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Physical Function for Adult Patients with Maintenance Hemodialysis in Baghdad City

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Abstract:*The purpose of this study was to assess the physical function among the adult patients with maintenance hemodialysis (MHD). A descriptive analytical design study for (100) male and female patients who have been attending hemodialysis centers was effectuated to achieve the objectives of the study. The period of the study was from 2nd of November, 2015 to 2nd of May, 2016). To meet the study objectives questionnaire was constructed, and then conducted in six hemodialysis units at Baghdad teaching hospitals. The questionnaire consisted of three parts: the first part includes seven items of demographic characteristics: gender, age, marital status, educational level, occupational status, monthly income and residence; the second part concerning with Clinical characteristics was deal with the hemodialysis patients which included seven items: duration of hemodialysis, frequency of hemodialysis session, diabetes mellitus, hypertension, body mass index (BMI), hemoglobin rate, and serum albumin rate; The third part deal with physical function which consist of fifteen items. These items are covers Basic activities of daily living (BADL) (1-7) items and intermediate activities of daily living (IADL) (8-15) items. Reliability of the questionnaire was determined through pilot study and validity determined through a panel of experts consists of (20) experts. The majority of hemodialysis patients have decline in physical function at low level. The physical function for hemodialysis patient was significant with many variables which include (age, marital status, educational level and occupational status, frequency of hemodialysis session, diabetes, BMI, hemoglobin rate and serum albumin rate). The present study recommends; the Hemodialysis nurses who deal with patients must be taught that timely follow-up and evaluations of Physical function is essential to the care of patients. A simple manual booklet and ongoing Education for patients with end stage renal disease (ESRD) is necessary to initiate in predialysis stage and after maintenance dialysis to enhance their knowledge about the illness, treatment, complications and ways to alleviate and adapt for it that consequently improve their physical function impairment. Set up a counseling room in the hemodialysis centers to enhance functional status for patients with appropriate referral system.*

Keywords: *ESRD, Hemodialysis, Physical Function*

I. Introduction

Chronic Kidney Disease (CKD) is a serious condition when the loss of renal function progressively occurs usually within a course of several years. It can be caused by the factors such as cardio-vascular disease, hypertension, diabetes, and obesity among others. If untreated it can progress to the End-Stage Renal Disease (ESRD) and dialysis treatment or kidney transplant would be needed [1].

Hemodialysis is the main form of renal replacement therapy used worldwide. The dose of dialysis is the most important modifiable determinant of survival in patients with end-stage renal disease who are receiving hemodialysis [2].

In hemodialysis patients, physical inactivity may be even worse, due to the frequent presence of different co-morbidities, such as anemia, uremic, neuro and myopathy, bone and mineral disorders, cardiovascular abnormalities, and depression. As an additional factor, the 12-hour a week dialysis period may contribute to hemodialysis patients' inactivity [3].

Hemodialysis therapy interferes with the person's normal life, preventing or limiting the carrying out of daily routine activities, as these often cause physical incapacity and emotional [4].

Patients with ESRD are characterized by low levels of physical activity and a continuous decline in physical function. Observational studies have revealed that physical inactivity is associated with increased mortality in these patients. Patients have a substantial and sustained decline in functional status, especially during the period before and after initiation of dialysis, in addition to a dramatically high mortality [5].

A low level of physical fitness is associated with significant impairment of daily activities, including those related to self-care (e.g., bathing, housework, dressing, and shopping), paid work, functioning in the community, and recreation. It is unknown to what extent limitations in physical functioning are inevitably results of renal failure and/or dialysis treatment and to what extent a result of reduced physical activity [6].

II. Objectives of the Study

The study aims at: (1) to determine the physical function level among the adult patients with maintenance hemodialysis (MHD); (2) to find out the relationship between physical function for hemodialysis patients and their Demographic characteristics; (3) to find out the relationship between patients' physical function and their clinical characteristics.

