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DIGITAL HEALTH INFORMATICS TO MONITOR THE QUALITY OF INDIVIDUAL PLACEMENT AND SUPPORT MODEL OF SUPPORTED EMPLOYMENT SERVICES IN MALAYSIA

Bin Ismail Ishak[1], Normal Mat Jusoh[2], Jasmy Yunus[2], and Abdul Kadir Abu Bakar[1]
[1]Hospital Permai R&D, JB, Johor, Malaysia
[2]Universiti Teknologi Malaysia, Skudai, Johor, Malaysia
E-Mail: prof_ishak@hotmail.com

ABSTRACT

There is overwhelming evidence which shows that individual placement and support model of supported employment (IPS-SE) do help in the recovery of mentally ill clients. Presently, IPS-SE implementation is adhoc and non-integrated in nature. Employment services are segregated. On such developmental trajectory, it will be difficult to sustain quality implementation of IPS-SE. This has motivated the Director of Hospital Permai JB Johor to work with Universiti Teknologi Malaysia (UTM) Faculty of Computing to develop a system of digital health informatics via Permai Virtual Hospital Network (DHI-PVHN). Using DHI-PVHN, it will be possible to (a) have a clear and current view of the impact of mental illness on labour force activity, (b) effectively integrate vocational assistance with mental treatment and care, (c) produce accurate financial planning which will make implementation of IPS-SE a sustainable endeavor, and (d) strengthen the intensity and the continuity of individualised help in IPS-SE. This paper describes the DHI-PVHN user centred design pilot project carried out two years ago and describe the criteria used and the theory behind the use of the criteria. The pilot project has indicated that Hospital Permai JB Johor and Hospital Alor Star Kedah have implemented IPS-SE well. Success in the implementation of IPS-SE depends on the relative potential employment opportunity at the locality of the IPS-SE service provider. It also depends on certain management constraints of the IPS-SE service provider.

Keywords: digital health informatics, permai virtual hospital network, mentally ill clients, individual placement and support model of supported employment, individual placement and support, vocational rehabilitation, and dartmouth college fidelity scale.

INTRODUCTION

Individual placement and support model of supported employment (IPS-SE)

IPS-SE stands for individual placement and support model of supported employment where people with disabilities are given the opportunity to earn an income through normal employment. All necessary support and guidance are provided to them to sustain employment and to help them develop a career. IPS-SE supports people in their efforts to achieve steady employment in mainstream competitive jobs, either part-time or full-time. This stands in contrast to other vocational rehabilitation approaches that employ people in sheltered workshops and other set-aside jobs.

Implementation of IPS-SE in Malaysia

In 2009, Hospital Permai JB Johor took the initiative of implementing individual placement and support model of supported employment (IPS-SE) for mentally ill clients (MI) [1]. Subsequently IPS-SE was implemented in four other hospitals in Malaysia. These hospitals were Hospital Bahagia Perak, Hospital Sentosa Sarawak, Hospital Mesra Sabah and Hospital Alor Star Kedah. In due course, Hospital Sentosa was unable to continue implementing IPS-SE programs due to logistic as well as management problems.

The objective, aim and rationale for developing a system of digital health informatics via permai virtual hospital network (DHI-PVHN)

A system of digital health informatics via Permai Virtual Hospital Network (DHI-PVHN) was developed because implementers of vocational rehabilitation (VR) for MI had realized that IPS-SE, which was developed in the United States before 2003, required certain committments from IPS-SE providers. IPS-SE model is simple and effective. However, it needs facilities, staff support, feedback and continuous corrections and improvement from the feedback which can be facilitated by a system of digital health informatics. With useful digital health informatics, the benefits accruing for MI with consistent work on the job and their work outcomes improve over time. According to Becker, *et al*. [2] , there is a very good probability that IPS-SE could end up as competitive employment. This is because a system of digital health informatics can effectively support IPS-SE service providers' approach to rapid job search and sustain job maintenance and job retention for MI. As there will be early involvement of MI in the timing of the job search and in the assessment to ensure that the job matches MI preferences, motivation towards job engagement will be greatly enhanced.

