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Improving Metabolic Screening and General Physical Health for Rural and Remote Mental Health Consumers Using Lean Practices

Dr. Brian Mayahle[1*], Stephen Parnell[2], Dr. Anthony welch[3], Dr. Jennifer Barr[4] & Fumiso Muyambo[5]

[1]Central Queensland Rural and Indigenous Mental Health Services Manager

[2]Director Operations and Innovations CQHHS

[3]Associate Professor, Associate Professor Mental Health, Discipline Head, MentalHealth, CQUniversity, Australia

[4]Associate professor, Deputy Dean of Research, Central Queensland University, Australia

[5]PhD Student, Disaster Management Training and Education Centre for Africa (DiMTEC) Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, South Africa

*Correspondence to: Dr. Brian Mayahle, Central Queensland rural and indigenous mental health services Manager.

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Abstract

Aim

To improve metabolic screening for rural and remote mental health consumers.

Background

Monitoring and treatment for physical health conditions including metabolic syndrome in mental health consumers taking antipsychotics is generally poor in comparison to the general

population [1]. Mental health consumers in Central Queensland regional, rural and remote areas have a challenge securing regular and consistent physical health checks, due to the general inaccessibility of health professionals in rural communities. As a result, some mental health teams are now allocating responsibility of Metabolic screening to community mental health nurses to increase compliance. However, this approach creates consumer dependency on secondary mental health care services and additional workload to the already stretched mental health nurses. The impetus of this paper, therefore, is to present the application of Lean to improve the flow of information between secondary and primary health services, for consumers that require metabolic screening and treatment to have their metabolic screening conducted by GPs under a share management plan.

Method

A chart audit tool, based on Gearing, *et al.,* (2006) chart audit review framework, was developed [2]. It was used to review consumer records pre- and post-Lean implementation, to ensure that all consumers who had an open episode to the service diagnosed with bipolar, schizophrenia and prescribed antipsychotic medication, were offered an opportunity for metabolic screening through their general practitioners (GPs).

Lean Intervention

Lean Intervention included Kaizen (rapid improvement) three-day workshops which were conducted with operational staff to develop standard work instructions, huddles and visual management systems to constantly monitor consumers, who were newly diagnosed with schizophrenia, bipolar disorder and were prescribed antipsychotic medication. A communication plan was developed to ensure effective collaborative working between GPs and rural community mental health teams.

Key Results

• Improved awareness for the clinicians to offer consumers an opportunity to participate in metabolic screening
• Improved recording of the opportunities offered by clinicians to the consumers in the consumer's electronic charts
• Clear communication process with GP practices regarding metabolic monitoring
• Increased participation of rural mental health consumers in metabolic monitoring

Conclusion

The findings are indicative that Lean philosophy can be applied in rural and remote mental health services to improve the participation of mental health consumers in metabolic screening and subsequently improve their general physical health through effective collaborative working between secondary and primary health services.

Introduction

The Queensland state-wide models of services emphasise the monitoring of metabolic screening for mental health consumers. Metabolic syndrome refers to a cluster of cardiovascular risk factors including insulin resistance, hypertension, central obesity and dyslipidaemia, which result in significantly increased risk of cardiovascular disease and mortality [1].

Mental health consumers, particularly those diagnosed with schizophrenia, bipolar disorder and major depressive disorders, have a higher risk of developing metabolic syndrome than the general population without such previous diagnosis, due to family history of diabetes, poor diet, physical inactivity, obesity and the side effects of antipsychotic medication. As a result, any consumers with a diagnosis of schizophrenia, as well as those who are prescribed mood stabilisers and antipsychotic medication should routinely have metabolic screening.

However, there are several contributing factors to mental health consumers not having metabolic screening routinely conducted in rural and remote areas. One major contributing factor is the lack of consistent mental health nursing staff in community rural mental health teams due to well documented recruitment and retention challenges [3,4]. According to Caldwell, *et al.,* (2004), a GP is usually the first or only local medical contact in the community [5]. Accessing a GP can be difficult in some localities and GPs may vary in their level of experience of treating psychological distress or mental illness. Waiting lists, lack of treatment options or the need to travel to access health care services may result in many people with mental health challenges not accessing support services, or not receiving treatment due to cost and time barriers, until their condition has deteriorated significantly [4].

These challenges, including the lack of process and flow of information between primary and secondary healthcare services in the Central Queensland regional, rural and remote areas, subsequently led to reduced consumer participation in metabolic screening. It is, therefore, against this backdrop that Lean methodology was implemented to streamline, improve and create sustainable processes for several quality measurement domains including metabolic screening.

Definition of Lean

Lean thinking is defined as a process management philosophy which examines organisational processes from a customer perspective with a goal of limiting the use of resources to those processes that create value for the end customer [6].