III. Methodology

A descriptive analytical design study was effectuated to achieve the objectives of the study. The period of the study was from 2nd of November, 2015 to 2nd of May, 2016). A purposive (non-probability) sample of (100) male and female patients who have been attending at six hemodialysis centers, were selected from Baghdad teaching hospitals. All adult patients were scheduled for hemodialysis. Subjects for this study met the following criteria: 1) Adult patients 18 years and above, 2) Patients who are diagnosed with end stage renal failure (ESRD), 3) Patient who is ongoing hemodialysis therapy at least (3) months, & 4) Patients who accepted to participate in the current study. To meet the study objectives a questionnaire was constructed. This questionnaire consisted of three parts: the first part includes seven items of demographic characteristics: gender, age, marital status, educational level, occupational status, monthly income and residence; the second part concerning with Clinical characteristics was deal with the hemodialysis patients which included seven items: duration of hemodialysis, frequency of hemodialysis session, diabetes mellitus, hypertension, BMI (height and weight), hemoglobin rate, and serum albumin rate; The third part deal with physical function which consist of fifteen items. These items are covers Basic activities of daily living (BADL) (1-7) items and intermediate activities of dailyliving (IADL) (8-15) items. These items were rated on three-point Likert rating scale. The score was (1= always, 2= sometimes and 3= never). Three levels suggested for assessment of physical function according to their cutoff point (1-1.66 = low level, 1.67-2.33= moderate level and 2.34-3= high level). Reliability of the questionnaire was determined through pilot study and validity determined through a panel of experts consists of (20) experts. Data collected by; 1) Revision of the hemodialysis patient chart, 2) Self report and a structured interview technique used for patients who cannot read and write, 3) anthropometric measurement method and blood sample was also used for laboratory investigation. BMI was calculated by special formula ($\text{BMI} = \frac{\text{Body Weight (kg)}}{\text{Height (m)}^2}$). Based on BMI, patients were classified into five groups: underweight (BMI ≤18.4 kg/m2), normal (18.5 to 24.9 kg/m), overweight (25 to 29.9 kg/m2), obese (30 to 34.9 kg/m2 and severely obese (BMI ≥35 kg/m) [7]. Data were analyzed by applying: descriptive statistical (frequencies, percentages and mean of score) and inferential statistical (Independent sample t-test statistic, one-way analysis of variance test and simple linear regression) through the SPSS (Statistical Package for Social Sciences) version 21.0 application Statistical analysis system.

IV. Results

1. Descriptive Data Analysis

1.1: Sample demographic characteristics general description

Table (1) revealed that the majority of study sample (55%) was female and remaining was male, the highest percentage of them were (59-68) years old and accounted for (25%). In regarding the marital status, the majority of sample (83%) was married. According to educational level, the highest percentage of them was Illiterate and they consist of (30%). Relative of occupational status, the most of them (43%) were Housewife. Concerning the monthly income, the majority of the study sample (69%) was barely sufficient. Finally, the residence (87%) was from urban residence.

Table 1. Distribution of the study sample according to their socio-demographic characteristics

Variables	Groups	Frequency	Percent
Gender	Male	45	45.0
	Female	55	55.0
	Total	**100**	**100.0**
Age (Years)	19-28	5	5.0
	29-38	11	11.0
	39-48	16	16.0
	49-58	23	23.0
	59-68	25	25.0
	≥ 69	20	20.0
	Total	**100**	**100.0**
	(Mean & SD) = 54.5±15.2		
Marital Status	Single	10	10.0
	Married	83	83.0
	Divorce	2	2.0
	Widow	5	5.0
	Total	**100**	**100.0**
Educational Level	Illiterate	30	30.0
	Read & Write	15	15.0
	Primary	24	24.0
	Intermediate	8	8.0
	Secondary	8	8.0
	Institute	1	1.0
	College	12	12.0
	Advanced Studies	2	2.0
	Total	**100**	**100.0**
Occupational Status	Employee	11	11.0
	Free Job	10	10.0
	Housewife	43	43.0
	Retired	26	26.0
	Unemployed	10	10.0
	Total	**100**	**100.0**
Monthly Income	Sufficient	18	18.0
	Barely Sufficient	69	69.0
	Insufficient	13	13.0
	Total	**100**	**100.0**
Residence	Urban	87	87.0
	Rural	13	13.0
	Total	**100**	**100.0**

1.2: Sample clinical characteristics general description

The Results of table (2) show that the (42%) duration of hemodialysis was at (3-11 months). According to the frequency of hemodialysis session, the majority of study sample were (44%) at 2 sessions weekly. In addition to, the high percent of them (68%) were no diabetes, and (84%) have hypertension. Concerning the BMI, the high percentage was (38%) overweight. Finally, the majority of study sample (95%) have anemia and (77%) have normal serum albumin rate.