With the help of DHI-PVHN user centred design pilot project, Hospital Permai Johor Bahru did a preliminary audit on the implementation of IPS-SE as a process of continuous improvement [3]. This preliminary audit exercise was to look at how work environment affects quality of life of MI. In Hospital Permai Johor

Bahru, IPS-SE is considered as a model of human occupation (MOHO) based intervention. Occupation in MOHO definition is any activity which MI is occupied in, including IPS-SE. This approach has been taken because modern care for MI considers activities of employment as an important driver for recovery. As disability is defined as the relationship between access and integration into the environment and is influenced by personal capacities, environmental characteristics, and the kind of activity or occupation performed [4], comparison of the influence of work environment on the personal life of MI (that is his/her quality of life) can be used as a measure of the effectiveness of the intervention employed. The importance of quality of life (QOL) in assessing recovery has been accepted within health professionals [5]. Analysis on the data collected in the preliminary audit study shows that the influence of work environment on the quality of life for MI is about the same regardless whether MI have been selected for IPS-SE in places of work in competitive employment job places or in job sectors within the protective areas of Hospital Permai Johor Bahru. The ability of MI to cope with employment in the harsh environment of the outside world is due to the new concept implemented in the organization of IPS-SE.

Digital health informatics system via permai virtual hospital network (DHI-PVHN)

The overall aim of DHI-PVHN is to manage IPS-SE in a sustainable manner and to improve the quality and efficiency of mental health care in Malaysia. Permai Virtual Hospital Network is a local cloud for the management and monitoring of IPS-SE, Preventive Mental Health Care and Trauma. It handles a variety of clinical information systems that support communication and collaboration, targeting broader or more specific settings, such as electronic health records, decision-support applications, and patient management systems. Over the last decade, patients have become more empowered in the decision making of their own treatment and care, leading to increased interest in patient-centered e-health services such as telehomecare platforms, personal health records, and consumer-oriented mobile apps. The purpose of these services is to enable patients to engage in self-management and exchange experiences and advices to better cope with day-to-day personal health issues.
DHI-PVHN focusses on

- Exploring the potentials and preconditions for adequate e-health services meant for IPS-SE
- Designing e-health services that assist aligning the concerns of patients and clinicians
- Designing IT-support for cooperation among all IPS-SE providers

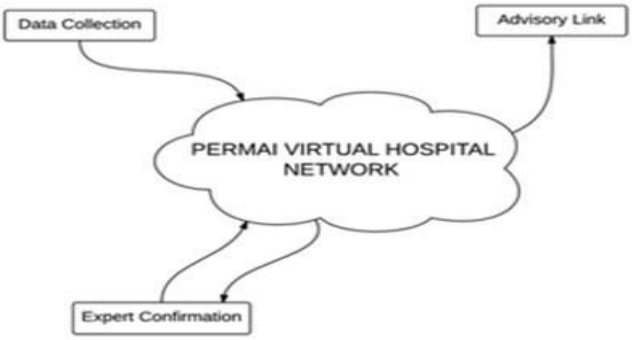

Figure-1. Conceptual structure of DHI-PVHN.