Methodology

The research study used the retrospective chart audit framework by Gearing and colleagues [2] which has eleven items which included the metabolic screening item. This tool was used to review consumer records pre and post Lean implementation to ensure that all consumers who had an open episode to the service, diagnosed with bipolar, schizophrenia and prescribed antipsychotic medication were offered an opportunity for metabolic screening through their general practitioners (GPs). Chart review was chosen because it

provides a relatively inexpensive ability to research the rich, readily accessible existing data; easier access to conditions where there is a long latency between exposure and disease, allowing the study of rare occurrences; and most importantly, the generation of hypotheses that then would be tested prospectively [7-10].

This research project endeavoured to reduce the variance in the quality of information recorded and the compliance of recording information in a timely manner, which ultimately improves consumer participation in metabolic screening through implementation of Lean thinking principles. As a result, a retrospective chart audit was a suitable way of analysing the reasons why the rural mental health service did not meet the metabolic screening requirement and inform the service on continuous improvement processes required to meet the targets. Quantitative data was collected using chart audits, and in-house Key Performance Indicators (KPIs) 13 week's pre-Lean and 13 weeks post-Lean intervention. The research process is shown diagrammatically in Figure 1.
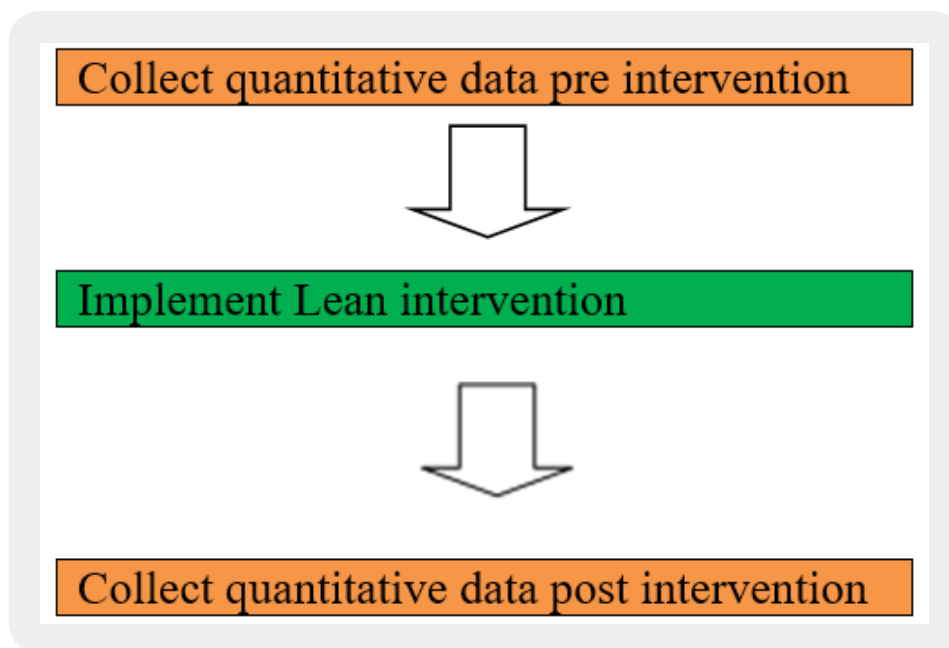

Figure 1: Research Process

Gearing, *et al.,* (2006) Chart Audit Framework

The study followed some discreet steps in order to effectively and systematically extract data from consumer records [2]. One of the key preparatory steps for conducting chart audits was to develop a good understanding of the design of the existing health records and how the data was recorded.

The first stage as suggested by Gearing, *et al.,* (2006) was the generation of hypothesis [2]. The hypothesis for this research study was that Lean thinking would improve processes, efficiencies and outcomes of mental health consumers including metabolic screening and treatment in rural and remote areas. Stages two and three were comprised of a literature review and proposal development. This research study was assessed by a university panel for confirmation after submitting a proposal with extensive literature review Secondary

literature provided the required background and illuminated how other researchers operationalised key concepts or variables. However, the literature review process was repeatedly undertaken throughout the duration of the research.

Stage four focused on the creation of a relevant data abstraction instrument. Organisation, simplicity and clarity were essential criteria for the development of a uniform data abstraction instrument [11]. An easy to use paper chart audit tool was created as suggested by [12].

A chart audit tool was developed and used to gather the quantitative data as shown in Appendix A. The electronic clinical records were accessed through Consumer Integrated Mental Health Application (CIMHA) in order to gather data for Central Queensland Mental Health Services.