Table 2. Distribution of the study sample according to their clinical characteristics

Variables	Classifications	Frequency	Percent
Duration of hemodialysis	3-11 months	42	42.0
	1 year	18	18.0
	2 years	10	10.0
	3 years	8	8.0
	4 years	4	4.0
	5 years	4	4.0
	6 years and more	14	14.0
	Total	**100**	**100.0**
	Mean & S.D = 2.4±2.9		
Frequency of Hemodialysis session	3 session weekly	43	43.0
	2 session weekly	44	44.0
	1 session weekly	13	13.0
	Total	**100**	**100.0**
Diabetes	Yes	32	32.0
	No	68	68.0
	Total	**100**	**100.0**
Hypertension	Yes	84	84.0
	No	16	16.0
	Total	**100**	**100.0**
BMI	Underweight	8	8.0
	Normal	37	37.0
	Overweight	38	38.0
	Obese	11	11.0
	Severely obese	6	6.0
	Total	**100**	**100.0**
	Mean & SD = 25.36±3.94		
Hemoglobin rate	Above normal	0	00.0
	Normal	5	5.0
	Below normal	95	95.0
	Total	**100**	**100.0**
	Mean & S.D = 9.7±1.5		
Serum albumin rate	Above normal	0	00.0
	Normal	77	77.0
	Below normal	23	23.0
	Total	**100**	**100.0**
	Mean & S.D = 3.8±0.6		

S.D. = Standard Deviation

1.3: Sample physical function general description

The finding of table (3) revealed that the majority of hemodialysis patients were complaint regarding physical function restriction with high mean score for item (1), while some items of physical function have moderate level in compliances which are (2,3,4,5,6,7,13), and low level in some items (8, 9, 10, 11, 12, 14, 15).

Table 3. Mean of score, standard deviation, and level of patients' physical function items

List	**Physical Function items** (Do you have difficulty in following activities)	Min.	Max.	M.S	S.D.	Assess.
1	Eating?	1	3	2.68	0.510	High
2	Dressing?	1	3	1.96	0.724	Moderate
3	Grooming like; combing hair, brushing teeth, shaving for men, makeup for women?	1	3	2.18	0.716	Moderate
4	Bathing?	1	3	1.76	0.712	Moderate
5	Managing toileting?	1	3	2.23	0.709	Moderate
6	Moving into and out of a bed or chair?	1	3	2.21	0.782	Moderate
7	Walking indoors?	1	3	2.12	0.795	Moderate
8	Walking one block?	1	2	1.35	0.479	Low
9	Walking more than one a block?	1	2	1.03	0.171	Low
10	Climbing flights of stairs without stopping?	1	1	1.00	0.000	Low
11	Doing housework such as moving a furniture, cooking, cleaningor gardening?	1	2	1.02	0.141	Low
12	Doing errands, such as grocery shopping?	1	2	1.10	0.302	Low
13	Using the telephone or other communication devices?	1	3	1.86	0.652	Moderate
14	Driving a car or using public transportation?	1	2	1.12	0.327	Low
15	Doing vigorous activity such as running, lifting heavy objects or participation in strenuous sports?	1	1	1.00	0.000	Low
Total				**1.64**	**0.57716**	**Low**

Min.=minimum, Max.=maximum, M.S. =Mean of score, S.D. =standard deviation, Assess. = level of assessment (1-1.66 low, 1.67-2.33 moderate, 2.34-3 high for three scored)

2. Inferential Data Analysis

2.1: Independent sample t-test statistic was applied to determine the significant difference for physical function by socio-demographic characteristics (gender, and residence) and one-way analysis of variance test was used to determine the significant difference for physical function with by socio-demographic characteristics (age, marital status, educational level, occupational status, and monthly income).

The results of table (4) presented that the physical function has high significant association with patients' age, marital status, educational level, and occupational status, while physical function has no significant association with gender, monthly income and residence.

