Quality of psychiatric referrals in Saudi Arabia

A structural equation modeling approach

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ABSTRACT

Objective: This study seeks to model proposed causal relationships between the quality of psychiatric referral letters, and its indicators, linked to the features of the referred patient, referring physician, and practice setting.

Methods: This study was executed at Buraidah Mental Health Hospital, Saudi Arabia, in the year 2000-2002. Data regarding 18 independent variables underlying 3 latent constructs and one dependent variable represented by quality of psychiatric referral letter score (outcome) was derived from patient files, physician training records, and 540 psychiatric referrals. Structural equation modeling was used to analyze the data for examining proposed causal relationships between the quality of psychiatric referral letters, and its potential predictors.

Results: The structural equation modeling analysis revealed a reasonably good fit of the proposed model to the data based on various fit indices. The tested model explained 67% of the variance in the quality of psychiatric referral letters. The referring physician characteristics (experience, education, and psychiatric training) and features of the referral setting (nature of setting and referral letters-administrative information) were highly significant indicators of quality of psychiatric referral letters, which in turn was negatively predicted by patient features including severity of the mental illness.

Conclusion: Despite some caveats, the quality of psychiatric referral letters is accurately predicted by 3 latent constructs represented by referring physician skills, nature of the setting, and patient socio-clinical features.

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Primarily, the referral system consists of 3 interrelated and integrated components: referring primary care physicians, patient, and the referred consultant. Therefore, the characteristics such as doctor-doctor effective communication, meaningful communication between patient and doctor, clinical competency of the doctors, correct diagnosis, treatment and its effectiveness and also other features related to referred patient, referring physician, practice setting, and referred consultant tend to predict referral and possibly, quality and success of psychiatric referral letters (PRL's).[1-6] Further, an effective network for liaison among health providers and consumers also contributes positively both to the quality of referral and comprehensive feedback from referred consultants.[7] Notably, the mental illness severity, itself determined by patient profile, psychiatric co-morbidities, genetic and socio-cultural factors[8-11] could also contribute both to the quality and types of referrals. Generally, a good quality referral written by a referring physician after a thorough discussion with the patient and the referred consultant is coupled with good compliance, precise diagnosis and effective therapy, teaching and research, and global improvement of health services.[3,6,12-15] Unlike in developing countries, there is a huge Western database on, and remarkable advancements, in other aspects of referral system and liaison psychiatry coupled with the best quality care to the clients.[16-21] However, there is little on the use of structural equation modeling (SEM) for predicting the quality of PRL's based on its completeness as measured by information provided or not provided on the PRLs, which is the main goal of the present research. However, this study has not addressed doctor-patient-consultant communication and effectiveness of the treatment and other relevant variables due to design of the study, which also have a definite

impact on referral process. It would be realistic to place this study in the right perspective by describing briefly the referral system in the Kingdom of Saudi Arabia (KSA). Aside from establishing a primary health care system, the health authorities officially implemented an obligatory referral system in KSA in the year 1989, for delivering better quality services to all the people who should strictly follow referral guidelines. Despite this, many patients without PRLs, namely, unreferred clients visit psychiatric hospitals for consultation. Once a referral letter is made by the referring general practitioner (GP), it is given to the patient who delivers it at the time of first appointment at Buraidah Mental Health Hospital (BMHH). Notably, PRLs are not sent directly by the referring provider to BMHH. So, this study took into account only "successful referrals" that is only those where the patient actually followed up on the provider's recommendation to seek psychiatric consultation/treatment. Notably, there is a relative lack of psychiatrically trained primary health care personnel in KSA, but now this trend is slowly changing. Unlike in the Western world,[22] psychotropic drugs are also not available at primary health care centers (PHCC), and community mental health centers are yet to be established in all health provinces of KSA. In Arabian Gulf countries, hospital general physicians can now prescribe traditional antidepressants and also selective serotonin reuptake inhibitors and typical or atypical antipsychotics to the patients with diagnosed psychiatric disorders.