Sampling

The convenience sampling method was used to select the charts. Eleven key data elements or variables including metabolic screening were extracted from the electronic charts. As a rule, the sample size should be ten charts per variable in order to obtain results that are likely to be true and clinically useful [13]. While the literature generally holds ten events per predictor as an accepted norm [13-15], other scholars suggest that it is acceptable to have a minimum of five or seven events per predictor [16]. Hence, the sample size required to achieve statistical significance ranged from 55 to 110 charts. A total of 80 charts were reviewed for this study.

Data Storage

Research data was stored in locked files throughout the duration and for a period stated by Queensland Health and Central Queensland University (CQU) data storage policies. The computer used was also password protected and any paper copies were stored in a lockable file.

Ethics Approval

Since this study was conducted as part of a PhD research study, Ethics approval was sought from the appropriate institutional ethics committees, CQU and Central Queensland HHS Human Research Ethics. Obtaining confidential health information from the electronic medical chart of the consumer (CIMHA records) required ethics approval.

Quantitative Data Analysis

Simple frequencies and descriptive analyses were undertaken for all variables pre- and post-Lean intervention. The compliance rate for each data element was calculated. Statistical outcomes were interpreted and provided valuable evidence for quality improvement of the clinical processes.

Pre-Lean Chart Audit Results

A total of 80 charts were reviewed. The retrospective chart audits revealed unrecorded and irrecoverable information in the chart. Based on the chart documentation review, 82.5% of the consumers had an open episode to the rural mental health services and the majority of these consumers (70%) were prescribed

antipsychotic medication, making them eligible for this category. A significant number of the eligible consumers (64%) had their metabolic screening done and recorded in the right structured field on the electronic recording system. The remainder of the eligible consumers (36%) did not have their metabolic screening conducted as shown in Figure 2.
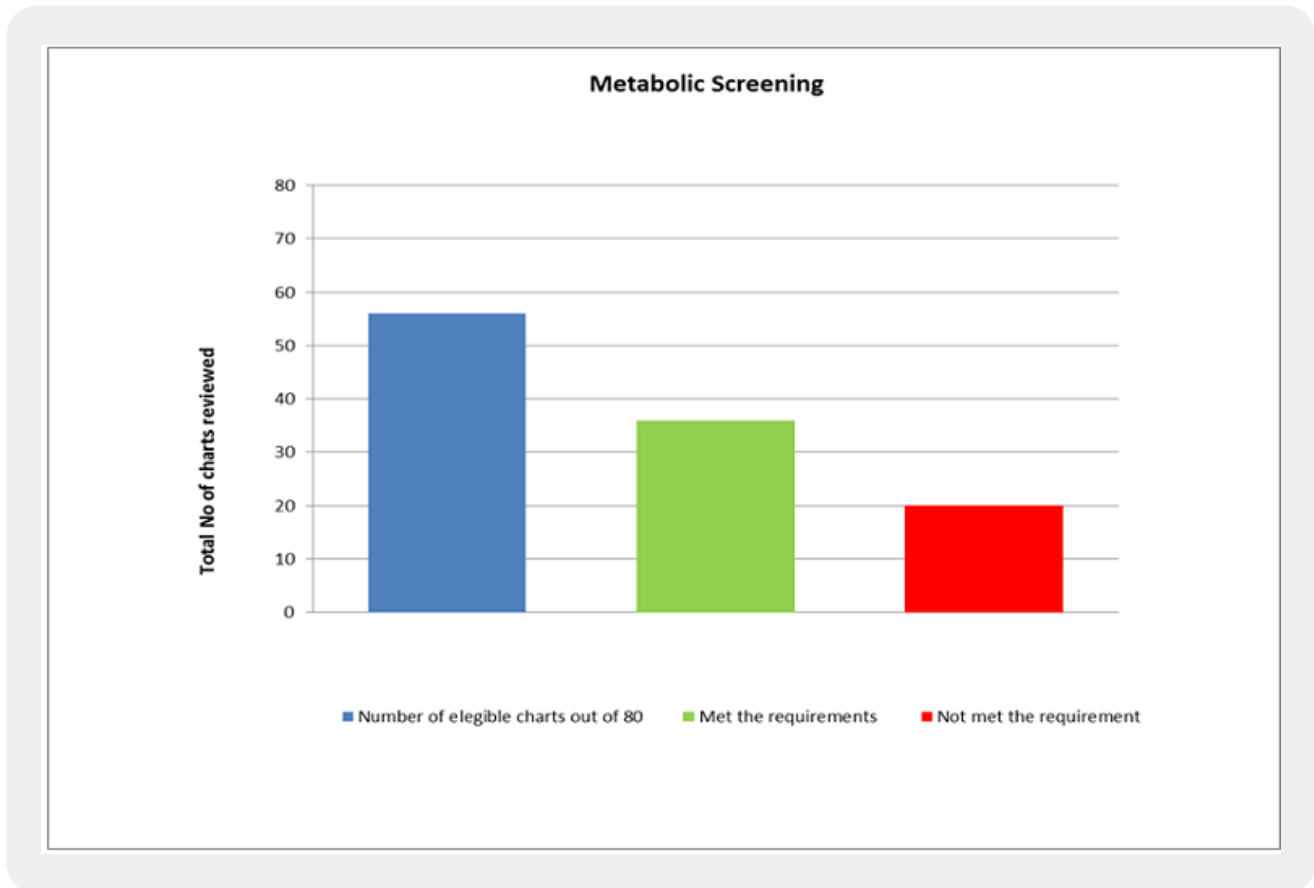

