascular disease (CVD) is a broad term for any disorder that effects an individual's heart and blood vessels (6), and metabolic syndrome is a cluster of conditions including diabetes, high blood pressure and abdominal obesity (7). Much of this goes undetected in this population (5) and remains a major public health concern. Following extensive research in the psychiatric population, rigorous monitoring of metabolic status and cardiovascular risk has been recommended (4, 8, 9). However, little is known about the monitoring of such parameters in the forensic psychiatric community setting, or how to better manage this sub-population, with a view to reducing their mortality.

1.1.Current Evidence Base for Severe Mental Illness and Poor Physical Health

People with SMI have been widely reported to be at increased risk of premature mortality due to physical health conditions (10), with CVD and diabetes being the most common causes (11). It has been suggested that this disparity in mortality translates into a 13–30-year reduction in life expectancy (12), of which 60% is due to physical illness (13, 14). This increased risk is thought to derive from a multitude of factors: poor diet, increased smoking and alcohol (5) and limited physical exercise (10, 11). The extent of this inequality was examined in a comprehensive meta-analysis reflecting inpatient, outpatient and community populations (13). The results showed that mortality from all causes was more than double for patients with a mental illness (pooled relative risk of 2.2) (13). Similarly, a publication by De Hert reported results stating that between two-thirds and four-fifths of deaths in individuals with SMI were a consequence of natural causes such as CVD and metabolic disease (10, 12). Given that these are also some of the most common causes of premature mortality in the general population, they are somewhat avoidable and preventable with early intervention in all patients (10).

1.1.1. Cardiovascular Disease

Cardiovascular disease is a term used by doctors to refer to a collection of diseases, including stroke, transient ischaemic attack (TIA), myocardial infarction (MI) and angina. Looking more specifically at the types of natural causes of death in patients with SMI, Brown carried out a 13-year follow-up on a cohort of patients with schizophrenia (15). Using a standardised mortality ratio to compare the excess mortality, it was clear that diseases of the cardiovascular system were the cause of significantly more deaths than diseases of any other body system (15). The study suggested that this was a result of cigarette smoking, and preventative measures should be the focus of health practitioners (15). Similarly, literature exploring a physical health intervention in a medium-secure forensic unit highlighted that cardiovascular events contribute most strongly to the excess mortality observed in schizophrenia (16). This theory was replicated in a retrospective cohort study conducted by Osborn, which concluded that people with SMI have an increased risk of death from coronary heart disease (CHD) and stroke that is not explained by antipsychotic medication or social deprivation scores (16).

An Australian study protocol for a randomised controlled trial identified the need for a novel intervention that could deliver physical health care to patients with SMI (17). Addressing the fact that CVD is the most common cause of death in this population, associated with high rates of modifiable risk factors, a motivational programme is being trialled to reduce CVD risk by 20% (17). Not only does this emphasise the severity of the international problem surrounding risk reduction in these patients, it also has the potential to be a ground-breaking preventative strategy translated worldwide (17).

1.1.2 Metabolic Disease

A number of recent guidelines have highlighted the importance of monitoring metabolic function in the psychiatric population in order to lessen their cardiovascular risk (4, 18, 19). As mentioned earlier, the metabolic disease of interest in this area is diabetes. Metabolic syndrome is a medical term, including diabetes and two other conditions that put individuals at further increased health risks (7). Cohen explored the idea that patients with schizophrenia are more likely to have disturbed glucose metabolism, and his research unveils some interesting findings (20). In a sample of 200 Caucasian patients with schizophrenia, 7% were

found to have hyperglycaemia and 14.5% to have diabetes (20). This result appears to confirm previous clinical judgement: that patients with schizophrenia are more likely to suffer with abnormal glucose regulation (20).

In a similar Belgian study, the complex issue surrounding the prevalence of diabetes and metabolic syndrome in the schizophrenic population was investigated. This study suggested that, although metabolic abnormalities were already present in first-episode patients, the direct effect of their SMI increased the prevalence of diabetes fourfold when compared to the general population (21). Given that the results of this cross-sectional study could be influenced by the cohort effect, it is important to consider other sources of literature in this field. A more robust prospective study of monitoring practices for metabolic disease confirmed that there was as high a prevalence of dyslipidaemia, obesity and undiagnosed disorders of glucose homeostasis when measured at baseline (4). More alarmingly, despite informing the appropriate physicians and mental health workers of these findings, after a certain follow-up period the metabolic parameters had in fact worsened or remained unchanged (4).

1.1.3 Influence of Antipsychotic Medication

So, do antipsychotic drugs play a counter-intuitive role in SMI and cardiometabolic health? Based on the available research to date, a diagnosis of SMI alone, such as schizophrenia or schizoaffective disorder, plays a fundamental role in the pathophysiology of cardiovascular disease (18). However, evidence from multiple clinical trials suggests that the underlying mechanism of antipsychotic medication also plays a significant part (18). A journal on managing schizophrenia describes the effects of second-generation atypical antipsychotics on weight gain, blood glucose and lipid levels (18). Although these drugs have revolutionised the management of SMI and provided an improved quality of life to thousands of patients, attention has been focused on the possible harmful metabolic side-effects. A 14-week prospective study reported glucose dysregulation in patients taking both atypical and typical antipsychotics and increased cholesterol levels in patients taking atypical drugs (22). Specifically, other studies have reported new onset diabetes in all commonly prescribed atypical agents such as quetiapine (23), risperidone (24) and olanzapine (25). While it is evident that primary- and secondary-care-givers should be aware of the high burden of physical

comorbidity, it is imperative to consider the deleterious effects of the antipsychotic medication that they are regularly administering.

1.2 Recommendations for Physical Health Monitoring

The guidelines put forward by the National Institute for Health and Clinical Excellence (NICE) on the management of schizophrenia (26) and bipolar (27) recognise the impact of physical health comorbidity in patients with SMI. These UK guidelines recommend annual stringent monitoring of metabolic status and cardiovascular risk by health-care professionals in this population (26, 27). Similarly, The Maudsley prescribing guidelines recommend yearly monitoring of physical health parameters in individuals on antipsychotic medication, including weight, blood pressure, blood glucose and lipids (16, 28). In 2014 the NICE guidelines were updated, explaining the responsibility of physical health monitoring in patients with psychosis or schizophrenia (28). Although this is recognised as a challenging task, monitoring is the responsibility of the secondary-care team for the first 12 months, or until the patient is stable (28). It is accepted that once this has been achieved, the responsibility is shared with the primary-care service (28). A review in the *Canadian Journal of Psychiatry* discussed the ongoing international recommendations for patients taking antipsychotic medication in a range of countries (18). The UK, which was represented by a panel of varied medical professionals including psychiatrists and endocrinologists, concluded that a structured protocol should be adopted for effective metabolic monitoring (18). For the successful delivery of physical health-care monitoring, a collaborative relationship between the multi-disciplinary team is necessary (18). When this is not in place, clinicians are encouraged to enforce its development (18).

1.2.1 Commissioning for Quality and Innovation (CQUIN) National Goals

The 2018/19 Commissioning for Quality and Innovation (CQUIN) indicator stated that 75% of cardiometabolic physical health checks for community-based patients should be completed (Appendix B). Following this, an audit was conducted within the South London and Maudsley (SLAM) Trust with a view to improving physical health care in patients with SMI (29). This was ultimately carried out to assess cardiometabolic monitoring in patients with a diagnosis of psychosis and to ensure that physical health parameters were being appropriately recorded

(29). The audit focused on specific boroughs: Lambeth, Croydon, Lewisham and Southwark. The main recommendation from the audit was that all service-users in inpatient settings, a community team or an early-intervention team must have a cardiometabolic report and any lifestyle changes be documented on the Electronic Patient Journey System (ePJS) annually (29). Interestingly, the audit emphasised that, while inpatient services are meeting targets for carrying out and recording this information, community and early-intervention teams need to make improvements in this area (29).

