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ORIGINAL PAPER

Disparities in Preventive Health Services Among Somali Immigrants and Refugees

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Abstract African immigrants and refugees—almost half of them from Somalia—account for one of the fastest-growing groups in the United States. There is reason to suspect that Somali-Americans may be at risk for low completion of recommended preventive health services. This study's aim was to quantify disparities in preventive health services among Somali patients compared with non-Somali patients in an academic primary care practice in Rochester, Minn. It also examined the effect of medical interpreters, emergency department visits, and primary care visits on the completion of preventive services. Rates of pap smears, vaccinations (influenza, pneumococcus, and tetanus), lipid screening, colorectal cancer screening, and mammography were assessed in Somali and non-Somali patients during the second quarter of 2008. Data were collected regarding the utilization of medical interpreters, emergency services, and primary care services among Somali patients. Results were reported using standard descriptive statistics. Of the 91,557 patients identified in the database, 810 were Somali. Somali patients had significantly lower completion rates of colorectal cancer screening, mammography, pap smears, and influenza vaccination than non-Somali patients. Use of medical interpreters and primary care services were generally associated with higher completion rates of preventive services. There are significant discrepancies in the provision of preventive health services to Somali patients compared with that of non-Somali patients. These findings suggest the need to identify the root causes of these discrepancies so that interventions may be crafted to close the gap.

Keywords Somalia · Preventive health services · Papanicolaou smear · Colonoscopy · Mammography · Language · Primary health care

Introduction

Ethnic and racial disparities in healthcare have been well documented and demonstrated across the clinical spectrum [1–6]. Disparities in attainment of preventive health services are particularly prevalent [1, 3–10]. However, healthcare disparities are heterogeneous among and within different racial and ethnic groups, and immigrants may particularly be susceptible to factors that fuel healthcare disparities [11]. The population of African-born immigrants in the United States grew 142 % from 1990 to 2000 [12]; Somalis represent nearly 40 % of African immigrants and refugees who arrived in the United States from 1999 to 2008 [13]. However, little is known about healthcare habits or health disparities affecting this population [9].

There is reason to suspect that Somali-Americans may be at risk for low completion of recommended preventive health services [14]. For many Somalis, their first experience with a

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formal healthcare infrastructure (e.g., accessible clinics, emergency services, hospitals) is in the United States. Shaped by cultural values, exposure to war, and the refugee experience, Somali patients may lack a frame of reference for the idea of long-term health management and prevention having been previously focused on issues of immediate survival [11]. This lack of understanding of long-term health goals in the context of limited English proficiency [12, 15], concerns about patient-physician gender concordance [14], and low literacy rates [16] likely put this population at risk for low completion of preventive health services. Indeed, a single previous study has demonstrated decreased rates of breast, colon, and cervical cancer screening in Somali women (n = 37) compared with Vietnamese and Cambodian women [9]. However, a broader investigation of preventive health services disparities has not been previously reported. Therefore, a population-based study was conducted in a large academic primary care practice in Rochester, Minn. to investigate preventive service provision to Somali patients compared with non-Somali patients and to identify factors associated with completion of these services.

Methods

Practice Setting and Study Sample

This study was conducted in the Primary Care Internal Medicine and Family Medicine clinics at Mayo Clinic Rochester, an academic outpatient practice with 79 faculty members, 100 internal medicine residents, 25 family practice residents, and 15 midlevel providers (nurse practitioners and physician's assistants). These two practices provide primary care to 91,557 patients older than age 18. The study sample includes all patients older than 18 with an assigned primary care provider in one of the two departments. The subset of Somali patients was identified through an electronic search of self-reported race/ethnicity data included in medical registration records for the term *Somali*. Patient records were abstracted from April 1, 2008 to June 30, 2008. The comparison, non-Somali, group was comprised of all remaining patients not identified as Somali.

