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Characterizing the Copts in Egypt: Demographic, socioeconomic and health indicators

Yousra A. Mohamoud[1], Diego F. Cuadros[1,2], Laith J. Abu-Raddad[1,2,3,*]

[1]Infectious Disease Epidemiology Group, Weill Cornell Medical College, Qatar; Cornell University, Qatar Foundation – Education City, Doha, Qatar
[2]Department of Public Health, Weill Cornell Medical College, Cornell University, New York, NY, USA
[3]Vaccine and Infectious Disease Division, Fred Hutchinson Cancer Research Center, Seattle, WA, USA
*Email: lja2002@qatar-med.cornell.edu

ABSTRACT

Background: The demography of Copts in Egypt is subject to an intense debate in the context of a dearth of analytical studies on this community. Our objective was to estimate the size of the Coptic community in Egypt, map its geographical clustering, and describe demographic, socioeconomic, and health-associated indicators.

Methods: We conducted descriptive and Kulldorff spatial scan statistics analyses using the 2008 Egypt Demographic and Health Survey (EDHS) data. We also used chi-square trend analysis and earlier EDHS data to examine the temporal trend in the proportion of Copts.

Results: The proportion of Copts in the 15–59 years population was 5.1% (95% confidence interval (CI): 4.6%–5.5%). This translates to 4,274,145 (95% CI: 3,855,111–4,609,372) Copts. We identified three main clusters of Copts: Minya-Assuit cluster (17.6%), Assuit-Souhag cluster (15.1%) and the metropolitan Cairo cluster (9.4%). The proportion of Copts was stable since 1988 ($P = 0.11$). Copts had higher educational attainment ($P = 0.002$), and a wealth index quintiles distribution skewed towards the rich ($P < 0.001$). Copts also had stronger representation in white collar job types, but limited representation in security agencies. The majority of demographic, socioeconomic and health indicators were similar among Copts and Muslims.

Conclusions: One in every 20 Egyptians is a Copt, a proportion smaller than commonly circulated in the scholarly literature and public sphere. Despite some identified disparities, our study indicates a well-integrated Egyptian society regardless of religious affiliation. Our study provides evidence to inform the ongoing debate on the status of Copts in Egypt.

Keywords: Copts, Egypt, demography, religion, minorities

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INTRODUCTION

The Middle East and North Africa (MENA) region is the native land of Christianity, but the rich link between MENA and Christianity runs deeper than the link between a religion and its birthplace. Christianity has contributed to the cultural fabric of this region for two millennia,[1–3] making MENA home to some of the richest Christian cultural traditions.[1,2] Despite this history, the fraction of Christians in the population of this region appears to have been declining for decades.[3,4] Today, there are more Christians in Indonesia (the largest Muslim-majority country in the world) than there are in the whole of the MENA region.[5] Preserving the cultural contribution of Christianity in MENA is essential to this region; a region marked historically by the diversity of its traditions and its heritage of coexistence.

The Coptic Orthodox Christian community in Egypt is one of the oldest Christian communities in the world, with conversion to Christianity starting in the very first century of the Common Era.[2] Followers of the Coptic Orthodox Church, founded by Saint Mark in the middle of the first century,[2] constitute the largest Christian community in MENA and the majority Christian group in Egypt.[6] Despite their prominent role in Egyptian history, there is a dearth of analytical studies on the modern Egyptian Coptic community.[7] Basic estimates on the size of the Christian population in Egypt vary widely, ranging between about 10% and 20% in scholarly journals and books,[6,8–10] and up to 30% in popular media.[11–14] The size of the Coptic community has become an intensely debated and controversial issue both in scholarly circles and mass media.[8,11–13,15] One of the widely held perceptions cited for this lack of credible demographic measures is the apparent absence of reliable statistical data on the Coptic community in Egypt.[7,16]

The intensity of the Coptic question in Egypt appears to track times of sweeping change in the political and social environment in the country. The 19th century, the time in which the first elements of the modern Egyptian state were seeded, saw a rise in the dialogue surrounding the Coptic question.[6,8,9] The inclusive and supportive political and social environment, starting from the 19th century through mid-20th century, facilitated a "golden age" for Copts in the modern history of Egypt that was marked with dynamism and reform.[8,9,16] The community and its contributions to the state and society flourished, and prominent new institutions were established to address the needs of the community and to empower Copts to be an integral part of the Egyptian society.[8,9,16]