1.3 Current Evidence for Deficits in Physical Health Monitoring

Across different health-care systems globally, audits and studies have shown that physical health-care monitoring in psychiatric patients is lacking (16). The prospective study mentioned previously, focusing on community-treated patients, revealed a worryingly poor rate of monitoring of cardiometabolic parameters (4). Despite being notified about the extent of physical comorbidity in the sample population, documentation on measures of adiposity, blood glucose and lipid levels was very poor, and in many cases non-existent (4). A case note audit of a community mental health service in Australia shared similar findings to Mackin's study (11). It found that information on physical health care was embedded within the depths of many other digital entries and not available with other relevant information about patients' psychiatric needs (11). The above literature highlights the varied issues surrounding the overall care of these patients; monitoring is not being conducted according to the recommended guidelines, or it is being carried out but recorded poorly or not at all (11). This fundamental problem underpins the quality of health care that these patients are able to receive and the ability of medical professionals to respond appropriately to their physical health needs (11).

1.4 The QRISK®3 Calculator and Purpose

1.4.1 What is QRISK?

Explicitly defined directly from the web calculator:

"The QRISK algorithm calculates a person's risk of developing a heart attack or stroke over the next 10 years. It presents the average risk of people with the same risk factors as those entered for that person (30)."

Given that there is an extensive body of evidence to suggest that carrying out a cardiovascular risk assessment can provide vital information about certain patients' health status, NICE clearly recommends their use (9, 30, 31).

1.4.2 Current Evidence for Cardiovascular Risk Assessment

NICE has identified more than twenty studies that have assessed the validity of the available tools (QRISK®2, Framingham, UK Prospective Diabetes Study (UKPDS)) and found them all to be better than chance at identifying CVD risk in the general population (9). Out of the above three tools, the QRISK®2 was found to perform best in terms of calibration and re-classification (9). Importantly, the current 2014 NICE guidelines (9), which are due to be reviewed in December 2019 still recommend the use of QRISK®2. In 2018 an updated version of this algorithm was developed by doctors and academics: the QRISK®3 (Appendix B) (30). Development of this tool means that it involves an additional eight clinical factors, including atypical antipsychotic use and a diagnosis of SMI. It is believed that, with the addition of these variables, medical professionals will be able to further identify those most at risk of heart disease and stroke (30). Although relatively new, the QRISK®3 is fundamental to guiding future management and preventing the undesirable outcome of coronary heart disease, ischaemic stroke or transient ischaemic attack (TIA) (30, 31).

As the QRISK®3 was published in 2018, it is important to ensure that its predictive accuracy and performance have been validated. A recent prospective cohort study looking at the development and validation of QRISK®3 to estimate future risk of CVD was conducted. Remarkably, it included an astounding 7.89 million patients in the derivation cohort and 2.67 million patients in the validation cohort (31). The results of the study showed that 4.3% of men and 6.8% of women had a diagnosis of severe mental illness, which was associated with an increased risk of CVD of 13% and 14%, respectively (31) This was thought to be independent of the risk associated with atypical antipsychotics, and both factors have a compound effect on cardiovascular risk; hence, they have been included separately in the new algorithm (31). Crucially, psychiatrists will now be better equipped to provide information to patients about

interventions to reduce cardiovascular risk and the possible harmful side-effects of their medication (31).

1.5 The Current Research

At present there is clearly a significant amount of evidence to suggest that those with a diagnosis of SMI are at increased risk of cardiometabolic disease. Nonetheless, few studies have explicitly looked at this within the forensic psychiatric population. As such, the aim of this project is to conduct a first-phase audit assessing whether the monitoring of five cardiometabolic parameters within the Southwark Community Forensic Team (SCFT) is in keeping with Trust policy, as set out by CQUIN. Identifying any monitoring deficits and possible demographic and clinical variables that influence the likelihood of these important physical health checks being completed will act as a thorough service evaluation. With all of the above in mind, this study was explicitly guided by the following research questions:

- Does the monitoring of QRISK®3 parameters fall short of Trust gold-standard recommendations?
- Do age, sex, ethnicity, SMI diagnosis and type of antipsychotic medication influence the level of monitoring of the QRISK®3 parameters?
- Are patients who are admitted to hospital as a result of their severe mental illness more likely to have had the appropriate physical health checks carried out than patients who remain in the community?

Ultimately, the findings will be disseminated to local services, guide physical health management in this deprived population and provide a platform for future audit cycles.

Methods

2.1 Design

This study consisted of a first-phase audit. SPSS was then used to carry out analysis on the SLAM data extracted by the Clinical Record Interactive Search tool (CRIS).

2.2 Participants

2.2.1 Inclusion Criteria

Participants were male and female patients, aged 25–84 years, with an active team episode between 1/06/18 and 24/05/19 (window period) in the Southwark Community Forensic Mental Health Team. The participants also had to have a primary diagnosis of a severe mental illness, as defined by the ICD-10: schizophrenia (F20), schizoaffective disorder (F25) or bipolar affective disorder (F31).

2.2.2 Exclusion Criteria

Participants were excluded from the study if they fell outside the age-range criteria. This is the age range that is stipulated by the QRISK®3 calculator. They were also excluded if they had a primary diagnosis of a mental health disorder that was not one of the diagnoses mentioned above.

2.3 Measures

The tables below describe the measures that this study addressed with regards to physical health monitoring in this population. It is important to bear in mind that, although the original QRISK®3 calculator includes a wide range of factors (see Table 1) to enable health professionals to identify those most at risk of developing CVD, this study specifically focused on the physical health parameters set out by CQUIN that make up the algorithm (see Table 2). An additional variable of 'hospital admission during the window period' was added to table 2 to allow all the research questions to be answered. It should be noted that, although it is advised to fully complete the calculator using as much patient information as possible, it is still feasible to produce a risk score with uncompleted factors.

Table 1 – Parameters that make up the QRISK®3 – 2018 risk calculator

Variable	Outcome
Sex	Male/Female
Age	25–84 years
Ethnicity	White Indian Pakistani Bangladeshi Other Asian Black Caribbean Black African Chinese Other ethnic group
Postcode	-
Smoking status	Non-smoker Ex-smoker Light smoker (fewer than 10) Moderate smoker (10–19) Heavy smoker (20 or more)
Diabetes status	Type 1/Type 2
Angina or heart attack in a first-degree relative < 60	Yes/No
Chronic kidney disease (Stage 3–5)	Yes/No
Atrial fibrillation	Yes/No
On blood-pressure treatment	Yes/No
Migraines	Yes/No
Rheumatoid arthritis	Yes/No
Systemic lupus erythematosus (SLE)	Yes/No
Severe mental illness	Yes/No
On atypical antipsychotic medication	Yes/No
On regular steroid tablets	Yes/No
A diagnosis of or treatment for erectile dysfunction	Yes/No
Cholesterol/HDL ratio	-
Systolic blood pressure (mmHg)	-
Standard deviation of at least two most recent systolic blood-pressure readings (mmHg)	-
Body mass index (BMI)	Height Weight

Table 2 – Parameters derived from the QRISK®3 – 2018 calculator, used in this study

Variable	Outcome
Sex	Male/Female
Age	25–84 years
Ethnicity	White background Non-White background
Severe mental illness	Schizophrenia Schizoaffective disorder Bipolar affective disorder
Antipsychotic medication	Typical antipsychotic Atypical antipsychotic
Hospital admission during window period	Yes/No
Smoking status	Recorded during window period – Yes/No
Diabetes status (HbA1c)	Recorded during window period – Yes/No
Cholesterol/HDL ratio	Recorded during window period – Yes/No
Systolic blood pressure (mmHg)	Recorded during window period – Yes/No
Body mass index (BMI)	Recorded during window period – Yes/No

2.4 Procedure

Physical health checks are usually carried out by assigned community psychiatric nurses, psychiatrists or opportunistically by general practitioners, and they should then be uploaded to SLAM's electronic clinical records (ePJS). This routine patient information, uploaded onto ePJS as free text or in structured forms, is then stored within CRIS. Thus, CRIS enables projects to be carried out using the vast amount of case records available within the Trust. The tool is supported by the NIHR Biomedical Research Centre (BRC) for Mental Health, which is situated at the SLAM NHS Foundation Trust and Institute of Psychiatry, Psychology and Neuroscience. It is jointly funded by Guys and St Thomas and South London and Maudsley Trustees. As SLAM has been paper-free since 2007, it is this electronic information that forms the basis of the participant data used in this study.