Figure 2: Metabolic Screening

Documentation habits of clinicians varied significantly where some clinicians documented the metabolic screening in a general progress note and some in the right field. The auditing progress did not automatically pick up the cases where the clinicians did not document in the right field therefore the principal investigator read through to check if there were any notes related to metabolic screening. The pre-Lean implementation chart audit review showed the following key issues which needed to be addressed:
• Increasing awareness for clinicians to offer those eligible to participate in metabolic screening
• Documenting in the right field every time the clinicians offer the consumers
• Increasing participation of eligible consumers in metabolic screening

Lean implementation

Implementation of Lean in the Central Queensland rural mental health targeted on several improvement areas. The first rapid improvement workshop (kaizen) which was called "The rural mental health 5S and visual management kaizen workshop" occurred from 11th–13th April 2016. The kaizen workshop did not

only target improving on the metabolic screening quality measure. Instead the quality measure was one of several other quality measurement indicators which the rural mental health team targeted for improvement through development of streamlined and sustainable process using the 5S approaches. 5S is the key foundation for the successful implementation of the Toyota management system [17], because it is usually implemented at neutral or low cost as it requires less technology. However, it is very effective in making problems visible. It sets for the basis for continuous improvement because the desired standard is set clearly at the initial stage of implementation. 5S does not only make the workplace tidy (clean), but it is also very effective in the management of supplies and inventory. According to Hirano (1996) [17], the purpose of 5S goes beyond neatly organising and labelling materials to maintain a shiny environment. Rather, Lean systems use 5S to support a smooth flow to takt time and can be used as part of the visual control system [17,18].

In addition to reorganising the workplace environment, the workshop focused on setting up a visual management board for documentation adherence, KPIs, auditing and setting up standard day to day operational processes. Visual control is principle seven of Toyota management system and focuses on visible control of key organisational performance indicators. Visual control ensures that all targets are not hidden and can be reviewed at a glance to improve flow [19]. Visual management and 5S are usually combined at the foundational phase of implementation of Lean because inventory waste can be eliminated, which makes the workplace tidy. Moreover, controls are set to avoid accumulation of inventory to ensure that performance dysfunctions are corrected quickly and will no longer be hidden.

Workshop Goals

1. Reorganise work environment to reduce clutter;
2. Improve inventory management;
3. Set up standard day-to-day operational processes;
4. Set up a quality measurement visual management board;
5. Improve on CIMHA documentation adherence and KPIs; and
6. Improve staff motivation and enthusiasm about quality improvement.

It was on the third day of the workshop that the team members spent the time setting up the visual management board to track how the rural mental health team was meeting Key Performance Indicators (KPIs) and other significant quality improvement measures, including metabolic screening. The KPIs and other significant quality improvement measures were identified during previous Lean workshops and problem identification sessions such as the Queensland state-wide models of service review, as well as from the chart reviews conducted in October 2015.

It was important to set up the visual management board as part of the foundational process of implementing the CQWay (Lean) in rural mental health services, so that all baseline problems in service provision were surfaced and addressed. The rationale was to ensure that departmental performances were communicated openly at the foundational stage of the Lean implementation journey. Due to this exercise, the staff would immediately know whenever there was a deviation from the set standards. The team used the 5S concept to set up the visual management board. According to Liker (2004) [19], the 5S concept can be used beyond cleaning the workplace. It can be used in a sophisticated way to improve complex processes or flow of important information, for example, KPIs [17].

The pre-Lean statistical quantitative data from chart audits showed the inconsistencies and variations in the clinical documentation and delivery of care. This data was critical in the prioritisation decision making process. After the presentation of the essential data, the team brainstormed on quality measurement elements, which they thought required to be tracked closely through the visual management board. In addition, decided on how the data was going to be displayed on the visual management board.

Liker (2004) posits that the key to organisational learning is to align objectives of all employees with common goals and, if employees identify with the problem or issue, they will take up ownership of monitoring and improving their own metrics [19]. Furthermore, involvement of staff in identifying problems and creating a visual management board was a departure from the results oriented approach towards the process focused leadership model, thus investing in people and process, which eventually leads to the desired results.