Clinical Decision Support for Preventive Services

Mayo Clinic's electronic medical record (EMR) is a GE Centricity Practice Solution. However, the clinical decision support system for preventive services and disease management was not developed in a GE Centricity-compatible environment. The primary care practices utilize Generic Disease Management System (GDMS) software for every primary care visit. GDMS is a Web-based application that uses GE Web Services and a MSQweb.net platform to retrieve patient vital statistics such as blood pressure, weight, body mass index, age, demographic information, prior diagnoses, allergies, and previous preventive services (e.g., immunizations, cancer and metabolic screenings, laboratory test results pertaining to diabetes, coronary artery disease, asthma, depression) from different clinical information systems. The GDMS includes a rules-based application in which national guidelines for age-specific, sex-specific preventive services and for process and outcome measures for diabetes and coronary artery disease have been coded. The criteria used for compliance with preventive services are detailed in Table 1 and are in accordance with recommendations at the time of the study by the US Preventive Health Services Task Force [17], the Centers for Disease Control and Prevention [18], and the American Cancer Society [19]. On the basis of the data from Web services, the rules provide point-of-care decision support regarding services that the patient needs at the time of their visit and in the next 90 days. A paper printout, which is generated at the intake desk as soon as the patient arrives, is included in the rooming packet for the nurse rooming the patient. It provides information to the physician of the services for which the patient is due.

Table 1 Criteria for completion of preventive health services

Colorectal cancer screening and surveillance
Age 50 to 80 years
No colonoscopy or computed tomographic colonoscopy in the previous 10 years
No sigmoidoscopy or barium test in the previous 5 years
No fecal occult blood test in the previous year
No surveillance colonoscopy in previous 3 years for those with a personal history of polyps
Pap smear
Any female between 21 and 65 without a pap test in the previous 3 years, excluding those with hysterectomy not due to cervical cancer
Mammography
Any female aged 40 to 75 without a mammography in previous year
Influenza vaccination
Anyone older than 50 without an influenza immunization in previous year
Pneumococcal vaccination
Anyone older than 65 without any pneumococcus immunization
Tetanus vaccination
Anyone older than 18 without a tetanus immunization in the previous 10 years
Lipid screening
Any female aged 45 to 75 or male aged 35 to 75 without a high-density lipoprotein cholesterol or total cholesterol or lipid panel determination in previous 5 years

Evaluation of Clinical Prevention Services

Mayo Clinic utilizes an information system (database) that consolidates data from the institutional operational, clinical, and administrative data sources to help primary care physicians manage their patient population. The system defines patient eligibility and completion of preventive services, including cancer screenings, immunizations, and metabolic screenings by retrieving completion of services from all-source operational, clinical, and administrative data systems. This information system can be queried to determine the completion rates of any service for any demographic population. After study approval by the Mayo Clinic Institutional Review Board, this information system was used to assess the completion rates of preventive services in the study sample. Completion rates were obtained for age- and gender-appropriate cancer screening (mammography and colorectal cancer screening, pap smears), lipid profile screening, and vaccinations (influenza, pneumococcus, and tetanus) and were assessed among both Somali and non-Somali patients.

Evaluation of Factors Associated with Completion of Preventive Health Services

A chart review of the Somali patients' medical records was used to obtain data regarding health-seeking behaviors hypothesized to be associated with completion of preventive health services. The number of visits to their primary care providers and to the emergency department (ED) in the previous year was assessed for each patient. Furthermore, the use of trained medical interpreters was assessed for each encounter. Use of interpreters was identified through a search of Mayo Clinic language department records. These records specify medical interpreter use by the medical record number for whom the interpreter was used, allowing the cross referencing of language department records with the list of Somali patients. All interpreters utilized in medical encounters have been medically trained. These variables were then tested for association with completion of preventive health services.

Statistical Analysis

Differences in screening rates between Somali and non-Somali patients were compared using Pearson's χ^2 test. Comparison of the utilization of interpreter, emergency, and primary care services among Somali patients with and without appropriate preventive service completion was compared using a two-sample t test or Fisher's exact test, as appropriate. Logistic modeling after adjustment for age and gender was performed for comparison of service completion. All statistical analyses were performed using SAS version 9.2 software (SAS Institute Inc., Cary, NC).

Results

A total of 91,557 patients older than 18 years old, including 810 Somali patients, were identified in the database. Baseline characteristics of Somali patients are shown in Table 2.

Comparison of Preventive Health Services Between Somali and Non-Somali Patients

Multiple disparities in attainment of preventive health services between Somali and non-Somali patients were identified (Table 3). Rates of completion were significantly lower among Somali patients for mammography (15.38 vs. 48.52 %, $p = <0.0001$), colorectal cancer screening (38.46 vs. 73.35 %, $p = <0.0001$), pap smears (48.79 vs. 69.1 %, $p = <0.0001$), and influenza vaccination (41.45 vs. 54.73 %, $p = <0.0001$). There was no significant difference in services for lipid screening, pneumococcal vaccination, or tetanus vaccination. These results remained unchanged after adjustment for age and sex.