Methods. Buraidah Mental Health Hospital with a 150-bed capacity provides in and outpatient services to the one million population of Al-Qassim province, which has 142 PHCC of the Ministry of Health (MOH), 38 private clinics and 14 health units of other ministries. All PHCC are supposed to use a referral letter provided by the MOH. This referral letter is meant to note patient's information on 23 variables. Ten general hospitals (GH) including 3 with psychiatric clinics that deliver integrated mental services to outpatients, also use a more or less similar referral format. In addition, several health units of other ministries, university and school health units [7 types of health units other than MOH], private clinics, and 7 small GH use dissimilar referral letters containing 10-15 items only. Some ministries have now changed this practice by copying MOH referral letters or developing their own detailed referral forms. It is wise to note that though MOH referral letters should not be modified at least across different PHCC, certain items in particular history, duration of symptoms, systemic examination, diagnosis, treatment and administrative were excluded (or included) from MOH referral letters across 17 GH and 8 primary health units. This

modification in referral letters is attributable to regional health administration. Generally, a multidisciplinary team of mental health professionals evaluates referred and self-referred patients to reliably record data in their files. In addition to offering a diagnosis, consultant psychiatrists recommend an integrated management plan. Moreover, difficult to diagnose and manage cases are discussed in weekly psychiatric consensus meetings. Furthermore, each referral letter is conventionally attached to the file of the referred patient. Admitted patients have an additional inpatient file. To partially bridge the psychiatric knowledge gap of primary care physicians, our team introduced special programs to train GPs in clinical psychiatry and the referral process in order to integrate mental health into primary care.[23-26] Briefly speaking, the psychiatric consultants intensively trained batches of 15-20 GPs (total=150 from 220, 68%) selected from PHCC for one week. Albeit these educational courses may not be at par with western standards, the effectiveness of such programs was reflected in: 1) increased referrals from PHCC to GH and BMHH, 2) a promising report by 2 neutral western trained evaluators, and 3) other regions of the KSA have also adopted our training programs. Although we have studied GP's attitudes to mental illnesses,[23] Saudi community perceptions are yet to be explored. Notably, all citizens working in public sectors receive free healthcare services including referrals to higher healthcare. However, private clinics and hospitals are expensive and possibly a proportion of patients cannot bear the costs of treatment and hence they have slightly restricted access to private health services. Overall, these types of health organizations certainly affect the rate of referrals but equivocally the quality of written psychiatric referrals.

Model variables-sample. The sample included 540 referral letters, which we collected randomly over one year from January 1999 to January 2000. First, we selected randomly 10 sections of the 30 racks of the psychiatric record centre in which outpatient files were organized and distributed according to number. Each section contained 110-125 files, and there were 3664 total outpatient files. Then, we screened all randomly selected files, namely 1110 out of 3664 and only those containing referral forms (n=540) were retained. Hence, approximately 50% of patients without PRLs visit BMHH for consultation (self-referred patients). Notably, we did not consider self-referred patients, namely, patients without referral letters and so no letters on file for such patients as our specific objective was to elucidate indicators of quality of PRLs by measuring the completeness of information on referral letters. However, a study aimed at the factors determining referrals to secondary-tertiary care should also include

self-referred patients as a control group and then there would be no need to use SEM techniques. The appended referral letters to these files were photocopied. Patient's name was used to ensure that no referral letter was included twice.

Sociodemographic and clinical variables of patients [Table 1]. We expanded the socio-demographic and clinical database of each referred patient (n=540) after reviewing outpatient files and PRLs. We obtained information on patient age, gender, nationality, education, marital status, occupation, and finally psychiatric diagnosis and transmitted this to each patient's respective referral letter. Additionally, we also noted physical disorders, clinical complaints, classified psychiatric illnesses into psychotic, non-psychotic, and depression types, and further defined the severity of psychotic or non-psychotic proportions based on non-psychotic symptoms, functional impairment, occupational difficulties, and psychotic symptoms such as delusions, hallucinations, disorganized thinking, abnormal affect, and co-morbid physical disability. If the depression was the primary diagnosis with psychotic features, we considered it as psychotic. Thus, we measured 10 variables underlying sociodemographic and clinical latent construct.