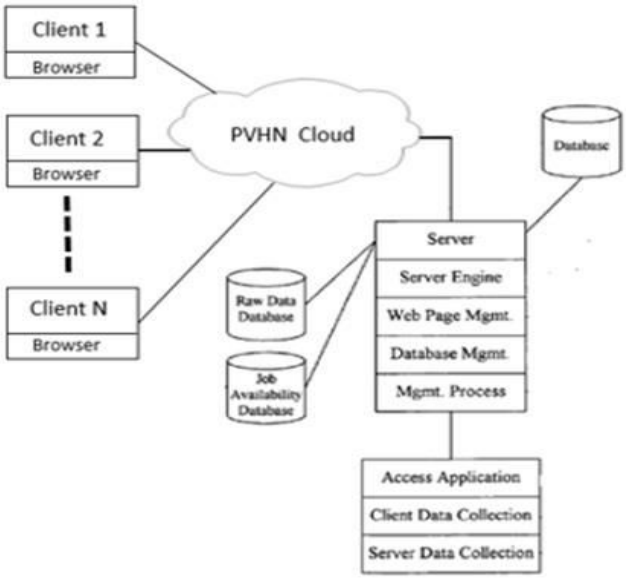

Figure-2. Architecture of DHI-PVHN.

Conceptually, DHI-PHVN requires data collection facilities, Expert Confirmation Window and Advisory Link (refer to Figure-1). Expert confirmation is required because data obtained has to be in conformity with Good Clinical Practice [6]. Advisory Link allows IPS-SE service providers (Hospitals) to communicate with one another. The architecture of DHI-PVHN is shown in Figure-2. This architecture allows IPS-SE service providers to communicate with the cloud and with one another via their terminals (Client GUI). The server handles all information pertaining to the implementation of IPS-SE as well as information on job availability.

In order to coordinate service delivery in accordance with the embodiment of total quality, the elements of DHI-PVHN are structured as in Figure 3. The management process module in the architecture of DHI-PVHN ultimately proceed to estimate the outcomes from the information platform. That is, the process moves from the archive stage to the evaluation stage (refer to Figure-3). The needed outcomes are (a) IPS-SE Providers' Management Fidelity Criteria (b) IPS-SE Providers' Performance Fidelity Criteria, and (c) IPS-SE service providers' organisational and staffing characteristics

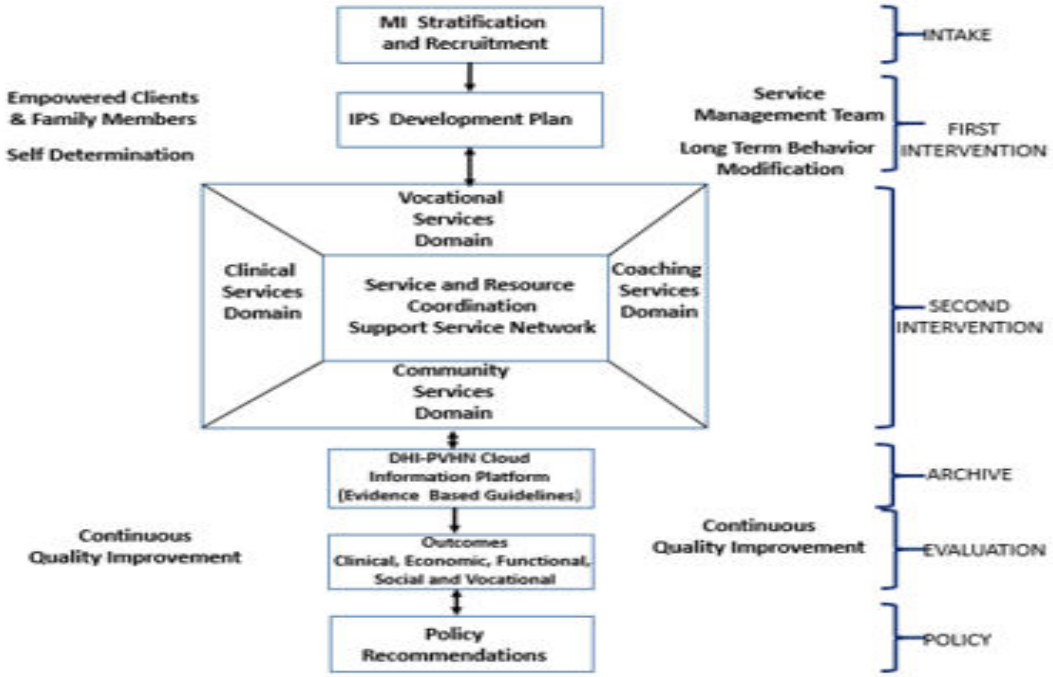

Figure-3. Elements of DHI-PVHN: Coordinate service delivery network in accordance with an embodiment of the innovative arrangement.