Risk Factors for Non-completion of Preventive Health Services

Among Somali patients, higher utilization of primary care services was associated with more successful completion of all measured preventive health services (Table 4). Patients who had at least one primary care visit in the previous year were far more likely to receive all of the recommended services than those who had not seen their doctor (p value range < 0.001–0.012). Furthermore, the number of Somali patient visits to a primary care physician was associated with increased completion of recommended services in a "dose–response" fashion (Table 5).

Table 2 Study sample demographics

Demographic	Non-Somali patients (n = 91,557)	Somali patients (n = 810)
Gender		
Male	41,636 (45.5 %)	311 (38.4 %)
Female	49,921 (54.5 %)	499 (61.6 %)
Age (years)		
<25	12,900 (14.1 %)	210 (25.9 %)
25–39	24,701 (27.0 %)	258 (31.9 %)
40–54	25,797 (28.2 %)	148 (18.3 %)
≥55	28,159 (30.8 %)	194 (24.0 %)

Table 3 Comparison of preventive health service completion among Somali and non-Somali patients

Measures	Non-Somali patients			Somali patients			*p* value[a]
	Screened	Eligible	Percent	Screened	Eligible	Percent	
Cancer screening							
Mammography	5,015	10,336	48.5	10	65	15.4	<0.0001
Colorectal cancer screening	22,001	29,994	73.4	85	221	38.5	<0.0001
Pap smear	15,132	21,900	69.1	101	207	48.8	<0.0001
Lipid screening							
Fasting lipid profile	36,947	43,839	84.3	251	292	86.9	0.4316
Adult immunization							
Influenza	19,122	34,940	54.7	97	234	41.5	<0.0001
Pneumococcus	13,012	15,073	86.3	88	105	83.8	0.4546
Tetanus	74,521	89,693	83.1	657	777	84.6	0.2758

[a] Pearson's χ^2 test

Table 4 Associations between utilization of emergency department or primary care visits and completion of preventive services among Somali patients

Number eligible	Any ED visit			*p* value[b]	Any primary care visit			*p* value[b]
	Service completed	No[a]	Yes[a]		Service completed	No[a]	Yes[a]	
Cancer screening								
Mammography (n = 189)	No (125)	73 % (85)	56 % (40)	0.018	No (125)	98 % (45)	56 % (80)	<0.001
	Yes (64)	27 % (32)	44 % (32)		Yes (64)	2 % (1)	44 % (63)	
Colorectal cancer screening (n = 223)	No (137)	66 % (96)	53 % (41)	0.08	No (137)	76 % (41)	57 % (96)	0.016
	Yes (86)	34 % (50)	47 % (36)		Yes (86)	24 % (13)	43 % (73)	
Pap smear (n = 367)	No (160)	49 % (121)	33 % (39)	0.007	No (160)	58 % (82)	35 % (78)	<0.001
	Yes (207)	51 % (128)	67 % (79)		Yes (207)	42 % (60)	65 % (147)	
Lipid screening								
Fasting lipid profile (n = 294)	No (42)	16 % (34)	9 % (8)	0.14	No (42)	34 % (31)	5 % (11)	<0.001
	Yes (252)	84 % (174)	91 % (78)		Yes (252)	66 % (60)	95 % (192)	
Adult immunizations								
Influenza (n = 236)	No (137)	59 % (91)	57 % (46)	0.78	No (137)	96 % (55)	46 % (82)	<0.001
	Yes (99)	41 % (64)	43 % (35)		Yes (99)	4 % (2)	54 % (97)	
Pneumococcus (n = 107)	No (17)	17 % (12)	14 % (5)	0.78	No (17)	38 % (8)	10 % (9)	0.005
	Yes (90)	83 % (58)	86 % (32)		Yes (90)	62 % (13)	90 % (77)	
Tetanus (n = 775)	No (115)	17 % (92)	10 % (23)	0.011	No (115)	26 % (81)	7 % (34)	<0.001
	Yes (660)	83 % (451)	90 % (209)		Yes (660)	74 % (236)	93 % (424)	

[a] Percent of patients by presence/absence of visit type (N)

[b] Fisher exact test

Use of the ED over the previous year was associated with an increased likelihood of completion of mammography (44 vs. 27 %, $p = 0.016$), pap smears (67 vs. 51 %, $p = 0.005$), and tetanus vaccination (90 vs. 83 %, $p = 0.012$). There were no significant associations between an ED visit in the preceding year and the likelihood of completing colorectal cancer screening, lipid screening, influenza vaccination, or pneumococcal vaccination (Table 4).