Table 4. Association between patients' socio-demographic characteristics and physical function

Gender	**Physical function**			**Independent t-test**		
	Frequency	**M**	**S.D.**	**t-value**	**Sig**	**C.S**
Male	45	25.6889	5.28214	1.751	0.083	**N**
Female	55	23.7455	5.70970			
Age	**Physical function**			**One-way ANOVA-test**		
	Frequency	**M**	**S.D**	**F- value**	**Sig.**	**C.S**
19-28	5	31.0000	0.70711	14.169	0.001	**H**
29-38	11	31.0909	1.30035			
39-48	16	27.5625	4.89855			
49-58	23	24.1739	4.75444			
59-68	25	22.7200	5.07871			
69 and more	20	20.0000	3.71342			
Marital status	**Physical function**			**One-way ANOVA-test**		
	Frequency	**M**	**S.D.**	**F- value**	**Sig.**	**C.S**
Single	10	30.8000	1.13529	8.509	0.001	**H**
Married	83	24.0602	5.41981			
Divorce	2	31.0000	0.00000			
Widow	5	19.0000	1.87083			
Educational level	**Physical function**			**One-way ANOVA-test**		
	Frequency	**M**	**S.D.**	**F- value**	**Sig.**	**C.S**
Illiterate	30	21.5333	5.12420	5.758	0.001	**H**
Read & Write	15	22.7333	5.68792			
Primary	24	25.7500	5.61249			
Intermediate	8	25.8750	3.35676			
Secondary	8	23.7500	0.46291			
Institute	1	31.0000	0.00000			
College	12	30.5000	3.34392			
Advanced Studies	2	31.5000	0.70711			
Occupational status	**Physical function**			**One-way ANOVA-test**		
	Frequency	**M**	**S.D.**	**F- value**	**Sig.**	**C.S**
Employee	11	30.0909	3.23897	11.211	0.001	**H**
Free Job	10	29.9000	1.85293			
Housewife	43	22.2093	5.17576			
Retired	26	23.1923	4.84990			
Unemployed	10	27.4000	5.21110			
Monthly income	**Physical function**			**One-way ANOVA-test**		
	Frequency	**M**	**S.D.**	**F- value**	**Sig**	**C.S**
Sufficient	18	25.3333	5.01762	0.463	0.631	**N**
Barely Sufficient	69	24.6667	5.75905			
Insufficient	13	23.3846	5.54585			
Residence	**Physical function**			**Independent t-test**		
	Frequency	**M**	**S.D.**	**t-value**	**Sig.**	**C.S**
Urban	87	24.4483	5.42123	-0.795-	0.429	**N**
Rural	13	25.7692	6.67275			

M=mean, SD= standard deviation, F-value= computed value for Observed-F, t-value= computed value for observed-t, Sig.= significance, C.S.=comparison of significance: ≤0.05=significant, ≤0.001=high significant, & ≥ 0.05=no significant.

2.2: Simple linear regression test was used in the current study to determine the relationship between clinical characteristics variables and patients' functional status.

The analysis of sample linear regression as show in table (5) describes that there is highly significant correlation for diabetes, BMI, hemoglobin rate, and serum albumin rate with physical function and significant correlation with frequency of hemodialysis while there was no significant correlation for duration of hemodialysis and hypertension with physical function.

Table 5. Analysis of simple linear regressions between clinical characteristics and physical function

Independent Variables	Dependent variable (Physical function)					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	C.S
	B	Std. Error	Beta			
Duration of hemodialysis	0.013	0.260	0.005	0.051	0.960	**N**
Frequency ofhemodialysis session	-2.051-	0.791	-.253-	-2.592-	0.011	**S**
Diabetes	4.818	1.099	0.405	4.383	0.001	**H**
Hypertension	1.271	1.524	0.084	0.834	0.406	**N**
BMI	-2.131-	0.534	-0.374-	-3.993-	0.001	**H**
Hemoglobin rate	2.147	0.303	0.582	7.094	0.001	**H**
Serum Albumin rate	6.073	0.628	0.699	9.670	0.001	**H**

Sig.= significance, C.S.=comparison of significance: ≤0.05=significant, ≤0.001=high significant & ≥ 0.05=no significant.