2.4.1 CRIS Data-Extraction Technique

As stated above, the CRIS software allows interrogation of ePJS and uses various different search technologies to extract output into database formats, commonly used for research purposes. The information used in this study was extracted by CRIS from a variety of different locations, which are described below (see Tables 3–4). Following multiple meetings with the

CRIS training and development lead, the required data on the relevant cardiometabolic parameters was elicited. It is important to note that for certain parameters, the free text on ePJS was searched. The free text includes attached letters and documents from a range of health professionals, as well as regularly updated entries under the events section.

2.4.2 Ethnicity

The data collected from CRIS included an extensive range of ethnicities that represented the entire patient population used in this study. It was noted that some of the ethnic minority categories had very few patients of that origin. Therefore, it was decided to appropriately group the ethnicities into larger categories, creating bigger cell counts that would be more beneficial in the analysis stage. White background included *White British*, *Irish* and *Other White background patients*. Non-White background comprised *Black Caribbean*, *Black African, Other Black background patients, White and Black Caribbean, White and Asian*, *Other Mixed background* patients and *Other ethnic minorities*.

2.4.3 Age

Likewise, to enable successful analysis when looking at the effect of age on the monitoring practices, it was decided to split the patients into three evenly sized groups. These were calculated as *25–38, 39–50* and *51–84* and represented the young, middle and old-age population.

Table 3 – Sources of information on ePJS used by CRIS with regards to the cardiometabolic parameters of interest

Cardiometabolic parameter	Source of information used by CRIS to extract data
Smoking status	Community physical health screen form Current physical health new form Free text
Diabetes status (HbA1C)	Lab results
Cholesterol/HDL ratio	Lab results
Systolic blood pressure (mmHg)	Free text
Body mass index (BMI)	Community physical health screen form Current physical health new form Nutrition risk screen community form Nutrition risk screen inpatient form Free text

Table 4 – Sources of information on ePJS used by CRIS with regards to the demographic and clinical variables of interest

Demographic/clinical variable	Source of information used by CRIS to extract data
Sex	EPR patient form
Age (at index date)	EPR patient form
Ethnicity	EPR patient form
Severe mental illness	ICD-10 Form
Antipsychotic medication	Structured medication form SLAM pharmacy data Free text
Hospital admission during window period	Inpatient episode form

In order to address the main aim of the study, this information was combined into a table and exported to Microsoft Excel to create a large spreadsheet. The data was then used to audit the monitoring of the above cardiometabolic parameters (smoking status, diabetes status, cholesterol/HDL ratio, systolic blood pressure and BMI) during the window period by the Southwark Community Forensic Team.

Following on from this, the second objective of the study was to analyse whether particular demographic variables (age, sex and ethnicity) and clinical variables (diagnosis, medication and hospital admission) influenced the level of monitoring.

2.5 Data Analysis

Data was exported from Microsoft Excel to SPSS for the analysis stage. The Pearson's chi-squared test of independence was carried out for smoking status, diabetes status, cholesterol/HDL ratio, systolic blood pressure and BMI. This was to assess whether there was any association between the above parameters and the six demographic/clinical variables highlighted. Where there were particularly small cell counts, SPSS conducted the alternative Fisher's exact test.

2.6 Ethical Considerations

Audit approval was obtained through the SLAM Research Outcome and Service Evaluation (ROSE) Committee (see Appendix C).

An application to use CRIS was carried out (see Appendix D) and ethical approval was obtained once this application had been accepted, as the study only used CRIS data. The search technology used by CRIS comprises processes that de-identify records, protecting the legal and ethical rights of the patient data stored on the system (ePJS). CRIS was approved as a data set for research purposes by the Oxfordshire Research Ethics Committee (08/H0606/71) and is now widely accepted as an anonymised database. Practically, this meant that once the data had been collected, each participant was given a unique CRIS code, which rendered him or her totally anonymous.

Results

3.1 Sample Characteristics

The results are displayed in the tables below. The sample size was made up of 137 community-based patients, of which 127 (93%) were male and 10 (7%) were female. The mean age of the patient group was 44 years. Most patients were of non-White background (74%); however, one-quarter of the participants (26%) were of White background. More than half of the patients were taking an atypical antipsychotic (58%); however, a significant proportion of the sample were prescribed both an atypical and typical antipsychotic medication (28%). Of the 137 patients with care coordinated in the community, 15% were admitted to hospital during the window period.

Table 5 – Demographic details of the participants at the index date

Demographic/clinical factor	Variable	N (%) Total N = 137
Sex	Male	127 (93)
	Female	10 (7)
Age	25–38	47 (34)
	39–50	48 (35)
	51–84	42 (31)
Ethnicity	White background	35 (26)
	Non-White background	102 (74)
Primary severe mental illness diagnosis	Schizophrenia (F20)	116 (85)
	Schizoaffective disorder (F25)	13 (9)
	Bipolar affective disorder (F31)	8 (6)
Antipsychotic medication	Atypical antipsychotic	79 (58)
	Typical antipsychotic	17 (12)
	Both	38 (28)
	None	3 (2)
Hospital admission during window period	Yes	20 (15)
	No	117 (85)

Importantly, 116 (85%) of the patients included in the sample had a primary diagnosis of schizophrenia. Schizoaffective disorder (9%) and bipolar disorder (6%) were less common but still prevalent within the team's caseload.

Table 6 – Overall monitoring of physical health parameters by the Southwark Community Forensic Team during the window period

Cardiometabolic parameter	Documented on ePJS	Number of patients (%)
Smoking status	Yes	107 (78)
	No	30 (22)
Diabetes status (HbA1c)	Yes	16 (12)
	No	121 (88)
Cholesterol/HDL ratio	Yes	29 (21)
	No	108 (79)
Systolic blood pressure (mmHg)	Yes	63 (46)
	No	74 (54)
Body mass index (BMI)	Yes	50 (36)
	No	87 (64)
All the above parameters	Yes	3 (2)
	No	134 (98)

Table 6 (above) illustrates the monitoring and documentation of the important parameters defined by the QRISK®3 calculator during the year window period. Smoking status was monitored the most successfully, with 107 (78%) of the participants having this noted in their electronic records, reaching the compliance target outlined by CQUIN. Monitoring of systolic blood pressure and BMI was average, with 63 (46%) and 50 (36%) patients having this checked throughout the year, respectively. Alarmingly, the monitoring of cholesterol (21%) and diabetes status (12%) was very poor. With this in mind, only 3 (2%) participants had all the cardiometabolic parameters completed on their records, which falls massively short of the 75% CQUIN indicator. From these results, it is clear that there are huge deficits in the monitoring of diabetes status, cholesterol/HDL ratio, systolic blood pressure and BMI.

3.2 Monitoring of Individual Cardiometabolic Parameters

The individual cardiometabolic parameters are further examined in Table 7 (below). As mentioned above, this study was designed to identify if the demographic and clinical variables affected the level of monitoring conducted by the team.

3.2.1 Smoking Status

Table 7 – Monitoring of smoking status by the SCFT during the window period

Demographic/clinical factor	Variable	Number of patients who had smoking status documented (%)
Sex	Male	98 (77)
	Female	9 (90)
Age (years)	25–38	36 (77)
	39–50	41 (85)
	51–84	30 (71)
Ethnicity	White background	30 (86)
	Non-White background	77 (75)
Primary severe mental illness diagnosis	Schizophrenia (F20)	91 (78)
	Schizoaffective disorder (F25)	10 (77)
	Bipolar affective disorder (F31)	6 (75)
Antipsychotic medication	Atypical antipsychotic	60 (76)
	Typical antipsychotic	13 (76)
	Both	32 (84)
	None	3 (100)
Hospital admission during window period	Yes	20 (100)
	No	87 (74)

As revealed earlier, smoking status was broadly well monitored throughout the cohort of patients. Slightly fewer males were monitored (77%) than females (90%) out of the total study sample. The middle-age category (39–50) was monitored the most successfully (85%) in comparison to the other age categories. Although the monitoring of smoking status was at a good level across both ethnic groups, patients of White background were monitored better (86%) than those of non-White background (75%). Overall, for the majority of the variables, the monitoring of this cardiometabolic parameter met the CQUIN target of 75% or more patients.