Table-1. Indicators for DCFS.

Staffing	
staf01	Caseload size
staf02	Employment services staff *
staf03	Vocational generalists *
Organisation	
orgn01	Integration of rehabilitation with mental health through team assignment
orgn02	Integration of rehabilitation with mental health through frequent team member contacts
orgn03	Collaboration between employment specialists and vocational rehabilitation counsellors
orgn04	Vocational unit
orgn05	Role of employment supervisor
orgn06	Zero exclusion criteria
orgn07	Agency focus on competitive employment
orgn08	Executive Support for SE **
Services	
serv01	Work incentives planning
serv02	Disclosure
serv03	Ongoing, work-based vocational assessment
serv04	Rapid search for competitive job *
serv05	Individualised job search
serv06	Job development - frequent employer contact **
serv07	Job development - quality of employer contact **
serv08	Diversity of job types
serv09	Diversity of employers
serv010	Competitive jobs
serv011	Individualized follow-along supports
serv012	Time unlimited follow-along supports *
serv013	Community-based services **
serv014	Assertive engagement and outreach by integrated treatment team **

Items which are critical components in the implementation of IPS-SE are marked with one star (*) while items which are critical as well as key components in the implementation of IPS-SE are marked with two stars (**).

Table-2. DCFS scores for IPS-SE providers (centers) in Malaysia.

No	Criteria	Hospital Permai	Hospital Tg Rambutan	Hospital Sentosa	Hospital Bukit Padang	Hospital Alor Star
Staffing				5 staff – 1 U32 and 5 U29 No supported Employment due to: 1. Transport problem 2. Unable to claim mileage 3. No newspaper – unable to get new job/job bank 4. To start voc. rehab		
1.	Caseload size	5	5		5 (4 = 26 pt (1ot and 3 nurse) = 7/6	5
2.	Employment services staff	5	5		5	5
3.	Vocational generalists	5	5		5	5
Organization						
1.	Integration of rehabilitation with mental health thru team assignment	5	5		5	5
2.	Integration of rehabilitation with mental health thru frequent team member contact	5	3		3	4
3.	Collaboration between employment specialists and Vocational Rehabilitation counselors	1 if remain VC 5 if VC =specialist	1		1	1
4.	Vocational unit	5	1		2	2 (monthly basis)
5.	Role of employment supervisor	4	2		2	4
6.	Zero exclusion criteria	5	4		4	5
7.	Agency focus on competitive employment	5	2		2	5
8.	Executive team support for SE	4	1		1	1
Services						
1.	Work incentives planning	5	1		1	5
2.	Disclosure	5	3		3	5
3.	Ongoing, work-based vocational assessment	5	4		4	5
4.	Rapid search for competitive job	5	4		4	5
5.	Individualized job search	5	4		4	5
6.	Job development- Frequent employer contact	4	2		2	4
7.	Job development- Quality of employer contact	5	3		3	5
8.	Diversity of job types	5	2		2	5
9.	Diversity of employers	5	3		3	5
10.	Competitive jobs	5	2		2	5
11.	Individualized follow-along supports	4	2		2	4
12.	Time-unlimited follow-along supports	5	4		4	4
13.	Community-based services	5	2		2	5
14.	Assertive engagement and outreach by integrated treatment team	5	3		3	5
	Total	116	73 fair		74 fair	109 good

Hospital Tg. Rambutan = Hospital Bahagia Perak; Hospital Bukit Padang= Hospital Mesra Sabah