V. Discussion

The a systematically interpretation and discussion of the results that presented according to the objectives of the study with the support of available literatures related studies as following;

1. Discussion of the Socio-Demographic Characteristics for hemodialysis patients (Table-1)

Throughout the data analysis of present study, it has been noticed that the majority (55%) of the study sample were female and remaining were male. This finding disagree with result obtain from study done by Frazao, et al., (2014), which reported that the majority (52.2%) of hemodialysis patients' gender were male [8]. This finding related to most of males in hemodialysis units refused to participate in the present study and boring from recurrent previous studies from different specialized at hemodialysis units in Baghdad

Most of the study sample were at age group (59-68) years old and accounted for (25%) with mean and stander deviation (54.5±15.2) years, and this result is in line with Palamidas, et al., (2014), who indicate that the majority of hemodialysis patients' age with mean and stander deviation (52.0±11.0) years [9].

Concerning marital status, the majority (83%) of study sample was married, and this result is supported by Li, et al., (2014), which showed that the most of hemodialysis patients (83.8%) were married [10].

According to educational level, the highest percentage (30%) of them was Illiterate, and this finding is closely to study of Kadhum, (2012) who mentioned that the greater number of patients with hemodialysis were illiterate and they were accounted for (22.9%) of the study sample [11].Relative of occupational status, the most (43%) of hemodialysis patients were Housewife. This finding comes along with study of Alharbi (2010), who reported that the majority 35.6% of hemodialysis patients were housewife [12].Regarding the monthly income, the highest percent (69%) was barely sufficient. This result disagrees with Al-Rishawi (2015) who mentioned that the majority (35%) of hemodialysis patients have sufficient monthly income and (35%) of them has insufficient [13].Concerning the residence, the majority (87%) of the study sample was from urban residence, and this result is supported by Guerrero, et al., (2012) who stated that the majority (69.2%) of patients were living in urban areas [14].

2. Discussion of the clinical characteristics for hemodialysis patients (Table-2)

Analysis of clinical characteristics revealed that the majority (42%) forduration of hemodialysis was at (3-11 months) with Mean and stander deviation (2.42±2.93) years. These result disagree with Poveda, et al., (2014) who stated that The duration of dialysis patients ranged from 1 month to 13 years, with 18 (36%) of subjects in treatment between 6 and 10 years [15].According to the frequency of hemodialysis session, the majority (44%) of study sample was at 2 sessions weekly. These result come along with the study of Chandrashekar, et al., (2014) who mentioned that the most (80.2%) of the patients were on twice weekly hemodialysis session. This finding disagreed with many author which stated that the number of hemodialysis session must be between 3 or 4 session per week [16].The result of present study revealed that the (32%) of hemodialysis patients have diabetes and (84%) of them have hypertension. These finding is in line with Hajira, et al., (2013), who stated that the among 66 patients with hemodialysis (84.4%) (n =56) were hypertensive, and (40.9%) (n=27) were diabetic [17].

Concerning the BMI, the high percentage was (38%) overweight with mean and stander deviation (25.36±3.94) kg/m², and this finding is closely to study done by Carreira, et al., (2015) who mention that the mean and stander deviation of BMI were (25.1 ± 5.1) kg/m² for hemodialysis patients [18]. In addition, the study results showed that the majority (95%) of study sample have anemia with mean and stander deviation (9.7±1.5) g /dl for hemoglobin rate. These finding agree with study done by Anees& Ibrahim (2009) who indicated (91.1%) of hemodialysis patient were anemic [19]. Finally, the majority (77%) of study sample have normal serum albumin rate with mean and stander deviation (3.8 ±0.6) g /dl and this result is supported by Foley, et al.,

(2011) who confirmed that the mean and stander deviation serum albumin rate for hemodialysis patients was (3.8±0.5) g / dl [20].

3. Discussion of physical function for hemodialysis patients (Table-3)

Regarding the physical function, the present finding revealed that the physical function items were in different levels according to mean score for each item. The level of mean score for 7 items (dressing, grooming, bathing, managing toileting, moving into and out of a bed or chair, walking indoors and using the telephone or other communication devices) were moderate, while low level for another 7 items (walking one block, walking more than one a block, climbing flights of stairs without stopping, doing housework, doing errands, driving a car or using public transportation, and doing vigorous activity) except the first item (eating) were high level. These result come along with Perneger, et al., (2003), who stated the chronic Hemodialysis patients had significantly lower scores for physical functioning [21]. Oller, et al., (2012) also indicated that the patient who is being treated by hemodialysis has physical limitations and among other changes that could have an influence on the execution of these activities on a routine basis [22].