3.2.3 Diabetes Status

Table 8 – Monitoring of diabetes status by the SCFT during the window period

Demographic/clinical factor	Variable	Number of patients who had diabetes status documented (%)
Sex	Male	12 (9)
	Female	4 (40)
Age (years)	25–38	4 (9)
	39–50	6 (12)
	51–84	4 (10)
Ethnicity	White background	4 (11)
	Non-White background	12 (12)
Primary severe mental illness diagnosis	Schizophrenia (F20)	13 (11)
	Schizoaffective disorder (F25)	2 (15)
	Bipolar affective disorder (F31)	1 (13)
Antipsychotic medication	Atypical antipsychotic	11 (14)
	Typical antipsychotic	0 (0)
	Both	5 (13)
	None	0 (0)
Hospital admission during window period	Yes	1 (5)
	No	15 (13)

Generally, diabetes status was monitored very poorly across all the variables, with only 16 (12%) patients found to have had this information uploaded on ePJS within the window period. Females demonstrated a better level of monitoring (40%) in comparison to males (9%); however, the age, ethnicity and diagnosis of the patient appear to have had limited influence on the level of monitoring of this parameter. Patients prescribed an atypical antipsychotic, or both types of antipsychotic, revealed better monitoring than those on a typical antipsychotic or no medication. This was represented by sample percentages of (14%) and (13%), respectively, in comparison to (0%).

3.2.3 Cholesterol/HDL Ratio

Table 9 – Monitoring of cholesterol/HDL ratio by the SCFT during the window period

Demographic/clinical factor	Variable	Number of patients who had cholesterol/HDL ratio documented (%)
Sex	Male	26 (20)
	Female	3 (30)
Age (years)	25–38	15 (32)
	39–50	10 (21)
	5—-84	4 (10)
Ethnicity	White background	6 (17)
	Non-White background	23 (23)
Primary severe mental illness diagnosis	Schizophrenia (F20)	26 (22)
	Schizoaffective disorder (F25)	2 (15)
	Bipolar affective disorder (F31)	1 (13)
Antipsychotic medication	Atypical antipsychotic	16 (20)
	Typical antipsychotic	1 (5)
	Both	12 (32)
	None	0 (0)
Hospital admission during window period	Yes	13 (65)
	No	16 (14)

Similarly, monitoring of the cholesterol/HDL ratio was below average (21%). Marginally, a greater proportion of females (30%) were monitored than males (20%). When looking at the impact of age, it seems fair to say that a higher percentage of younger patients (32%) had this cardiometabolic parameter checked within the year. Those of non-White background had a relatively higher level of monitoring of (23%). Likewise, those with a diagnosis of schizophrenia showed higher levels of monitoring (22%) in comparison to the two other severe mental illnesses. Equally, those prescribed both typical and atypical antipsychotic drugs demonstrated the highest level of monitoring within the sample (32%). It is important to note that an admission to hospital within the window period resulted in higher levels of monitoring of this blood test (65%).

3.2.4 Systolic Blood Pressure (mmHg)

Table 10 – Monitoring of systolic blood pressure by the SCFT during the window period

Demographic/clinical factor	Variable	Number of patients systolic blood pressure documented (%)
Sex	Male	57 (45)
	Female	6 (60)
Age (years)	25–38	22 (47)
	39–50	24 (50)
	51–84	17 (40)
Ethnicity	White background	17 (49)
	Non-White background	46 (45)
Primary severe mental illness diagnosis	Schizophrenia (F20)	54 (47)
	Schizoaffective disorder (F25)	6 (46)
	Bipolar affective disorder (F31)	3 (38)
Antipsychotic medication	Atypical antipsychotic	36 (46)
	Typical antipsychotic	4 (24)
	Both	23 (61)
	None	0 (0)
Hospital admission during window period	Yes	19 (95)
	No	44 (37)

Systolic blood pressure was monitored somewhat better than the two previous parameters: diabetes status and cholesterol/HDL ratio. Specifically, around half of the patients (46%) in the whole sample had their blood pressure checked and documented within the window period. From table 10 it is clear that those aged 51–84 years had the lowest level of monitoring of this parameter (40%). Around half of the patients of White background (49%) underwent blood-pressure monitoring, in comparison to 45% of those identified as non-White background. Those with a diagnosis of bipolar affective disorder showed a marginally lower level of monitoring (38%) than those with schizophrenia (47%) or schizoaffective disorder (46%). Again, those prescribed both forms of antipsychotic medication also had higher levels of monitoring (61%) than those who were on typical antipsychotic drugs (24%) or none at all (0). Notably, the patients who were admitted to hospital during the window period had a very high level of monitoring (95%) for this cardiometabolic parameter.

3.2.5 Body Mass Index (BMI)

Table 11 – Monitoring of body mass index (BMI) by the SCFT during the window period

Demographic/clinical factor	Variable	Number of patients BMI documented (%)
Sex	Male	47 (37)
	Female	3 (30)
Age (years)	25–38	20 (43)
	39–50	17 (35)
	51–84	13 (31)
Ethnicity	White background	10 (29)
	Non-White background	40 (39)
Primary severe mental illness diagnosis	Schizophrenia (F20)	43 (37)
	Schizoaffective disorder (F25)	5 (38)
	Bipolar affective disorder (F31)	2 (25)
Antipsychotic medication	Atypical antipsychotic	25 (32)
	Typical antipsychotic	5 (29)
	Both	19 (50)
	None	1 (33)
Hospital admission during window period	Yes	19 (95)
	No	31 (26)

Monitoring of patients' body mass index was mixed across the six variables of interest. Younger patients (25–38 and 39–50) experienced better monitoring during the window period: 43% and 35%, respectively. The non-White background patient group showed the highest level of monitoring (39%) with regards to ethnicity. Similarly, patients with a diagnosis of schizophrenia (37%) and schizoaffective disorder (38%) demonstrated higher levels of monitoring than those with bipolar affective disorder (25%). Similarly, regarding the results from the systolic blood pressure, higher levels of monitoring were observed for patients who were taking both forms of antipsychotic medication (50%) and those who were admitted to hospital during the window period (95%).

3.3 Statistical Analysis

In order to assess whether the differences in monitoring practice were statistically significant with regards to the demographic and clinical variables, the data collected above was transferred over to SPSS, and multiple Pearson chi-squared tests/Fischer's exact tests were conducted. These are described below.

3.3.1 Smoking Status

Table 12 – Smoking status: statistical analysis of the demographic and clinical variables

Demographic/clinical Factor	Yes (Documented) N=107 (%)	No (Not documented) N=30 (%)	Statistics
Sex			
Male	98 (77)	29 (23)	$X^2 = 0.893$, (df=1), p=0.345
Female	9 (90)	1 (10)	Fischer's exact test = 2.19 , p=0.691
Age			
25–38	36 (77)	11 (23)	
39–50	41 (85)	7 (15)	$X^2 = 2.658$ (df=2), p=0.265
51–84	30 (71)	12 (29)	
Ethnicity			
White background	30 (86)	5 (14)	$X^2 = 1.593$ (df=1), p=0.207
Non-White background	77 (75)	25 (25)	Fischer's exact test = 7.66 , p=0.244
Primary severe mental illness diagnosis			
Schizophrenia (F20)	91 (78)	25 (22)	
Schizoaffective disorder (F25)	10 (77)	3 (23)	$X^2 = 0.064$, (df=2), p=0.969
Bipolar affective disorder (F31)	6 (75)	2 (25)	
Antipsychotic medication			
Atypical antipsychotic	60 (76)	19 (24)	
Typical antipsychotic	13 (76)	4 (24)	$X^2 = 1.976$ (df=3), p=0.577
Both	32 (84)	6 (16)	
None	3 (100)	0 (0)	
Hospital admission during window period			
Yes	20 (100)	0 (0)	$X^2 = 6.566$, (df=1), p=0.100
No	87 (74)	30 (26)	Fischer's exact test = 4.38, p=0.007

As detailed in Table 12, the level of smoking status monitoring within the groups did not differ significantly according to sex, age, ethnicity, diagnosis, medication or hospital admission.