Total quality concept in the implementation of IPS-SE

Apart from doing an internal auditing in the implementation of IPS-SE, it is also necessary for DHI-PVHN to look at the total quality measure of the execution of IPS-SE. It is important to see how IPS-SE meets the quality expectation as defined by the stakeholders. When there are more than one implementers of IPS-SE, it is essential to have a best practice, which can be referred to, so that there is integration of organizational effort designed to improve quality of processes at every implementation level to increase efficiency and reduce cost. Whether IPS-SE has been implemented as planned and whether or not IPS-SE has resulted in the desired outcomes are two issues to be addressed. With the move to consider IPS-SE as evidence based practices, providers of IPS-SE will require certain guidance to ensure that they are able to provide and sustain high quality services.

IPS-SE providers' management fidelity criteria

Using the frame-work suggested by Uperati, G. *et al*. [7] and Glasgow R.E. *et al*. [8], fidelity criteria can be analysed using the IPS-SE implementation fidelity model shown in Figure 4. Staffing interacts with the organization to provide services which may require external input. There is a feedback loop which provides information that enable staffing, organization and services be adjusted to bring about maximum performance. Hence fidelity criteria require the following optimization conditions:

$$\sum \text{Performance of Staffing} + \sum \text{Performance of Organization} + \sum \text{Quality of Service} = B = \text{High} \quad (1)$$

$$\sum \text{Staffing Cost} + \sum \text{Organizational Cost} + \sum \text{Service Cost} = C = \text{Low} \quad (2)$$

Figure-4. IPS-SE implementation fidelity model.

If *B* from equation. (1) can be given a value, then the fidelity criteria will provide a quantity which can indicate how efficiently the provider can provide the service. That is:

$$\text{Return of investment for the services provided} = R = \frac{B-C}{C} \quad (3)$$

It makes good sense to aim for positive high value of *R*. In the case of government hospitals, where service to the people is more important than profit, negative value of *R* is expected. However, it is prudent to keep |*R*| as small as possible.

IPS-SE PROVIDERS' PERFORMANCE FIDELITY CRITERIA

The purpose of fidelity scale

Fidelity Scale has been developed to facilitate IPS-SE providers to evaluate the implementation of IPS-SE. This is required to ensure that IPS-SE providers adhere to specific implementation standards. Dartmouth College fidelity scale (DCFS) is a widely used fidelity scale to gauge the quality of the implementation of IPS-SE [9]. A DCFS score of 115 – 125 indicates that the IPS-SE providers have implemented IPS-SE in an exemplary manner. A DCFS score of 100 – 114 is an indication that IPS-SE implementation has good fidelity while a DCFS score of 74 – 99 shows that IPSE implementation has fair fidelity. A DCFS score of 73 and less means that IPS-SE has not been implemented according to the required standard.

Measuring IPS-SE providers' fidelity scale

IPS-SE Providers' Performance Scale used by the DHI-PVHN is sourced from Dartmouth Psychiatric Research Centre, USA [9]. Dartmouth College fidelity scale (DCFS) is ideal for use in any longitudinal study to compare the performance of IPS-SE facilitated by the same provider at different times. DCFS does not take into consideration the costs involved. It is an assessment using 25 items enquiries directed to IPS-SE service providers who are required to respond using Linkert Scale 5 multiple choice answers. From the 25 items, 3 items concern staffing, 8 items concern organization and 14 items concern services provided.

The staffing items investigate the practices of IPS-SE service providers regarding the caseload size used. Employment specialists have different caseloads which range from 20 or less to 41 or more clients. The staffing items also look into time measured work load of specialists and the responsibilities of vocational generalists.

The organizational items deal mainly on Vocational Rehabilitation (VR) matters while the services items focus on job matters. The indicators for the IPS-SE fidelity scale are shown in Table-1.