Patients who used a trained medical interpreter were more likely to be current on preventive health measures. Interpreter use was significantly associated with increased rates of all measured preventive services (p value range < 0.001–0.035) (Table 6).

Table 5 Association between number of primary care visits and completion of preventive services among Somali patients

Number eligible	Service completed	Number of primary care visits	
		Mean (±SD)	*p* value[a]
Cancer screening			
Mammography (n = 189)	No (125)	2.81 (±3.37)	<0.001
	Yes (64)	5.48 (±3.59)	
Colorectal cancer screening (n = 223)	No (137)	3.27 (±3.37)	<0.001
	Yes (86)	5 (±4.04)	
Pap smear (n = 367)	No (160)	1.67 (±2.62)	<0.001
	Yes (207)	2.99 (±3.18)	
Lipid screening			
Fasting lipid profile (n = 294)	No (42)	0.52 (±1.37)	<0.001
	Yes (252)	3.67 (±3.57)	
Adult immunizations			
Influenza (n = 236)	No (137)	2.3 (±2.81)	<0.001
	Yes (99)	6.27 (±3.63)	
Pneumococcus (n = 107)	No (17)	2.06 (±4.01)	0.004
	Yes (90)	5.04 (±3.85)	
Tetanus (n = 775)	No (115)	0.7 (±1.50)	<0.001
	Yes (660)	2.61 (±3.16)	

[a] 2 sample *t* test

Discussion

This study demonstrates significant disparities in completion of recommended preventive health services between Somali and non-Somali patients in a large primary care practice. Furthermore, these disparities exist despite an effective electronic flagging system for preventive services. This highlights the need for additional system and practice changes to target this particularly vulnerable population.

These findings are generally consistent with reports of preventive health services disparities among other minority groups. However, these results indicate that the magnitude of the disparity may be greater among the subset of Somali patients compared to African-Americans as a whole. Furthermore, the findings are consistent with those among immigrant populations [20], but the existence and magnitude of these disparities are heterogenous across different immigrant groups [21]. Therefore, the findings represent an important contribution to the literature in documenting disparities in completion of preventive health services among Somali patients. Identification of such disparities is important as they likely contribute to excess mortality among minority groups in general [22, 23].

Previous studies have explored factors associated with decreased completion of preventive health services among immigrants as a whole, the most prominent of which is a lack of health insurance [24, 25]. This study includes only patients with public or private health insurance, eliminating this variable. Qualitative explorations of perspectives of preventive health services among Somali women have identified a lack of awareness of existing preventive services and a lack of a conceptual framework for disease prevention as potential barriers to completion of recommended services [11, 26]. Our findings add to this literature

Table 6 Association between interpreter use and completion of preventive services among Somali patients

Number eligible	Service completed	Interpreter Use		*p* value[b]
		No[a]	Yes[a]	
Cancer screening				
Mammography (n = 189)	No (125)	73 % (82)	56 % (43)	0.019
	Yes (64)	27 % (30)	44 % (34)	
Colorectal cancer screening (n = 223)	No (137)	63 % (81)	59 % (56)	0.58
	Yes (86)	37 % (47)	41 % (39)	
Pap smear (n = 367)	No (160)	46 % (129)	36 % (31)	0.11
	Yes (207)	54 % (152)	64 % (55)	
Lipid screening				
Fasting lipid profile (n = 294)	No (42)	20 % (39)	3 % (3)	<0.001
	Yes (252)	80 % (159)	97 % (93)	
Adult immunizations				
Influenza (n = 236)	No (137)	70 % (94)	42 % (43)	<0.001
	Yes (99)	30 % (40)	58 % (59)	
Pneumococcus (n = 107)	No (17)	23 % (11)	10 % (6)	0.06
	Yes (90)	77 % (33)	90 % (53)	
Tetanus (n = 775)	No (115)	17 % (103)	7 % (12)	<0.001
	Yes (660)	83 % (492)	93 % (168)	

[a] Percent of patients by presence/absence of visit type (N)

[b] Fisher exact test

by demonstrating a positive association between completion of preventive services among Somali patients and the number of primary care visits, ED visits, and the use of a medical interpreter.