Referring setting. We categorized dichotomously, referring settings into rural versus urban, GH versus PHCC, and psychiatric service available versus unavailable. We presumed MOH referral letter with 23 items to be a standard referral letter. Against this background, the referral letters arising from different primary care units and GH, containing 50% items of MOH referral were arbitrarily considered of good standard and the rest were ranked as nonstandard. It is rare that 50% of noted information in referral letters will contain either administrative or only clinical data. If this is the case, such referrals should be excluded from the study but on the cost of introducing a new bias, namely, selection bias. Notably, the noted information on referral letters by the referring physicians was not the yardstick for this arbitration. Furthermore, the evaluation of the noted information on these referral letters by the referring physicians is a separate issue and has been dealt only in the next section of PRLs as an outcome variable of interest. Thus, this variable (standard versus nonstandard referral letter) is an evaluation of the form itself rather than the noted information only. Most importantly, not the items but the data provided or not provided by the referring physicians/GPs on the 23 or less items of referral letters has only contributed to the quality score. Thus, we measured 4 variables (residence-rural/urban, setting types-GH/PHCC, psychiatric services-available/unavailable, referral letter types-standard/nonstandard) underpinning referring setting latent construct (**Table 1**).

Table 1 - Input variables in the structural equation modeling technique.

Variables	n	(%)
A) Sociodemographic & clinical variables		
1. Age (range=1-110 years)*		
2. Gender		
Women	268	(49.6)
Men	272	(50.4)
3. Nationality		
Saudis	516	(95.6)
Non-Saudis	24	(4.4)
4. Education		
Illiterate	171	(31.7)
Literate	369	(68.3)
5. Marital status		
Married	365	(67.6)
Single	175	(32.4)
6. Occupation		
Employed	156	(28.9)
Unemployed	384	(71.1)
7. Physical disorders		
Present	123	(22.8)
Absent	417	(77.2)
8. Clinical complaints		
<4	366	(67.8)
>4†	174	(32.2)
9. Types of mental illness		
Psychotic	132	(24.4)
Non-psychotic	241	(44.6)
Depression	167	(30.9)
10. Severity of mental illness		
>Severe	158	(29.3)
<Severe‡	382	(70.7)
B) Referring setting		
11. Residence		
Rural	306	(56.7)
Urban	234	(43.3)
12. Setting types		
General Hospital	138	(25.6)
Primary Health Care Center	402	(74.4)
13. Psychiatric service		
Available	33	(6.1)
Unavailable	507	(93.9)
14. Referral letter types		
Standard	488	(90.4)
Nonstandard	52	(9.6)
C) Referring doctors' variables		
15. Gender		
Women	64	(11.9)
Men	476	(88.1)
16. Professional qualification		
MBBS	472	(87.4)
MD	68	(12.6)
17. Duration of practice		
≤10 years	353	(65.4)
>10 years	187	(34.6)
18. Psychiatric training		
Yes	143	(26.5)
No	397	(73.5)

*Mean ± SD = 30.63 ± 18.54, Number of patients >60 years = 12/540, 2.2%, Number of patients <18 years = 9/540, 1.7%, 1-year-old child diagnosis = seizure disorder, †from diagnostic perspective, 4 or >4 symptoms are enough to reach a possible diagnosis. ‡less severe means mild/moderate with little disturbance of the functional and occupational capacities of the person