By and large, the decision to track quality measurement elements on the visual management board were based on what the team thought was essential to the consumers. The 5S approach in selecting quality measurement items to be monitored ensured that staff would not view the visual management board as driven by state-wide or organisational KPIs, rather by the consumers' and their own needs. According to Liker (2004) [19], principle 13 of Toyota management is Nemawashi, which places an emphasis on making decisions slowly by consensus after thoroughly considering all options and then implement rapidly. The process of Nemawashi allowed both junior and senior staff to participate in the decision-making process that they usually would not be harnessed to in traditional management set ups.

Thereafter, standard work, good daily leadership, visual management and continuous improvement were developed and implemented.

Metabolic Screening for Consumers on Psychotropic Medication

The conduct of metabolic screening had proved difficult for the rural mental health teams due to high staff turnover; therefore, the team decided that, for consistency, they needed to develop a process where they could liaise with GPs to carry out the metabolic screening and share the results with the community mental health team. A standard letter was created which was sent to the GPs to request metabolic screening and the results were to be shared with the clinicians. That process would also ensure that any detected abnormalities would be followed up by the GPs expeditiously. However, those consumers who did not have a GP and did not want to engage with a GP were encouraged to participate in metabolic screening at the rural community mental health team. A business rule was set that the clinicians would offer the consumers and record in the right field with evidence of correspondence with the GP in the consumers' electronic file.

Metabolic Screening Improvement Approach

The metabolic screening followed a threefold improvement approach which consists of:
1. Offering metabolic screening to consumers;
2. Recording in the correct field on the electronic system; and
3. Consumer participation in metabolic screening.

Data was generated by the senior administration officer for all consumers on antipsychotics and mood-stabilisers and those with a diagnosis of schizophrenia. Staff sent correspondence to the GPs requesting them to conduct the tests and to send the results to the community mental health team. The staff then recorded this in the correct field and waited for results to be returned. Once the results were returned staff uploaded the results on the metabolic template on the consumer's electronic chart. The medical officers would cross check the results with clinicians for anomalies. This process increased collaborative working between GPs and community mental workers.

Huddles

Another change that made a difference, motivated staff and stimulated the culture of continuous improvement, was consistent daily leadership and the introduction of weekly huddles, with updates and progress reporting on the newly diagnosed consumers with bipolar, schizophrenia as well as prescribed antipsychotic medication. The weekly huddle led to staff deciding to set aside protected time for senior administration staff and clinical seniors, to assist staff with any outstanding or uncompleted tasks. The introduction of protected time to fix uncompleted tasks birthed the concept of stopping the line to fix problems in the rural mental health services.

According to Liker (2004), principle 4 of the Toyota Production System is building a culture of stopping to fix problems, to get quality right the first time in the office environment [19]. As part of building quality into the service environment and stopping when a quality problem is identified, tracking these uncompleted action plans on weekly basis ensured that there were no data discrepancies carried over. The result was that the team managed to achieve quick wins with data element improvements and consequently improved the metabolic screening. The process followed the Plan Do Check Act (PDCA) cycle on a weekly basis, as shown in Figure 3.