IPS-SE PROVIDERS' ORGANIZATIONAL AND STAFFING CHARACTERISTICS

There is some problem in using DCFS to compare IPS-SE fidelity of different IPS-SE providers directly due to the differences in the staffing, organisational set up and the number of in-patients as well as out-patients which these IPS-SE providers have been made to cater for. However, it may be possible to compute IPS-SE organisational and staffing characteristics (SEOSC) which can allow planners to see ways of optimizing IPS-SE fidelity for a group of IPS-SE providers.

Let f_j = the fidelity real data value at centre (IPS-SE provider) j.

Let x_{ij}= the i^{th} organisational and staffing item components at centre j.

If DCFS is a j^{th} dimensional vector [f_1 ,f_2 ,f_3 , ……, f_j] then

$$[f_1 , f_2 , f_3 , \ldots\ldots , f_j] = [a_1 , a_2 , a_3 , \ldots\ldots , a_i] \begin{bmatrix} x_{11} & x_{12} & x_{13} & \ldots\ldots & x_{1j} \\ x_{21} & x_{22} & x_{23} & \ldots\ldots & x_{2j} \\ x_{31} & x_{32} & x_{33} & \ldots\ldots & x_{3j} \\ . & . & . & & . \\ . & . & . & & . \\ x_{i1} & x_{i2} & x_{i3} & \ldots\ldots & x_{ij} \end{bmatrix}$$

In matrix form, this equation is

$$F = AX \quad (4)$$

Since the elements of X are always positive, F is optimum if all the elements of A have high positive values. The vector A can be considered as the IPS-SE organisational and staffing characteristics (SEOSC) for the

group of centres (IPS-SE providers) If a_k is negative, then the organisational and staffing item components x_{kl} (for all l = 1, 2, 3… j) do not contribute to IPS-SE fidelity.

IPS-SE FIDELITY DATA COLLECTION USING DHI-PVHN

Using DHI-PVHN**,** DCFS scores for 4 hospitals in Malaysia were collected in 2013. These hospitals were Hospital Permai JB Johor, Hospital Bahagia Perak, Hospital Mesra Sabah and Hospital Alor Star Kedah. Hospital Sentosa Sarawak was unable to implement SE fully because of organisational problems. DCFS figures were tabulated as in Table 2. In 2013, the total DCFS scores for Hospital Permai, Hospital Bahagia, Hospital Mesra and Hospital Alor Star were 116, 73, 74 and 109 respectively. According to the DCFS manual (i) a score of between 115 and 125 would indicate that the IPS-SE provider (centre) had implemented IPS-SE service with exemplary fidelity (ii) a score of between 100 and 114 would indicate that the IPS-SE provider (centre) had implemented IPS-SE with good fidelity (iii) a score of between 74 and 99 would indicate that the IPS-SE provider (centre) had implemented IPS-SE with fair fidelity. Any score below 74 would indicate that the centre was not providing IPS-SE service in the way recommended by DartmouthCollege [9].

Resulting outcomes from DHI-PVHN pilot project

High total DCFS scores would indicate that (i) the IPS-SE provider (centre) had the right staffing and the right organisational set up to implement IPS-SE, (ii) the IPS-SE provider (centre) had the right leaders to catalyse effective IPS-SE and to motivate MI towards self coping and self reliance. Yet, it will be difficult to look at the overall picture and compare one IPS-SE provider (centre) with another. This is because organisation and staffing item components for the different IPS-SE providers (centres) are dissimilar, as illustrated in Table-3.

Table-3. Background data relating to organization and staffing item components.