Referring doctor characteristics. The qualities of the referring doctor have a major impact on the quality of referral. We presumed that physicians, both in GH and GH psychiatric clinics, have more exposure to psychiatric training and teaching as compared to the GPs. We noted referring physician gender, professional qualification, duration of practice, and any psychiatric training. The source of this data was telephone contact, referral letters, and sociodemographic questionnaires used during training courses. Therefore, we have 4 measured variables underlying referring doctor latent construct. All the 18 independent input variables (**Table 1**) were used (severity of the mental illness dependent parameter too), most of them binomial, for generating a causal model. The fourth component that also affects the rate and quality of psychiatric referrals is the referred hospital characteristics, namely, quality of psychiatrists, better assessment and treatment offered, cost-effective services and possibly less erroneous referrals, but we have not considered these parameters in this study because of design and measurement difficulties.

Psychiatric referral letters as an outcome variable of interest (n=540). All PRLs were not similar to the MOH referral form [***Appendix 1**], which contains the following items 1) serial number, 2) family registration number, 3) name and address of the PHCC/GH, 4) date, 5) name, 6) gender, 7) age, 8) nationality, 9) referred hospital, 10) referred specialty, 11) type of referral, 12) complaints (with duration), 13) history, 14) physical examination, 15) systemic examination, 16) investigation, 17) treatment, 18) reasons for referral, 19) referring doctor name, 20) referring doctor signature, 21) MOH and doctor stamp, 22) diagnosis, and 23) feedback (**Table 2**). These administrative (family registration number) and clinical (symptoms) items are means of an effective link between health providers and users. Hence, all items-clinical and administrative were considered having equal significance but this may be a contentious issue due to unavoidable bias and hence may not be acceptable to all researchers. But, we still scored each item, except feedback, as 0 (information not provided) or 1 (information provided). An extra score of one was given for legible (versus illegible/not readable) writing, significant information, specific purpose of referral, and correct diagnosis. Significant information included short history, systemic (or mental status) examination findings, and psychiatric/non-psychiatric treatments and if 2 of them were noted by physicians, only then an additional score of one was given. Furthermore, the physicians'/GPs' noted psychiatric diagnosis was matched with the diagnosis entertained by the specialist/consultant who interviewed the patient in BMHH and noted each patient's diagnosis

in respective psychiatric file. Notably, the percentage of PRLs with correct noted diagnosis that is similar to psychiatrists' diagnosis was 30.2% (GH-45.7%, 63/138 and PHCC-24.9%, 100/402).[27] Each letter was assessed for scoring in a reliable manner, which was confirmed by an independent rater who similarly assessed 50 referral letters (GH=15, PHCC=35). The inter-rater agreement rate was 96%. The total quality score [range=0 to 26] of each PRLs was the dependent variable for SEM. The minimum and maximum quality scores were 6 (0.2%) and 23 (2%) and its mean with standard deviation was 14.66 ± 3.19. Higher score (>12) based only on noted data (but not based on 30% noted data) arbitrarily reflected good quality of PRLs, though this categorization is irrelevant specifically to SEM analysis.

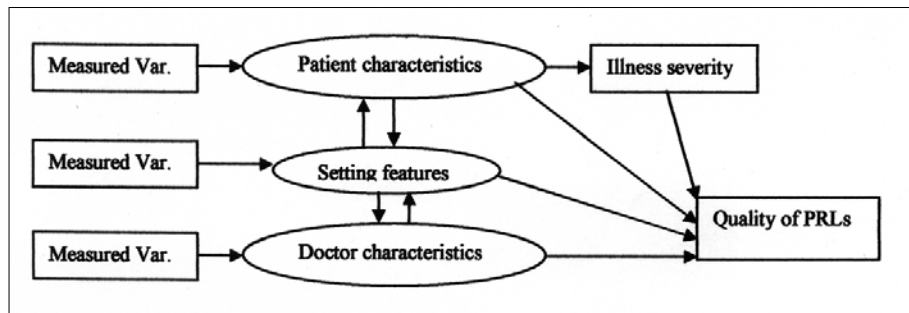***Proposed causal model of psychiatric referral letters.*** In this study, we test a causal model of PRLs (**Figure 1**) represented by 18 input variables underlying 3 latent constructs, which, are known to influence the quality of

Table 2 - Number and percentage of items that scored 0 or 1 on psychiatric referral letters.