By following the PDCA cycle as part of a learning framework and improving the team's approach to problem solving, the results improved with less consumers eligible to have metabolic screening information between community mental health and the GPs. Following this PDCA cycle resulted in the development of good workplace habits. The success of stopping to fix the outstanding tasks also empowered the staff to approach any quality issues with the same attitude of 'hang on something is not right, let's right it now' and became the teams' improvement culture.
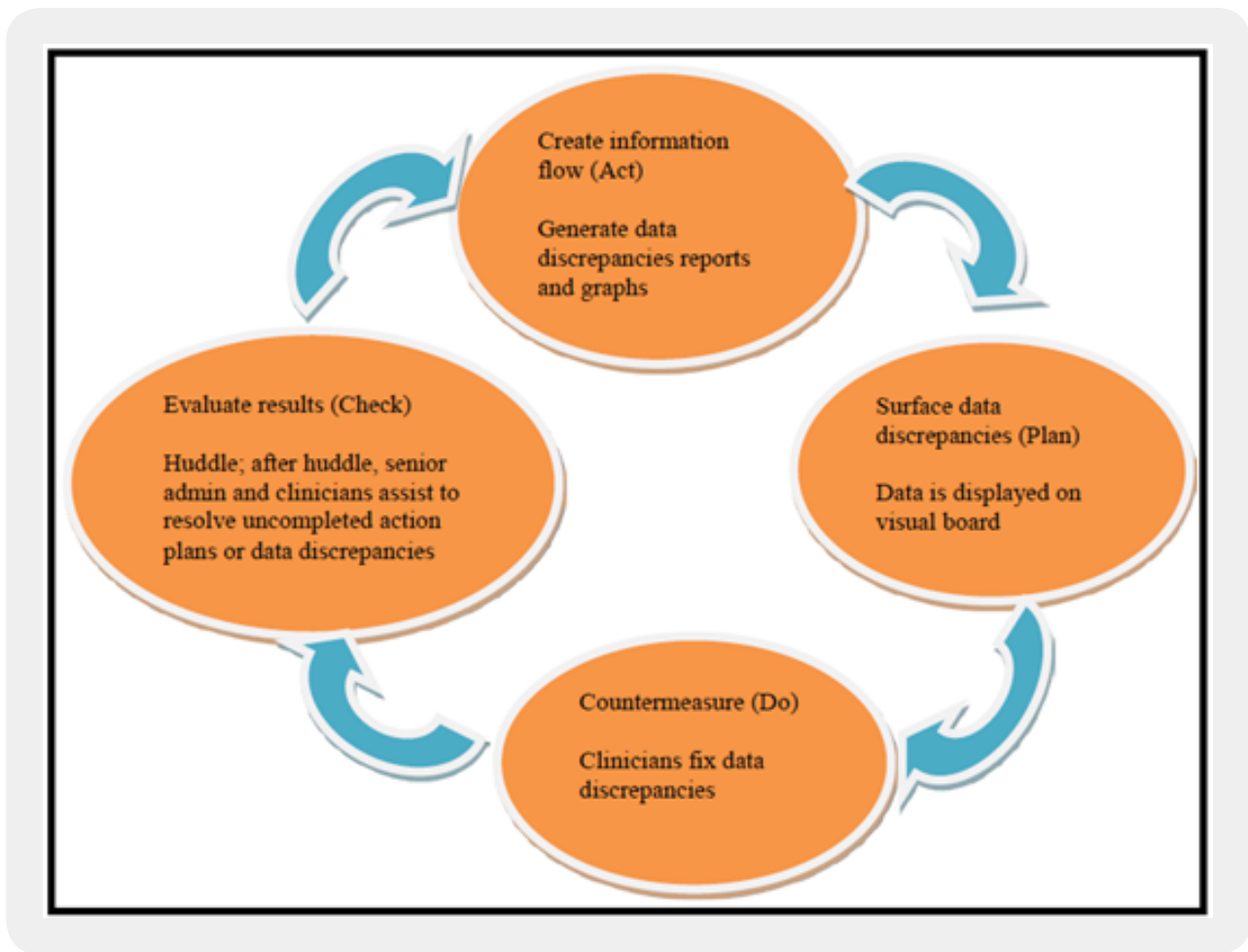
Figure 3: Visual Management Board Plan–Do–Check–Act Process