The association between the number of primary care visits and completion of recommended services stands in contrast to a previous study of this variable among immigrant groups as a whole [27]. Therefore, system changes that promote health-seeking behavior among Somali patients may be particularly beneficial.

Likewise, the findings of increased preventive service completion among Somali patients who visit the ED contrast with previous reports among immigrant groups as a whole [6, 28]. In those studies, patients seeking care in the ED were more likely to be uninsured. Among the insured Somali population, ED visits may act as a conduit for appointments with a primary care provider. In our study, patients with ED visits were more likely to also have primary care visits. Therefore, the ED may be an important gateway to establishment of primary care and completion of preventive services, particularly because new Somali immigrants and refugees may initially prefer care in the ED to that in primary care clinics [29]. Alternatively, it may be that these visits serve as a surrogate marker for health literacy and access, both known to be associated with completion of preventive services [6, 30].

The positive effect of interpreters on healthcare delivery has been demonstrated in previous studies [15, 31, 32]. However, these studies included predominantly Spanish-speaking patients; there is little published information regarding the role of interpreters in the healthcare of Somali immigrants and refugees. Similar to previously published data [15, 31, 32], the use of interpreter services was positively associated with improved delivery of preventive health services in this study. Interpreters allow improved physician-patient communication and can serve as cultural liaisons, enhancing understanding for both the provider and patient [33]. Further, the finding of decreased rates of preventive services completion in Somali patients who did not use an interpreter may be the result of overestimation of the language proficiency by the patient or provider. Interpreter services should be used whenever possible when caring for immigrant and refugee populations who do not yet have perfectly proficient English language skills. However, in the context of the large disparities noted in this study for most services, it is clear that effective use of a medical interpreter is necessary but not sufficient for completion of preventive health services among Somali patients.

Implications of our findings as a whole implore several next steps. The fact that a large disparity exists despite full insurance-related healthcare access and an advanced administrative flagging system implies that the reasons for the disparities are likely complex and multifactorial. Qualitative studies among Somali patients are needed to further elucidate perceived barriers and benefits to preventive health services and to engage these patients in deriving community and practice-based interventions aimed at reducing the disparity. Interventions should couple community-based awareness campaigns with culturally and linguistically tailored healthcare-based programs to introduce patients to the concepts behind preventive health services. Finally, the positive association between "touches" with the healthcare system and completion of services suggests that programs designed to promote patient-provider relationships and healthcare literacy in general may be beneficial. For example, clinic orientation for patients have proven beneficial in preventing missed appointments, and may be a particularly productive means of orienting immigrants and refugees to healthcare concepts in their new communities [34].

Limitations

This study has limitations. Generalizability of the disparity magnitude may be compromised by the demographics of the comparison group. The percentage of racial and ethnic minorities in the comparison group is slightly lower than the national average. Furthermore, this study did not assess the impact of socioeconomic variables on the associations with completion of services [20]. Additionally, the method used for identification of Somali patients is limited by the self-reported nature of Somali ethnicity at the time of medical registration. Therefore, it is likely that the study sample does not represent the entire Somali patient population. Reporting tetanus immunization data as any vaccine within the last 10 years is a useful process measure, but among immigrant and refugee patients it is not as clinically relevant as reporting whether these patients completed their primary tetanus immunization series. Finally, data regarding pap smears may be compromised by the fact that sexual histories could not be abstracted by our chart review; observed differences may be the result of appropriate shared decision making between patients and providers.

Conclusions

This study reveals significant discrepancies in the provision of preventive health services to Somali patients compared with non-Somali patients. Furthermore, use of primary care services, the ED, and medical interpreters was associated with increased rates of completion. Additional research is needed to further explore these associations and to test interventions aimed at increasing completion of preventive health services among Somali patients.

Conflict of interest T. Ben Morrison, Mark L. Wieland, Stephen S. Cha, and Ahmed S. Rahman have no financial disclosures. Rajeev Chaudhry, MBBS, MPH is an employee of Mayo Clinic and the inventor of the GDMS software referenced in this publication. Mayo Clinic has licensed this technology to a commercial entity (Vital-Health Software) but to date has received no royalties. Dr. Chaudhry receives no royalties from the licensing of this technology.

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