Psychiatric referral letters	n	(%)
1. Serial number	272	(50.1)
2. Family registration number	410	(75.9)
3. Name and address of the PHCC/GH	533	(98.7)
4. Date of referral	524	(97.0)
5. Patient name	540	(100.0)
6. Patient gender	540	(100.0)
7. Patient age	513	(95.0)
8. Nationality	513	(95.0)
9. Referred hospital-BMHH	522	(96.7)
10. Referred specialty-psychiatry	483	(89.4)
11. Type of referral-urgent/elective/emergency	113	(20.9)
12. Complaints with duration	533	(98.7)
13. History-present/past	257	(47.6)
14. Physical examination	255	(47.2)
15. Systemic examination	194	(35.9)
16. Investigation	118	(21.9)
17. Treatments	162	(30.0)
18. Reasons for referral	496	(91.9)
19. Referring doctor name*	503	(93.1)
20. Referring doctor signature	525	(97.2)
21. Ministry of Health/doctor stamp	531	(98.3)
22. Diagnosis	338	(62.6)
23. Feedback†	-	-

*Missing data was treated well, for example if there was no name we look for the signature so as to identify and thereafter score other variables of physicians, †Not considered. PHCC - Primary Health Care Center, BMHH - Buraidah Mental Health Hospital, GH - General Hospital

*Appendix found at the end of the article

Figure 1 - Proposed causal model of PRLs (measured variables are not shown). Var. - variables. PRLs - Psychiatric referral letters,

PRLs. This model hypothesized that there might be direct or indirect causal relationships between input variables, mediating variable, and the quality of PRLs. Further, latent constructs may have some interrelationships among themselves. Accordingly, an increase in the magnitude of one of the variables may hypothetically cause an increase (or decrease) in the magnitude of the other variables. For instance, this model predicts that an improvement in the variables of doctor characteristics, all other things being equal, may improve the quality of PRLs. Likewise, the role of the other 2 input variables may be interpreted. The mental illness severity was hypothesized to be a mediating variable between the 3 latent constructs and the quality of PRLs.

Statistical analysis. Utilizing the AMOS program,[28] SEM techniques were applied for analyzing covariance and multivariate data. Our research team associates have used this statistical procedure in other studies on problem-based learning and medical education.[29,30] In the present study, we combined path analysis with latent-factor models to formalize available information on potential indicators and to evaluate their adequacy for predicting the quality of PRLs. The causal hypotheses were expressed as a set of structural equations, de facto multiple regression functions. The sample covariance matrix was used as input and a maximum likelihood solution sought. Notably, SEM uses a variety of techniques for providing several statistics, which indicate the fit of the model to the data. These statistics include chi-square statistic, chi-square divided by degrees of freedom (df), several fit indices including the Bentler-Bonnet non-normed fit index (NNFI), normed fit index (NFI), and comparative fit index (CFI), and standardized root mean squared residuals (SRMR), and root mean square error of approximation (RMSEA). The larger the probability ($p>0.05$) associated with the chi-square, the better the fit of the model to the data. A chi-square/df ratio should be <5.0. Further, SRMR should be <0.05. Each fit index is derived by comparing the predicted co-variation in the hypothesized model to the

null model and ideally should be 1.0/or >0.9 indicating a good to excellent fit of the model to the data. The RMSEA, a population-based index and consequently, insensitive to sample size, is considered good (<0.10) and very good (<0.05). Item significance is based on the critical ratio (CR), which is the parameter estimate divided by an estimate of the standard error. A CR >2 in absolute value is considered significant.