Post Lean Implementation Chart Audit Results

A total of 80 charts were reviewed post-Lean implementation. Based on the chart review, 71.25% of the consumers had an open episode and 31.58% were prescribed antipsychotic medication. Of the eligible consumers, 83.3% had their metabolic screening conducted and recorded in the structured field on the recorded system, as illustrated in Figure 4.
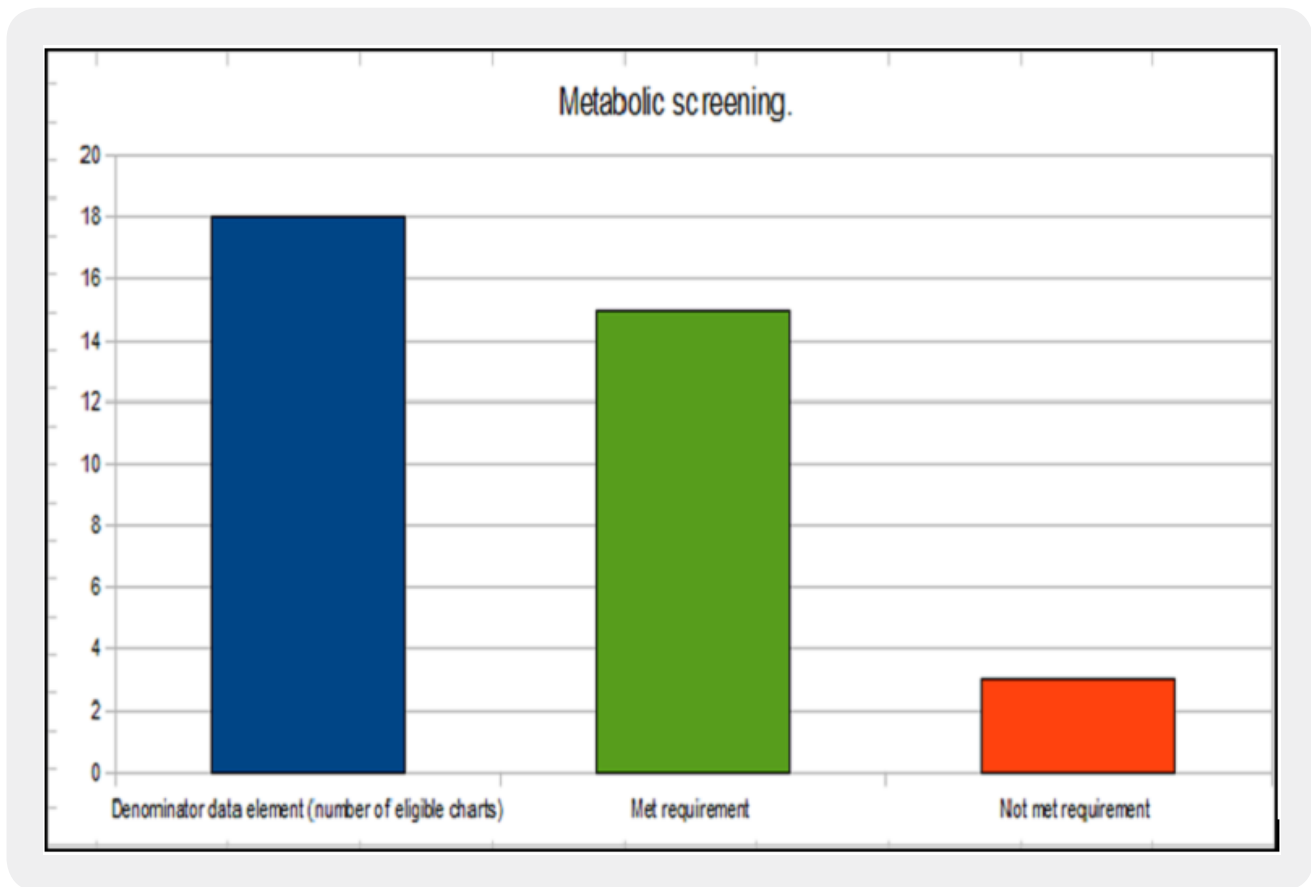
Figure 4: *Metabolic Screening*

Discussion

There was increased awareness among clinicians with regards to offering consumers metabolic screening through good liaison and collaborative work with GPs. There was also significant improvement on recording in the correct field when they liaised with GPs for consumers to participate in metabolic screening. However, participation of consumers was initially reduced because GPs would sometimes not recall the consumers to carry out the tests. The GPs and the community mental health team had to utilise the PDCA cycle to increase participation of the consumers.

During a follow-up meeting with the GPs, three months after introduction of new processes, one senior GP suggested an improvement to the process by sending the letter to the practice nurse and administration staff at the practice, to ensure that consumers would be recalled for the tests. The GP cited that most of them would not recall the consumer if the letter was addressed to them due to other commitments. When the team changed the process, more participation was experienced and better results were realised. This shows that follow-up meetings with key stakeholders are an important aspect for continuous improvement.

Furthermore, participation in metabolic screening increased when and where there was enhanced consumer to case manager therapeutic alliance, which enabled the consumer to be knowledgeable about the reasons why metabolic screening was important. As shown from the post lean chart reviews the increment reached 83% which is more than the average state-wide recommendation of 65% completion of metabolic screening.

In addition, auditing clinical documentation or conducting chart reviews informed senior leaders on issues that needed to be addressed to improve quality of care provided to consumers. However, there were circumstances where metabolic screening was conducted but not documented in the right field which raised false alarms on the metabolic screening not being conducted. This substantiates Hibbert *et al.,* (2013) who states that sometimes quality clinical documentation does not automatically translate to the provision of quality care and vice versa [20]. There is an old adage in healthcare that states that what is not documented in the consumer's chart never happened; hence the importance of recording accurately in the right field.

The decision to creatively widen the scope of 5S utilisation beyond the physical environment, to setting up the KPI visual management board at the foundational stage was the key driver to the success of this project. Setting up the KPI visual management board following the 5S concept allowed genuine involvement of the rural mental health team in deciding the quality measurement elements that needed to be monitored. Staff decided what needed to be monitored on the visual management board, based on the essential data and also on what they thought contributed significantly to good service delivery and improvement of the quality of care provided to consumers, instead of just the mandated state-wide KPI requirements. By and large, the staff 'saw sense and purpose' in the monitored indicators including metabolic screening resulting in increased motivation to achieve positive results.