3.3.2 Diabetes Status

Table 13 – Diabetes status: statistical analysis of the demographic and clinical variables

Demographic/clinical Factor	Yes (Documented) N = 16 (%)	No (Not documented) N = 121 (%)	Statistics
Sex			
Male	12 (9)	115 (91)	$X^2 = 8.388$, (df=1), p=0.004
Female	4 (40)	6 (9)	
Age			
25–38	4 (9)	21 (91)	
39–50	6 (12)	42 (88)	$X^2 = 0.765$, (df=2), p=0.682
51–84	4 (10)	38 (90)	
Ethnicity			
White background	4 (11)	31 (89)	$X^2 = 0.003$, (df=1), p=0.957
Non-White background	12 (12)	90 (88)	Fischer's exact test = 4.09, p=1.000
Primary severe mental illness diagnosis			
Schizophrenia (F20)	13 (11)	103 (89)	
Schizoaffective disorder (F25)	2 (15)	11 (85)	$X^2 = 0.203$, (df=2), p=0.903
Bipolar affective disorder (F31)	1 (13)	7 (87)	
Antipsychotic medication			
Typical	11 (14)	68 (86)	
Atypical	0 (0)	17 (100)	$X^2 = 3.099$, (df=3), p=0.377
Both	5 (13)	33 (87)	
None	0 (0)	100 (0)	
Hospital admission during window period			
Yes	1 (5)	19 (95)	$X^2 = 1.101$ (df=1), p=0.314
No	15 (13)	102 (87)	

Table 13 outlines the statistical analysis of the diabetes status monitoring during the window period, which was objectively very poor. With this in mind, the groups did not differ significantly according to age, ethnicity, primary diagnosis, medication or hospital admission. However, it should be noted that among the study sample, proportionately more females had their diabetes status monitored than males, $X^2 = 8.388$, (df=1), p=0.004.

3.3.3 Cholesterol/HDL Ratio

Table 14 – Cholesterol/HDL Ratio: statistical analysis of the demographic and clinical variables

Demographic/clinical Factor	Yes (Documented) N=29 (%)	No (Not documented) N=108 (%)	Statistics
Sex			
Male	26 (20)	101 (80)	$X^2 = 32.87$, (df=24), p=0.107
Female	3 (30)	7 (70)	
Age			
25–38	15 (32)	32 (68)	
39–50	10 (21)	38 (79)	$X^2 = 48.87$, (df=48), p=0.438
51–84	4 (10)	38 (90)	
Ethnicity			
White background	6 (17)	29 (83)	$X^2 = 20.22$, (df=24), p=0.684
Non-White background	23 (23)	79 (76)	
Primary severe mental illness diagnosis			
Schizophrenia (F20)	26 (22)	90 (78)	
Schizoaffective disorder (F25)	2 (15)	11 (85)	$X^2 = 34.20$, (df=48), p=0.933
Bipolar affective disorder (F31)	1 (13)	7 (87)	
Antipsychotic medication			
Typical	16 (20)	63 (80)	
Atypical	1 (5)	16 (95)	$X^2 = 42.16$, (df=72), p=0.998
Both	12 (32)	26 (68)	
None	0 (0)	3 (100)	
Hospital admission during window period			
Yes	13 (65)	7 (35)	$X^2 = 76.47$, (df=24), p<0.001
No	16 (14)	101 (86)	

Table 14 summarises the results for cholesterol/HDL ratio monitoring during the window period. The groups did not differ significantly according to age, sex, ethnicity, diagnosis or antipsychotic medication. However, it was not surprising to observe that those who were admitted to hospital were associated with higher levels of monitoring of this parameter. This result was statistically significant, $X^2 = 76.47$, (df=24), p<0.001.

3.3.4 Systolic blood pressure (mmHg)

Table 15 – Systolic blood pressure: statistical analysis of the demographic and clinical variables

Demographic/clinical Factor	Yes (Documented) N=63(%)	No (Not documented) N=74 (%)	Statistics
Sex			
Male	57 (45)	70 (65)	$X^2 = 39.21$, (df=31), p=0.148
Female	6 (60)	4 (40)	
Age			
25–38	22 (47)	25 (53)	
39–50	24 (50)	24 (50)	$X^2 = 61.47$, (df=62), p=0.495
51–84	17 (40)	25 (60)	
Ethnicity			
White background	17 (49)	18 (51)	$X^2 = 30.92$, (df=31), p=0.470
Non-White background	46 (45)	56 (55)	
Primary severe mental illness diagnosis			
Schizophrenia (F20)	54 (47)	62 (53)	
Schizoaffective disorder (F25)	6 (46)	7 (54)	$X^2 = 64.73$, (df=62), p=0.381
Bipolar affective disorder (F31)	3 (38)	5 (62)	
Antipsychotic medication			
Typical	36 (46)	43 (54)	
Atypical	4 (24)	13 (76)	$X^2 = 72.20$, (df=93), p=0.946
Both	23 (61)	15 (39)	
None	0 (0)	3 (100)	
Hospital admission during window period			
Yes	19 (95)	1 (5)	$X^2 = 75.23$, (df=31), p<0.001
No	44 (37)	73 (63)	

Likewise, Table 15 describes the monitoring of the cardiometabolic parameter: systolic blood pressure. Similar to the previously mentioned parameters, the groups did not differ significantly according to sex, age, ethnicity, primary diagnosis or antipsychotic medication. However, the results above again confirm that those who were admitted to hospital during the window period were more likely to have their systolic blood pressure monitored in comparison with those who weren't. This is reported as $X^2 = 75.23$, (df=31), p<0.001.

3.3.5 BMI

Table 16 – BMI: statistical analysis of the demographic and clinical variables

Demographic/clinical Factor	Yes (Documented) N=50 (%)	No (Not documented) N=87 (%)	Statistics
Sex			
Male	47 (37)	80 (63)	$X^2 = 41.87$, (df=48), p=0.721
Female	3 (30)	7 (70)	
Age			
25–38	20 (43)	27 (56)	
39–50	17 (35)	31 (65)	$X^2 = 96.65$, (df=96), p=0.462
51–84	13 (31)	11 (69)	
Ethnicity			
White background	10 (29)	25 (71)	$X^2 = 43.33$, (df=48), p=0.664
Non-White background	40 (39)	62 (61)	
Primary severe mental illness diagnosis			
Schizophrenia (F20)	43 (37)	73 (63)	$X^2 = 78.75$, (df=96), p=0.900
Schizoaffective disorder (F25)	5 (38)	8 (62)	
Bipolar affective disorder (F31)	2 (25)	6 (75)	
Antipsychotic medication			
Typical	25 (32)	54 (68)	
Atypical	5 (29)	12 (71)	$X^2 = 122.4$, (df=144), p=0.904
Both	19 (50)	19 (50)	
None	1 (33)	2 (67)	
Hospital admission during window period			
Yes	19 (95)	1 (5)	$X^2 = 129.1$, (df=48), p<0.001
No	31 (26)	86 (74)	

Table 16 reports the statistical analysis of BMI monitoring during the window period. Like the other cardiometabolic parameters, the groups did not differ significantly according to sex, age, ethnicity, primary diagnosis or antipsychotic medication. Nonetheless, those who were admitted to hospital were more likely to have their BMI monitored than those who were not admitted. This result was found to be statistically significant represented by $X^2 = 129.1$, (df=48), p<0.001.

Discussion

4.1 Interpretation of Findings

The monitoring of physical health is simple, easy to perform, inexpensive and should be routinely carried out across health-care systems (32). The present study used data from CRIS to audit the monitoring of five QRISK®3 parameters in patients' care coordinated by Southwark Community Forensic Team between 1/06/18 and 24/05/19. The results from this audit facilitated further analysis to assess whether particular demographic and clinical variables influenced the level of monitoring conducted by the team. Following the publication of the CQUIN indicator regarding cardiometabolic monitoring in patients with severe mental illness, it was established that over 75% of community patients should be receiving annual monitoring for certain physical health checks. It was found that the monitoring of smoking status was in keeping with the Trust's gold standard of 75%; however, diabetes status, cholesterol/HDL ratio, systolic blood pressure and BMI all fell short of this threshold.