Results. *Parameter estimates.* In addition to descriptive statistics (**Tables 1 & 2**), **Table 3** shows the correlation matrix of measured variables in the SEM analysis. There are some high negative correlations between quality of PRLs and psychiatric training, severity of the mental illness, and standard referral letter. These negative correlations reflect that no psychiatric training, very severe mental illness, and referral letters containing too many items may predict poor quality of PRLs. Other negative correlations could be similarly interpreted.

Model fitting (**Figure 2**). Structural equation modeling was used to test the proposed model of quality of PRLs. The resulting chi-square was equal to 85.24, based on df=33, chi-square/df ratio=2.58, $p<0.001$, which indicated that this model does not adequately represent the data. Therefore, we included the CFI (normal 1 or >0.90) analysis that overcame the problems of chi-square sensitivity to large sample size and detection of discrepancies between the data and the model. Moreover, the CFI also considers attributes of the unrestricted model relative to the model under test. For the model retested, goodness-of-fit indices were RMSEA = <0.05, SRMR = <0.05, and CFI = 0.93, which suggested that it represented a reasonable first approximation of the structures representing the data. In **Figure 2**, arrows represent significant path coefficients ($p<0.05$), which indicate the strength of the causal relationships among latent constructs, mental illness severity, and the quality of PRs. Other insignificant variables were trimmed by the SEM procedures.

Table 3 - Correlation matrix of variables included in the causal model of quality of psychiatric referrals letters.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Quality of referrals	-										
2. Age	0.164	-									
3. Gender	0.067	0.183	-								
4. Education	-0.007	0.403	0.154	-							
5. Occupation	0.072	0.095	0.543	0.200	-						
6. Health settings	0.086	0.102	0.113	0.037	0.135	-					
7. Doctor experience	0.288	0.098	0.095	0.052	0.077	-0.086	-				
8. Doctor education	0.402	-0.023	-0.042	-0.108	0.033	-0.062	0.170	-			
9. Psychiatric training	-0.477	-0.029	-0.076	0.024	-0.095	0.085	-0.384	-0.341	-		
10. Illness severity	-0.207	-0.258	-0.070	0.011	-0.176	-0.053	0.006	-0.112	0.121	-	
11. Referral letter	-0.281	-0.160	-0.115	-0.012	-0.021	-0.153	-0.076	-0.050	0.073	0.055	-
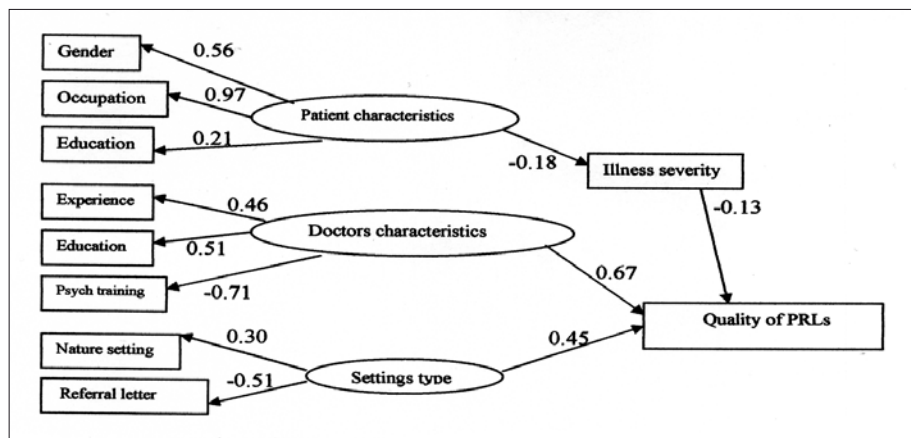
Figure 2 - Path estimates of the best-fitting model of quality of PRLs. Arrows represent path coefficients, latent variables are depicted in ovals, and observed variables are depicted in rectangles. All variables have estimated residual variance that is not depicted in the figure. PRLs - psychiatric referrals letters, Psych - psychiatric.