Setting the KPI visual management board at the foundational stage also gave the opportunity to build trust early with most staff. It assisted staff to understand that the intention was not for them to work faster, which is a common assumption that creates a hostile attitude from employees towards Lean initiatives. Involving and jointly setting up challenging goals with staff during the visual management board set up stage, resulted in staff becoming passionate about performance measurement and more accepting of constructive feedback. This was the game changer in achieving or cascading the vision and objectives of the organisation from the top management down to the frontline staff, as in Hoshin Kanri (Japanese word for strategy deployment or compass management). According to Jackson (2013), this process enables fast and accurate decision making, improves communication, maintains alignment, speeds information gathering and creates a sense of team integration [21].

The Kaizen workshop gave the staff the opportunity to have clarity and consistency in clinical procedures. However, some staff were initially resistant as they felt the visual management board was a naming and shaming process. This resistance delayed adherence to the documentation requirements and subsequently reduced compliance of the subsequent procedures. However, the clinical seniors and other enthusiastic junior staff could provide the consistent daily leadership that gradually converted the resistant staff. According to Liker and Meier (2007), when implementing Lean methodology, it is important to first concentrate on those staff who are willing to improve rather than those who will resist [22].

Contrary to the belief of many, that visual management board systems should be sophisticated electronic devices, the team utilised an ordinary cork board. An ordinary board, otherwise known as a visual management board, is any communication device that can be used in the work environment and tells at a glance the status of the work in process, information critical to the flow of healthcare and how the department is performing against set standards. The visual management board can communicate to staff who are keen to improve their work output and they will be able to visualise the status of their work at a glance and rectify anomalies to avoid deviating from the standard. Visual management boards do not need to be costly devices or IT systems. The most important aspect in visual control is active involvement of staff in the setting up process. If the visual management board is simple and people orientated, teams are more encouraged to achieve good results. This is not disregarding the power of computer systems and reduction of use of paper, but working from a virtual world has some disadvantages and these include:

1. Removing the hands-on teamwork processes;
2. Communication and sharing of responsibilities in teams. Several team members had different responsibilities that required constant reminders for each other; for example, generating the data, updating the visual management board and huddles. All the above-mentioned processes are common when utilising the traditional visual management boards as evidenced by the team during and after the workshop. Staff had to constantly communicate to each other which improved the team work experience.

Engaging staff in discussions at the visual management board design stage realised several benefits which included:
1. Alerting the staff about new consumer requiring metabolic screening
2. Ensuring that they took ownership of the clinical processes and their own workload to sustain the gains; and
3. Eradication of the idea that 'management is setting up work controls for us' and the 'naming and shaming' syndrome.

Funk *et al.,* (2009) concur with the notion of involving and empowering mental health staff to identify their own solutions to problems rather than waiting for decisions from management [23]. Senior managers should facilitate and provide the right environment for staff to improve the services, provide intelligent analysis of situations, and create and embrace change [24].

The project gave the team confidence that Lean implementation in rural community healthcare services is, in fact, an attainable goal. When the principles were implemented creatively, improvements of metabolic screening and other quality indicators improved in a short period of time [25,26].

Conclusion and Implications of Study

The findings of this paper highlight an increase in mental health consumers' participation in metabolic screening through collaborative working between secondary and primary healthcare professionals. The results also showed the improvement in staff awareness to offer consumers an opportunity to participate in metabolic screening and recording in the right field to ensure an auditable performance measurement process.

The study shows that once a process is developed, there is a need for discipline and regular follow up to check and improve the process continuously to subsequently improve consumer outcomes. The other contributing factor is involvement of the people that do the work to create the system that works.

Improved information flow results in improved consumer flow and outcomes. Effective collaborative working between GPs and community mental health teams can increase engagement of mental health consumers in metabolic screening. It also ensures that when anomalies are detected they can be addressed quickly through their GPs. Therefore, mental health consumers will not always be dependent on community mental health staff for their healthcare thereby ensuring smooth navigation for the consumers between primary and secondary healthcare. Moreover, they will not rely on mental health staff for such needs as depot injections; thus, creating more capacity for rural small-sized teams to focus on providing crisis interventions for those consumers with greater needs. That practically enhances case managers negotiating skills with the consumers and GPs as well as consumers' general recovery and independence. In addition, collaborative working with GPs ensures that consumers with schizophrenia will not be under secondary mental healthcare services for life merely due to their diagnosis. Provision of care will be provided by the appropriate service at the right time based on acuity and needs rather than the disease. However, the authors acknowledge that there will be a few consumers who will not engage with GPs, especially in rural areas, and for that small group of consumers it will be necessary for community mental health teams to conduct the metabolic screening. Nevertheless, the problem is when anomalies are detected, interventions would not be easily provided as the consumer would not have engaged with a GP.

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