Hospital or SE providers (centres)	Total in-patient In 2013	Total out-patients 2013	Total occupational therapists in 2013	Total psychiatrists in 2013	Total medical officers in 2013	Total staff nurse in 2013
Hospital Permai JB Johor	19,978	2,278	10	3	2	-
Hospital Alor Star Kedah	299	804	3	1	4	-
Hospital Mesra Sabah	-	102	1	1	-	3
Hospital Bahagia Perak	10,290	-	7	1	-	-

However, the data of Table 2 and Table 3 can be used to form a pattern which can characterise the manner IPS-SE was implemented in Malaysia for all the IPS-SE providers (centres).From Table-2,

F= $[f_1, f_2, f_3, \ldots\ldots f_j]$ .For this paper f_1= total fidelity of Hospital Permai, f_2 = total fiudelity of Hospital Alor Star, f_3 =total fidelity of Hospital Mesra and f_4 = total fidelity of Hospital Bahagia. Hence using Table 2,

F = [116, 109, 74, 73].

Using Tables-3, 4 and 5, it is possible to obtain the matrix X of equation (4).That is

$$X = \begin{bmatrix} 19.97 & 0.299 & 0 & 10.29 \\ 2.278 & 0.804 & 0.102 & 0 \\ 5 & 5 & 1 & 1 \\ 10 & 3 & 4 & 7 \end{bmatrix}$$

Using equation (4), the vector A can be computed to give

A = [- 4.655, - 6.250, 14.07, 15.152] ….. (5)

The vector A will provide an indication to the planner which organisation and staffing item components that contributes towards fidelity of SE program. From the 2013 data, the vector A indicates that the number of in-patients and out-patients do not contribute to the fidelity of IPS-SE implementation. However, increasing the number of medical and vocational specialists will enhance fidelity of IPS-SE implementation. The data also show that vocational specialists are a little more important than medical specialists in as far as fidelity of IPS-SE is concerned (refer to Table 5). The number of out-patients is more detrimental to the fidelity in the implementation of SE when compared to the in-patients.

Table-4. Providers of fidelity real data.

j	Providers (centres) where fidelity real data were measured	Associated parameters
1	Hospital Permai JB Johor	x_{i1}
2	Hospital Alor Star Kedah	x_{i2}
3	Hospital Mesra Sabah	x_{i3}
4	Hospital Bahagia Perak	x_{i4}

Table-5. Organization and staffing item components.

i	Organisation and staffing item components	Associated parameters
1	In-patients (organisation)	x_{1j}
2	Out-patients (organisation)	x_{2j}
3	Medical specialists (staffing)	x_{3j}
4	Vocational specialists (staffing)	x_{4j}

Cook [10] carried out a large multi-site study. He discovered that people with serious mental illness who were accessing supported employment services and living in areas with high unemployment rates were less likely to be working. The data obtained from DHI-PVHN is consistent with the results obtained by Cook [10].

Referring to Table-6, the total number of manufacturing and service projects (695) and the potential employment (73,313) in the area close to Hospital Permai for the years between 2006 till 2009 were high. These high figures resulted in high DCFS score of 116 in 2013.

Hospital Alor Star Kedah had a DCFS score of 109 in 2013. This was due to the fact that for areas near Hospital Alor Star Kedah, the total number of manufacturing and service projects during the 4 years between 2006 till 2009= 177 while the potential employment = 16,303. Hospital Alor Star Kedah had also the advantage of having high experts/patients ratio = 7.25.

Although the areas near Hospital Bahagia Perak had a higher number of manufacturing and service projects during the years 2006 till 2009 (at 201) and a better potential employment figure of 19,132, DCFS score of Hospital Bahagia Perak could not be as good as that of Hospital Alor Star Kedah because the experts/patients ratio at Hospital Bahagia Perak was low (at 0.78). There was insufficient number of experts to translate the potential employment into successful SE implementation and high value of fidelity score.

The potential employment for areas near Hospital Mesra Sabah was relatively low at 11,917, while the experts/patients ratio was very high at 49.02. For this reason, Hospital Mesra Sabah was able to be at par with Hospital Bahagia Perak who had high potential employment figure (= 19,132) but very low experts/patients ratio (=0.78).