Discussion. With regard to the findings of the model, the competence of doctor reflected by more clinical experience and postgraduate medical qualification tends to predict the good quality of PRLs. However, psychiatric training did have an indirect significant effect on quality of PRLs that is likely to be attributable to a wide gap between psychiatric training of doctors and the time of the present study. Moreover, the training courses were irregular with long interruptions and the trained doctors were not given any psychiatric clinical role, which might have dulled their skills over time. Moreover, pre-selection of the candidates for additional psychiatric training may also explain the negative correlation of psychiatric training and good quality of PRLs, though there were negative correlations with doctor's experience and doctor education. Alternatively, lack of psychiatric training predicted poor quality of PRLs. As revealed, the good quality of PRLs may also depend on the setting, particularly hospitals. Although the mere presence of referral letters did not directly affect the quality of PRLs, writing complete data in referral forms depends on several other factors including patient cooperation, doctor-patient meaningful communication, patient load, time, physicians' motivation, personality, and psychiatric skills. Another explanation is that a referral letter with more (or may be too less) items predicted poor quality of PRLs. Although it is counter-intuitive, GPs prefer a one-page referral letter containing lesser items that they tend to complete fully.[2] Conversely, more tedious referral letters may often be left uncompleted by GPs due to lack of sufficient time caused by patient overload. Albeit the sociodemographic variables of the patient, particularly male gender, unemployment, and illiteracy directly predicted severity of the illness, this had no positive impact on the quality of PRLs. Alternatively, mild illness of the patient may predict good quality referral. However, it is clarified that quality of PRLs is

partly a judgment of the quality/completeness of the referral letter itself, in addition to both the correct, significant information and the diagnosis but without treatment effectiveness. In summary, although qualities of referring physician and setting significantly predicted good quality referrals, the patient profile, including illness severity, was found to have low impact on the quality of PRLs.

Possible implications. The current study, designed to frame and understand the potential causal indicators of quality of PRLs, has multiple implications. The finding from this study, consistent with other studies,[1-5] highlighted the causal influence of the competence of doctors on the good quality of PRLs. The data is important as health planners and managers should retain competent doctors, or recruit doctors with additional specialist degrees, which, in turn, enhances the quality of PRLs. Good quality PRLs may also indicate good efficiency and success of the referral system, possibly coupled with improved healthcare services, though this study did not directly address these related issues of clinical relevance. Although psychiatric training parsimoniously contributed to the quality of PRLs, it would be worthwhile to note that educators must regularly train referring physicians in liaison psychiatry and the referral system.[16,18,21] However, additional and regular psychiatric training courses need to be modified including a specific training unit with respect to writing good quality, complete psychiatric referral letters because so far they are not useful to compensate for less doctors experience and post-graduate education. According to another significant finding, physicians in a hospital setting were found to write a good quality referral, possibly attributable to their higher qualification, more psychiatric experience, and frequent psychiatric training. Surprisingly, the referral letter itself predicted poor quality of PRLs, which may suggest, among others, the letter being too tedious. In turn, the more specific the referral letter is, the better would be the quality of referrals. Notably, definition of referral letter (standard versus nonstandard) and its validity and quantity of information (>30% noted data implies good quality of referrals) provided by the referring GPs/physicians may shed more light on the quality of PRLs. Therefore, the health authorities must ensure that there is a competent health team for writing adequate data in the referral letter. According to only some research,[2] the referral letter should be of one page, containing specific items as this has a major impact on the efficiency of the referral process.