4.1.1 Smoking Status

Adversely, smoking status was the only parameter that met the 75% threshold, with 78% of patients having this monitored within the window period. Similar to the results from this study, a previous audit revealed that clinicians were paying some attention to mentally disordered patients' physical health but that there were also widespread deficits in monitoring (11). This could be explained by a number of factors, the first being that it is the only parameter out of the five included in this study that requires no physical investigation. In other words, it is the least labour-intensive. For this reason, it can be assumed that patients are more likely to comply with being asked to discuss their smoking habits, and that medical professionals are able to determine an answer that can be documented more efficiently. When conducting further analysis on the variables that might influence the monitoring of smoking status, the Pearson chi-squared tests revealed no statistically significant differences. Given that this parameter involves asking a single question and all community patients are seen regualrly in clinic, it seems reasonable to suggest that, regardless of their demographics, a significant proportion of patients would be asked this at least once a year. The results from the study

correspond with findings from a previous audit that was designed to explore the case notes of a community mental health service. This audit found that smoking status and physical inactivity were both well reported in comparison to others (11). In this particular instance, it was suggested that the reasons for this were that staff were more familiar with the importance of these parameters, which were therefore embedded within their regular assessment (11).

4.1.2 Diabetes Status, Cholestrol/HDL Ratio, Systolic Blood Pressure and BMI

On the other hand, from the results above, it is clear that the monitoring of diabetes status (12%), cholesterol/HDL ratio (21%), systolic blood pressure (46%) and BMI (36%) all fall short of the Trust's gold-standard recommendations. More alarmingly, only 3% of the team's caseload had all five parameters checked and documented during the window period. In light of these results, it is important to consider the reasons why these are so low, particularly in the case of diabetes status. A related qualitative study that examined care coordinators' views and experiences of physical health monitoring in patients with severe mental illness highlighted a number of key issues on the matter. The authors of this study and several others proposed that the potential reasons explaining the barriers to successfully monitoring patients' physical health can be divided into *illness-related factors* and *system-related factors* (33, 34).

4.1.3 Illness-related Factors

It would appear from the results of this study that service-users are experiencing difficulties accessing the appropriate physical health care, possibly as a result of their mental health diagnosis. This opinion is supported by Gronholm, who pointed out that patients' positive psychotic symptomatology can affect their definition of health (33). Their mental health condition, which can cause a paranoid and suspicious state of mind, can prevent them registering with their GP and consenting to physical tests and interventions (33). In keeping with this idea, three studies undertaken in the US, UK and Australia, which addressed service-users' opinions, reported that they felt as though health professionals thought they were 'faking' physical illness, which resulted in them refusing important physical checks and avoiding GP appointments (34). Likewise, from an illness perspective, another issue related to poor monitoring is diagnostic overshadowing. This concept has been shown to be prevelant among patients with SMI and occurs when, albeit unconsciously, health professionals are distracted by the primary SMI diagnosis and disregard simple physical health checks (35-37). It is highly

likely that a combination of the above factors has contribued to the poor levels of monitoring conducted by the team.

4.1.4 System-related Factors

The first system-related factor is associated with clinical role clarificiation, and with where the responsibilty for physical health monitoring in clinical practice falls (32). One of the many reasons that the monitoring was below the pre-determined threshold is likely to be related to this factor. Two consenus conferences took place and demanded that all mental health providers take responsibilty for the physical health of their patients (32, 38, 39). However, it is believed that many psychiatrists still consider their primary role to be focused on patients' mental health and managing medication as opposed to physical health (32). Subsequently, does the burden of this prevalent issue fall elsewhere? The views of the care coordinators who were interviewed in the previously mentioned study were that it was the role of the GP (32). This presents another problem in that not all patients under the team's care are GP-registered, and, as pointed out earlier, this particular patient sub-group has tendencies towards avoiding GP appointments (34).

Another possible explanation is a lack of funding within the Southwark Team, resulting in scarce equipment and staffing issues. With growing demands from patients and falling numbers of doctors, nurses and supported living accomodation availability, the time dedicated to physical health monitoring often falls below other priorities (33, 40). This was supported by the interviews with the care coordinators, who described exceeding case loads well above the recommended limit and reduced contact time with their patients (33).

With system-related factors in mind, the results of this study call into question the accessibilty and practicaility of the relevant community physical health check forms that are to be completed by staff. As described in Table 3, multiple sources of information on ePJS were searched for data, for example: *free text*, *community physical health screen form* and the *current physical health new form*. This emphasises a very important point: that there is an urgent need for systematic changes to assist health professionals efficiently and succinctly to record patients' physical health status. This corresponds with the previous research that has reported time-consuming computerised note systems and poor communication between

primary- and secondary-care services (11, 33). The findings from this study have shown that not only is the monitoring lacking for the majority of parameters, it is also 'buried' within the plethora of everyday case-note entry and multiple different forms. Once again, this finding is supported by a previous audit that reflected on 100 case notes of patients with SMI (11). To address the burdening issue of the physical health needs of patients with SMI, this information needs to be brought to the forefront, along with other key information about their psychiatric needs (11, 34).

4.2 Strengths of the Study

This novel study is one of the first of its kind to be carried out in the forensic community setting and has several strengths that aid the validity of the findings. First, the study was particularly relevant given that the CQUIN indicator was published in June 2018, supported by the growing body of evidence to suggest that physical health monitoring is hugely important in this population. Likewise, a study of this type hasn't been done before for this team and the results are likely to guide future management and improve the physical health of Southwark Community Forensic Team patients. Second, it screened for a broad range of important physical health parameters. These were carefully selected following scrutiny of the QRISK®3 calculator and the CQUIN indicator. Once the most relevant parameters had been selected, the study allowed direct comparison between the demographic and clinical variables, which highlighted any deficits in the monitoring practices and patient groups that needed to be addressed.

4.3 Limitations of the Study

Nevertheless, the study has a number of drawbacks that must be reflected upon. Although the CRIS data-extraction technique is designed to be robust, it is not perfect. Considerable time was spent creating the exact specification used by CRIS to obtain the desired information, but there may have been areas of data that were missed and not correctly obtained. Obviously, this could have negatively impacted the results that were generated.

Another issue surrounding the data that was used is the concept of 'offered but refused'. The data that was extracted relied on whether a valid entry existed on ePJS. This method did not take into account whether a team member had offered to carry out the physical health checks

or discuss smoking status but was unsuccessful as a result of the patient declining. In this instance, the lack of information would be interpreted as not monitored by CRIS. As it is likely that a proportion of patients will have responded in this way during the year, it is important to bear this issue in mind when considering why the monitoring rates were so low.

A study size of 137 patients is relatively small for one of this kind and it was limited specifically by the number of females in the sample. The study included only ten females, and one could argue that monitoring standards may have been higher in a strictly female population. This is based on evidence from a large Canadian study that reported gender differences in health-care-seeking behaviour; women were found to visit primary-care services more frequently than males for both physical and mental health concerns (41). Although statistically, there is a higher prevalence of severe mental illness within the male population (0.9% in comparison to 0.8%) (42), it is something to consider when generalising the findings to the wider population. Furthermore, as a result of the low numbers of females in the sample, during the analysis stage certain cell counts were particularly low, which decreased the internal and external validity of the study.

The study examined the difference between the monitoring standards of those taking atypical and typical antipsychotics, as well as those taking both or none. Another limitation identified was that the study was unable to look at the monitoring of the parameters of those specifically taking clozapine. Those who are prescribed clozapine are required to undergo routine blood tests because of the physical health implications of the medication, and it would have been interesting to observe whether this influenced the monitoring of the other physical health parameters as well.

Finally, this study only examined patients with a primary diagnosis of schizophrenia, schizoaffective disorder and bipolar affective disorder. This unfortunately did not include patients under the team's care with a diagnosis of primary personality disorder and secondary severe mental illness. Including these patients would have ultimately increased the sample size and improved the validity of the study.