Wehman P. & Kregel J. [11] and McGaughey M. & Mank D. [12] had identified the critical as well as the critical and key components of IPS-SE fidelity. In Table 1, the critical components have been marked with one star (*) while the critical and key components have been marked with two stars (**). Comparing Table 1 and Table 2, it can be observed that the fidelity scale readings (DCFS) for the critical and key components of 2013 IPS-SE fidelity of Hospital Permai JB Johor and Hospital Alor Star Kedah were high while that of Hospital Bahagia Perak and that of Hospital Mesra Sabah were low.

CONCLUSIONS

The DHI-PVHN has been useful in helping in the analysis which revealed several findings:
IPS-SE providers are considered to perform with high fidelity if IPS-SE is implemented effectively and successfully. High fidelity is achieved if conditions in equations (1) and (2) are optimum.

Effectiveness in implementing IPS-SE depends on potential employment of the area in which the IPS-SE provider is situated in. MI who are accessing supported employment services and living in areas with high employment rates are more likely to be working.

The success of IPS-SE implementation also depends on the number of experts and the experts to patient's ratio. Vocational experts are occupational therapists and specialist nurses. The main purpose of vocational experts is to implement interventions which enable MI engage in everyday life through the performance of occupations that foster well-being and self-reliance. Vocational experts help MI in coping with stress, fear and uncertainty [13]. Medical experts are clinical psychiatrists who specialize in using clinical practices in the treatment of mental illnesses and disorders. Effective implementation of IPS-SE can be brought about when vocational experts and medical experts work as a team. IPS-SE providers with a higher percentage of experts per number of MI served in the community support program provide greater access to IPS-SE services. A larger number of experts who provide IPS-SE services translate into greater service capacity.

The critical and key components of supported employment as described in the Supported Employment Fidelity Scale are related to work outcomes. IPS-SE providers which fully implement the critical and key components of IPS-SE have better work outcomes. DHI-PVHN has shown that IPS-SE providers will be able to implement IPS-SE successfully and hence have high values of IPS-SE fidelity scale readings (DCFS) if they put emphasis on the importance of implementing the critical and key components of the IPS-SE practice rather than adapting the model to local conditions. Effective implementation of critical and key components of IPS-SE require management leadership committed to the welfare of MI. IPS-SE providers which have good track record of IPS-SE implementation have successfully created an organisational culture which embraces all the requirements of evidence-based psychiatric treatment, healing and rehabilitation.

DHI-PVHN has also shown that fidelity of IPS-SE implementation is not affected by increasing the number of in-patients or out-patients. However, the fidelity of IPS-SE implementation can be increased by enhancing the number of vocational and medical experts. This result opens opportunities for deinstitutionalized IPS-SE implementation with vibrant participation of the community. There is a need for members of the

community to partake in activities which can help MI to be assimilated back into their midst.

Table-6. Effect of employment rates and experts/patients ratio on IPS-SE [Extracted from MIDA (2006) (2007) (2008) (2009) and from Ministry of Health Malaysia] sourced from [14].

Hospital	Year	No of Manuf. and Service Projects close to the Hospital	Potential Employment for the area close to the Hospital	Number of Medical and Vocational Experts per 1,000 patients in 2013
Hospital Permai JB Johor Total: No of Experts in 2013 =15	2006 2007 2008 2009 2013	221 288 173 113 695	21,226 25,772 17,192 9,123 73,313	0.67
Hospital Alor Star Kedah Total: No of Experts in 2013 =8	2006 2007 2008 2009 2013	59 46 46 26 177	5,180 5,288 3,217 2,618 16,303	7.25
Hospital Mesra Sabah Total: No of Experts in 2013=5	2006 2007 2008 2009 2013	75 41 40 17 173	4,682 2,820 3,244 1,171 11,917	49.02
Hospital Bahagia Perak Total: No of Experts in 2013=8	2006 2007 2008 2009 2013	62 59 50 30 201	4,112 8,353 4,792 1,895 19,132	0.78

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