Obviously, diagnoses given in GH or PHCC were wrong in over 50% of the cases. This might indicate that correct administrative information and information about the patients' complaints are the most valuable information on the PRL because mental status and diagnosis have to be revised by the psychiatric consultant anyway until more profound psychiatric training can be provided to a large number of primary health care professionals. In fact, administrative information and complaints/reasons for referral seem to be the information that is actually completed in most PRLs. This is in line with the very interesting result that longer or standard PRL yielded actually less information though more items were included. This finding has relevance for the development of new PRL forms or doctor vigorous, continuing training. The causal influence of the sociodemographic qualities of the referred patients and the severity of the mental illness on referral quality is more limited, albeit significant. However, other studies[1-5,7] found that, interalia, sociodemographic variables of the patient are potential predictors of quality of PRLs. According to these findings, serious mental illness predicted poor quality of referrals. For example, seriously ill patients may have temporarily knocked out skills for establishing significant communication with the referring doctors who would feel at a loss to gather complete information, leading to poor quality of PRLs. Alternatively, mildly sick patients might offer detailed data to physicians for writing good quality referrals. The implication is that irrespective of patient profile including illness severity, the referring clinician should collect important data, not only from the patient but also key relatives (collateral sources) for writing a good quality referral for effective consultation. Although, illness severity has multiple implications,[8] the present study adds to the literature that it may also have a substantial indirect effect on the quality of PRLs. It is important to note how much of the variance is explained by each factor, namely, even a highly significant correlation of 0.2 explains only 4% of the data and hence how far factors can influence the dependent variable to a considerable extent. Notably, our tested model explained 67% of the variance in predicting the quality of PRLs. Without patient features and illness severity, the accounted variance was 61%. Hence, these results explaining more than 50% of variance reflect an acceptable level of predictability.

Methodological limitations. Several limitations of the current study should be noted. The fact that retrospective data is involved is reason to be careful in interpreting the results. Although the referring doctors assessed referred patients, our results are based on the combined data of what they recorded plus our own interpretation of this data. This was necessary as certain sociodemographic variables, the clinical profile of the referred patients and qualities both of referring doctors and the setting are reported to affect the quality of PRLs. Further, we have not used any standardized scales

for evaluating the noted contents of PRLs. Moreover, it is reiterated that the referral letters were of very good standard, but not validated. However, the health authorities drafted the referral letter after consulting many sources. The assessment and scoring of referral letters could be biased. There are many other potential indicators such as validity of noted information, doctor-patient communication, doctor-doctor communication, and treatment success of quality of PRLs, which we could not include in our study due to its retrospective design and other related inherent problems. Unless there are cross-cultural comparisons with studies that would use SEM for predicting quality of PRLs, these findings should not be generalized globally. Despite all these pitfalls, the strength of this study is that it describes research on a very interesting and critical topic interfacing psychiatric hospitals and GH and PHCC and it applies a sophisticated thorough methodological approach in terms of structural equation modeling.

In conclusion, this study identified the most important direct and indirect indicators of quality of PRLs, which are the possible attributes in terms of the experience, qualification and psychiatric training of referring hospital physicians and GPs, types of practice settings such as GH and PHCC and referral letters, and the referred patients' sociodemographic qualities as reflected by gender, occupation, education, and the severity of mental illness. The results of this study and a body of reviewed research indicate that there are some other indicators of quality of PRLs together with the revealed predictors; these should be the focus for future research.

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Appendix 1 - Referral form.

The Kingdom of Saudi Arabia
Ministry of Health
General Health Directorate,
Al-Qassim region

1. Serial number ....

2. Name of PHC/GH and address ....   3. Date of referral ....

4. Name of the patient ....   5. Nationality ....

6. Family registration number ....   7. Age ....

8. Sex   9. Referred hospital ......

10. Referred specialty ....

11. Type of referral*   a) Immediate   b) Urgent   c) Elective

12. Complaints (with duration),

13. History†

14. Clinical examination - Temp: Resp: BP: Pulse:

15. Systemic examination‡

16. Investigation,

17. Diagnosis

18. Treatment

19. Reasons for referral

20. Referring doctor name

21. Referring doctor signature

22. Ministry of Health/doctor stamp

23. Feedback form#

In some referral forms no items such as type of referral*, History†, systemic examination‡, diagnosis, treatment, and feedback form#.
PHC - primary health care, GH - general hospitals, Temp - temperature, Resp - respiration, BP - blood pressure