4.4 Implications of the Research

Generally, the findings from this study clearly demonstrate that monitoring of physical health parameters by the Southwark Community Forensic Team has been poor during the last year. Although smoking status was monitored to a good standard, the other parameters were severely neglected throughout the window period. This is something that needs to urgently improve based on the current evidence, which highlights the increased risk of cardiometabolic disease within this population (5, 15). Likewise, the 2018 CQUIN target was not adhered to by the team, and it is imperative that this is explained and emphasised to all staff so that awareness is raised and improvements can be made.

Looking more closely at the results from the study, females were found to be more likely to have their diabetes status monitored than males. For this reason, it is important that health professionals focus some of their efforts on males who are at risk of being under-monitored in this particular area. Similarly, patients who had spent time in hospital during the window period as the result of an acute admission were more likely to have their cholesterol/HDL ratio, systolic blood pressure and BMI checked. Although this result was somewhat expected, given that only 15% of patients were admitted, the implication of this finding is that it is essential to ensure that the remaining community patients are still receiving optimum care. This can be established by educating and training community health-care teams, identifying an assigned physical health-care team leader and improving access to equipment and interventions.

Contrary to the findings from a case-note audit, which revealed that young people with SMI received less physical health care, the results did establish that there was little significant difference between the monitoring standards for age, ethnicity, diagnosis and medication. This is an important negative finding, as there have been increasing concerns regarding metabolic syndrome due to antipsychotic medication and poor physical health in the sub-group of younger patients (43). Ultimately, the results highlight that none of these particular patient groups have been neglected and monitoring standards were largely poor across the board. Effort should be undertaken evenly to target all sub-groups of this population with regards to the above demographic and clinical variables.

4.4.4 Implication of Research for the QRISK®3

For this reason, it seems fair to suggest that, for the majority of patients under the Southwark Team, calculating an individual QRISK®3 score with updated physical health data would prove difficult and lack accuracy. This is worrying and an area of clinical practice that needs attention. As emphasised previously, the international data that consistently demonstrates that individuals with a diagnosis of SMI have an increased risk of co-morbid cardiometabolic disease cannot be ignored (34). It is vital that health professionals are able to correctly calculate a QRISK®3 score for this high-risk population and successfully carry out early-intervention and prevention strategies.

4.5 Future Research

This service evaluation was based upon an extensive first-phase audit. Thus, it would be advisable to distribute the findings to the relevant health professionals, implement the recommended changes and conduct a second-phase audit to complete the audit cycle. The South London and Maudsley Trust is made up of mental health services that provide care for patients in Croydon, Lambeth, Lewisham and Southwark. Future research of a similar nature looking at the monitoring practices in the other three boroughs would also be very useful as a comparative measure. As the majority of previous research has been conducted in the general psychiatric population, it would be interesting to carry out this study in a non-forensic psychiatric population. This would enable further exploration into the reasons why physical health monitoring is problematic in the mental health setting.

In light of the study mentioned previously (33), it would also be of interest to conduct a qualitative study on the opinions of staff and patients in the Southwark Community Forensic Team about why they think the levels of monitoring are low. With the results from the present study, and supportive findings from a qualitative study, significant improvements could be seen by creating a more tailored approach for those whose physical health is severely overlooked. Finally, as with all research, replicating the same study in a larger sample size, particularly including more females, would be beneficial to provide more generalisable findings to inform clinical practice.

4.6 Conclusion

The aim of this study was to conduct a first-phase audit assessing whether the monitoring of five QRISK®3 parameters by the Southwark Community Forensic Team was in keeping with Trust policy. Using this data, certain demographic and clinical variables were analysed to assess whether they affected the likelihood of these important physical health checks being completed. It was found that the monitoring of smoking status was in keeping with the Trust's gold standard of 75%; however, diabetes status, cholesterol/HDL ratio, systolic blood pressure and BMI were all well below this determined threshold. It was also revealed that only three patients had all of the five parameters monitored during the year. Females were found to be more likely to have their diabetes status monitored than males, and those who were admitted to hospital were more likely to have their cholesterol/HDL ratio, systolic blood pressure and BMI checked and documented. This has identified an extremely worrying problem within this population and highlighted a significant lack of awareness of physical health-care access for people with SMI. Given the growing body of evidence emphasising that mortality rates are high among people with SMI as a result of co-morbid physical disease (5, 10, 12, 13, 33), it is vital that this research is used to improve the standards of monitoring in this deprived population. It is likely that the quality of care is compromised by practical problems and communication difficulties between service-users and mental health-care providers (34). However, these insights must inform efforts to reduce the barriers to successfully monitoring the physical health status of these patients, educating patients and the health-care community and bridging the gap between physical and mental health care (32).

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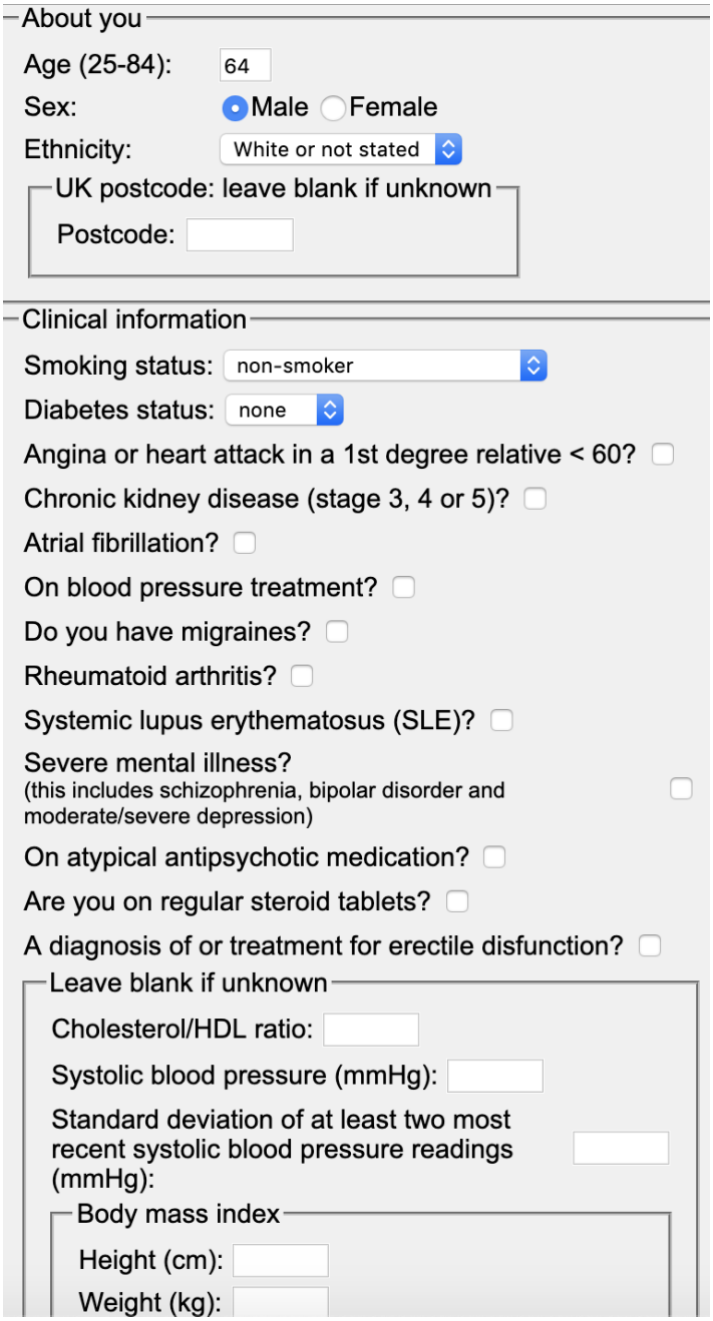
Appendix A – 2018 CQUIN Indicator Target for Cardiometabolic Assessment for Patients with Psychoses