4. Discussion of the relationship between physical function and socio-demographic characteristics (Tabe-4)

The result of the current study revealed that there was no significant association between physical function and gender for hemodialysis patients.This result is in line with studies by Kalantar-Zadeh et al., (2001), who indicate that there was no statistically significant difference was observed in the hemodialysis patients' gender with physical functioning [23].The patients' age has high significant association with their physical function impairment. This result is in line with Arogundade, et al., (2004) who stated that the age of the hemodialysis patients correlated negatively physical functioning ($P<0.0001$) and role limitation ($P=0.01$) [24].

The present study also indicated that there was high significant association between marital status and physical function. This finding disagree with Tutor, (2005) who found that the marital status analysis indicated no significant differences based on the fatigue level, activity level, and energy level, or independent function [25].

The results of study sample presented that the physical function has high significant association patients' educational level. This result supported by Tel, (2009) who stated that the patients' education had significant association with physical functioning [26].

Our study also revealed that the physical function has high significant association with occupational status for hemodialysis patients. This result confirmed by Fujisawa, et al., (2000) who stated that the patients on dialysis have significantly poorer general health and greater physical, mental, and social dysfunction, and greater limitations in their ability to work [27].

While the results of study sample indicated that the physical function has no significant association with monthly income and residence among hemodialysis patients. This finding is accordance with Cruz et al., (2011) who reported that there were no statistically significant differences between monthly income for hemodialysis patient and functional status [28], and this result supported by Vasilopoulou, et al., (2016) who observed that the total score of physical functioning presents statistically no significant association with hemodialysis patients' residence [29].

5. Discussion of the relationship between physical function and clinical characteristics (Table-5)

The analysis of sample linear regression describes that there was no significant correlation for duration of hemodialysis with physical function. According to Vasilieva, (2006) in linear regression analysis, duration of dialysis was a significant independent predictor of the low physical component score (PCS) in hemodialysis patient [30].The result of present study revealed that there was significant correlation between frequency of hemodialysis and patients' physical function. This finding disagrees with Anees, et al., (2011). According to him, there was no significant difference in physical health of the patients who are on twice and thrice weekly dialysis [31]. The highly significant correlation for diabetes with physical function was found among hemodialysis patients in present study. This finding supported by Petrovic, et al., (2011) who stated that the diabetic hemodialysis patients have lower score from non-diabetic for physical functioning and role physical [32].

The result of current study indicated that there was no significant correlation for hypertension with physical function of hemodialysis patients. This result disagrees with Rayyani, et al., (2014) who stated that the physical function was association with hemodialysis patient, who has suffered from hypertension [33].

Concerning BMI, there was highly significant correlation for BMI, with physical function among hemodialysis patient. This finding is in line with Bossola, et al., (2009) who mentioned that high BMI was associated with worse scores on the physical functioning scale and on the physical component summary for hemodialysis patient [34].The results of present study indicated that the hemodialysis patients have highly significant correlation for hemoglobin rate with physical function. This finding supported by Farag, et al., (2011) who stated that the altered hemoglobin has been significantly associated with physical functioning [35].

Finally, the serum albumin rate for hemodialysis patients has highly significant correlation with physical function. Also, Mahdavi (2013) confirmed that the Serum Albumin at (p= 0.049) Correlates with Physical Activity [36].

VI. Conclusion & Recommendations

The study sample demonstrated that the majority of hemodialysis patients have decline in physical function at low level. The physical function for hemodialysis patient was affected by many variables which include (age, marital status, educational level and occupational status, frequency of hemodialysis session, diabetes, BMI, hemoglobin rate and serum albumin rate). Based on the results of the present study, the following recommendations are suggested:

- Hemodialysis nurses who deal with patients must be taught that timely follow-up and evaluations of Physical function is essential to the care of patients
- A simple manual booklet and ongoing Education for patients with ESRD is necessary to initiate in predialysis stage and after maintenance dialysis to enhance their knowledge about the illness, treatment, complications and ways to alleviate and adapt for it that consequently improve their functional impairment.
- Set up a counseling room in the hemodialysis units to enhance functional status for patients with appropriate referral system.

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