3a. Cardio Metabolic assessment and treatment for patients with psychoses

CQUIN Indicator	
Indicator name	Cardio metabolic assessment and treatment for patients with psychoses
Indicator weighting (% of CQUIN scheme available)	0.80% of 0.25%
Description of indicator	To demonstrate cardio metabolic assessment and treatment for patients with psychoses in the following areas: a) Inpatient wards. b) All community based mental health services for people with mental illness (patients on CPA), excluding EIP services. c) Early intervention in psychosis (EIP) services.
Final Indicator	a) Inpatients – 90% b) Community mental health services (patients on CPA) - 75% c) Early intervention in psychosis services – 90%

Appendix B – QRISK®3 -2018 Web Calculator



Appendix C – Audit Approval for Proposed Project

South London and Maudsley NHS
NHS Foundation Trust

Project Proposal Form (PPF) for Clinical Audit, Service Evaluation and other Quality Improvement Projects

Should you require any assistance with completing this proforma, please contact your Local Clinical Audit Project Officer or, for Trustwide audits, the Clinical Audit & Effectiveness Team (details are available on the SLaM Clinical Audit & Effectiveness Internet Site). For local team-based or Clinical Pathway (Borough)-wide projects please send your completed PPF to your local Audit Project Manager/Officer, for ethical approval. For Trustwide projects please send your completed PPF to the Corporate Audit Dept. All relevant contact details are on the SLaM Clinical Audit & Effectiveness Team Intranet site.

1(a) Project lead details:	
Name: Dr Victoria Burt & Holly Clark	**Job title: Consultant Psychiatrist & Medical student** **Profession:**
Work Address: Southwark Community Forensic Team, Landor House, Lambeth Hospital, 108 Landor Road, London, SW9 9NU	
Telephone: 020 3228 7168 or 07808844494	**E-mail: Victoria.burt@slam.nhs.uk** **Holly.g.clark@kcl.ac.uk**
Within Clinical Pathway: Southwark Community Forensic **Multiple-Clinical Pathway (Borough) (please specify)** **Trustwide: ☐**	
1(b) Project Title: Monitoring of Physical Health Parameters Necessary for Completing QRisk3	
Project start date: 4th February 2019	**Project end date: 4th May**
1(c) Please tick ✓ one box: Is this project a:	

Clinical Audit √ ☐ **(i.e. measures a standard)**	**Service Evaluation ☐** **(e.g. patient survey)**	**Other Quality Improvement Project ☐** **(please specify) _____**

2 (a) Overall project aim or purpose of the audit:

To measure current levels of monitoring of physical health parameters required to complete a QRisk 3 in community forensic patients and identify any particular patient groups (sex, ethnicity or age) that have not had monitoring carried out.

Appendix D – CRIS Approval for Proposed Project

CRIS Application: 1331

1. Details: First Name: Holly Last name: Clark

Job Title: Medical Student

Department: Southwark community forensic team

2. Preferred email address (please use KCL, SLaM or an NHS email addresses for any communications regarding CRIS)

holly.g.clark@kcl.ac.uk

3. Do you have a substantive or honorary contract with SLaM?

Pending

4. Project Title

Physical Health: A service evaluation of cardiometabolic health monitoring in forensic patients diagnosed with severe mental Illness (SMI).

5. Lay Summary: Please provide just one sentence summarising the reasoning behind the project, and just one sentence describing what the project will do

This service evaluation will investigate the current level of cardio-metabolic monitoring of Southwark community forensic patients and evaluate whether this is in keeping with the guidelines defined in the policy. The results will guide future management of these patients with a view to reducing their cardiovascular risk.

6. Objectives of the analysis

1. Review the literature on the importance of monitoring of physical health in patients with SMI. In particular Q-RISK3 parameters looking at CVD risk

.

2. Audit the monitoring of the QRISK3 parameters in patients care co-ordinated by Southwark community forensic team during the period June 2018 to December 2018.

3. Analyse whether particular variables are well or poorly monitored, and whether demographics or clinical variables, including admission to hospital, contribute to this.

7. Rationale for the analysis (i.e. anticipated benefits / useful knowledge will arise from the results)

1. To conduct the first phase of an audit, assessing whether monitoring of Q-RISK3 parameters is in keeping with Trust policy

2. To determine if admission to hospital (between June and December 2018) increased the likelihood of these important physical health checks being completed.

3. To identify which, if any, particular variables are well or poorly monitored

4. To disseminate findings to local services, providing a platform for future completion of an audit cycle.

8. Types of variables you envisage using to define groups

Age (years)
The QRISK3 calculator is valid for individuals aged 25 to 84.
Sex
Ethnicity
Medication
SMI Diagnosis
Co-morbid Physical Diagnosis
GP Registered

9. Types of variables you envisage needing as outputs

- Postcode
- Smoking status
- Diabetes
- Angina or CHD in 1st degree relative <60 yrs.
- Chronic kidney disease (CKD)
- Atrial Fibrillation (AF)
- On blood pressure meds
- Migraines
- Rheumatoid Arthritis (RA)
- Systemic lupus erythematous (SLE)
- Severe mental illness (SMI)
- Atypical anti-psychotic med
- On regular steroids
- Diagnosis or treatment of erectile dysfunction
- Cholesterol/HDL Ratio
- Systolic BP
- Height and Weight

10. Are there any variables / combinations of variables which might identify individuals on the database? (If yes: what steps will be taken to avoid de-anonymisation?)

The above information will be fed into the QRISK3 calculator, giving us a percentage, and will not identify patients individually in the report.

11. Will your project use CRIS as part of the C4C process? (recruitment) If Yes please complete Q11a-f. If No please continue to Q12

No

11a. Research Ethics Committee approval number (REC approval number).

11b. Date of REC approval

11c. REC Expiry Date

11d. SLaM Research and Development (R&D) reference number

11e. Date of SLaM R&D approval

12a. Will your project require linking CRIS data to one of the external datasets held by the SLAM secure clinical data linkage service (CDLS), e.g. HES (acute hospital admissions, outpatient and A&E attendance), cause of death data etc.? If Yes, please complete Q12b. If No, please continue to Q13

No

12b. Please select which dataset you envisage your project will require linkage to (i.e. HES, Mortality)

13. Names of anyone else who will be involved in CRIS use for this project (or state 'None'). Please provide the roles, affiliation and email addresses (They must have SLaM honorary contracts or be a SLaM member of staff)

Dr Victoria Burt - Consultant forensic psychiatrist (Southwark community team)
victoria.burt@slam.nhs.uk

Dr Penelope Brown - Consultant forensic psychiatrist (Lewisham community team)
penelope.brown@kcl.ac.uk / Penelope.Brown@slam.nhs.uk

14. Please provide details of your supervisor (Name, Profession, Department, Work address, Telephone number). Please note we would like the details of the supervisor for the project you've detailed in this application (This may not necessarily be your line manager)If you are applying as the supervisor for this project, please indicate your level of clinical and/or academic seniority.

Dr Victoria Burt - Consultant forensic psychiatrist (Southwark community team)
victoria.burt@slam.nhs.uk

Landor House, Lambeth Hospital, 108 Landor Road, London, SW9 9NU
Mobile: 07808844494

Office: 020 3228 7168

15. How long do you envisage requiring use of CRIS for this project?

6 Months

16. Is this project a BRC project? If so, which theme does it fall under?

No

17. Would you class your project as research, audit, service development or service evaluation?

Service Evaluation

18a. If audit, please confirm the project has received appropriate SLAM Clinical Governance approval and email the approval to the CRIS administrator along with this filled out application

Yes

18b. State the Directorate responsible for this approval

Croydon/BDP

18c. Give the title of the approved project if different from above

Monitoring of physical health parameters necessary for completing QRisk3

19a. If research is intended to be published, please, State what is the output envisaged to directly arise from this analysis (publication/pilot study)?

No

19b. Is it likely that texts from CRIS will be quoted in the publications?

No

19c. Please give an indication of where you are intending to publish

N/a

20. Please list the CAG(s) for which your study may have relevance / utility

BDP

21. Use of CRIS requires adherence to the security model Please note here that you have read and understood these requirements .

Yes

22. Does this application relate to a study forming all or part of an MSc dissertation?

No

23. Is this project described as industry funded?

No