The 1952 revolution in Egypt, however, has led to contradictions in the status of Copts, and started a transformation in the way most Copts viewed the state and their role in Egyptian society.[8,9,16,17] While the lower socioeconomic strata among Copts have benefited from the agrarian reforms and nationalization policies, the liberal Coptic elite were affected adversely.[8,9] Probably of more consequence, the regime following the revolution, with its de facto domination of the state and society and authoritarian tendencies, has contributed to marginalization of sectors of Egyptian society, one of which were the Copts. Political expediency by successive presidents and the dynamics between the regime and its powerful Islamic opposition, have also entrenched discontent and alienation among Copts.[9,16,17] The Arab Spring and the toppling of the dictatorship in Egypt, followed by elections in which parties with roots in political Islam have won massively, brought the Coptic question to the forefront. With the tide of the Arab Spring unraveling across the region, the uncertainty about the status, role, and future of non-Muslim religious minorities in MENA, the largest of which are the Copts, has become a central concern as a new political order sets roots in the region.[4]

Against this background, the objectives of this study are four-fold (Figure 1). We aim to:

1. Estimate the size of Copts in Egypt both as a whole and by governorate.
2. Describe demographic, socioeconomic, and health-associated indicators for this population.
3. Examine change, if any, in the proportion of Copts over the last few decades.
4. Map the geographical clustering of Copts in Egypt.

Social determinants of health and economic status are a growing area of research, but there have been limited efforts in this regard in MENA.[18,19] In light of the democratic transition and emerging freedoms in the press and the public sphere following the Arab Spring, policy accountability may soon become a reality of the political process; paving the way for a more influential role of scientific research in policy deliberations. In this vein, our study focuses on a prominent and large minority in MENA. Future studies may attempt to investigate other minorities, such as Nubians and Sinai Bedouins, or other sectors of the population in this country and other MENA countries. Our study accordingly fits into the overarching theme of examining disparities in demographic, socioeconomic and health indicators. The aim of which is informing policy towards equity and effective governance within a civil society and a functioning democracy.

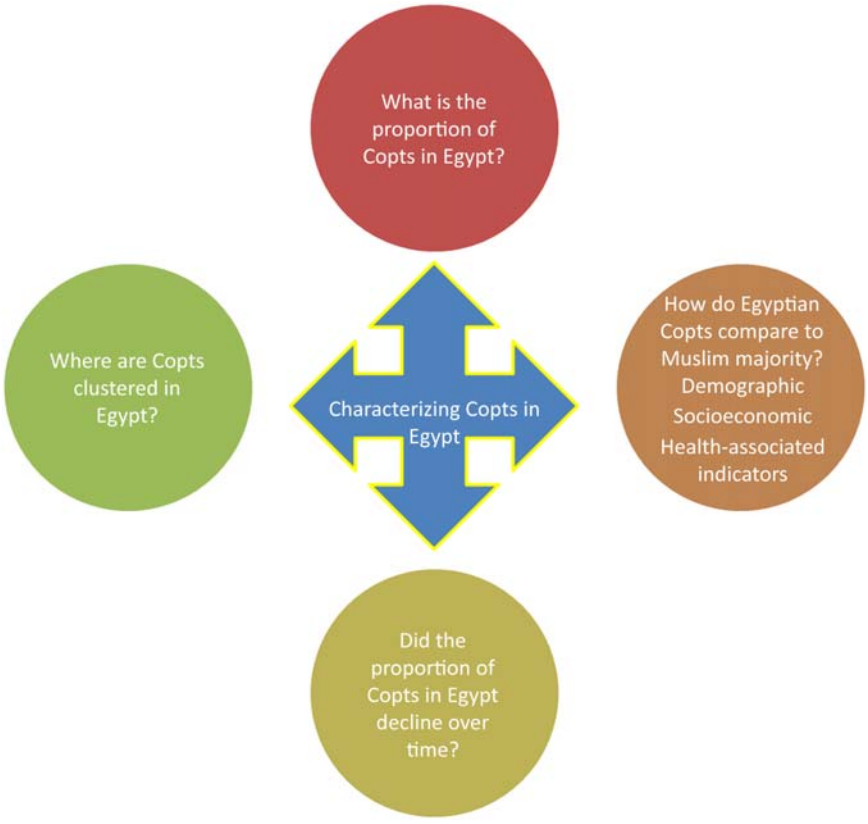

Figure 1. A schematic diagram of the four objectives of this study.

MATERIALS AND METHODS

Source of data

Data was extracted from the Egypt Demographic and Health Survey (EDHS) conducted in 2008. Details of the design and methods of the 2008 EDHS have been published elsewhere.[20] In summary, the EDHS was based on a stratified three-stage random cluster sample of more than 19,500 households, based upon the 2006 Egypt population census. The first stage included the selection of primary sampling units (PSUs), such as towns in urban areas and villages in rural areas. During this stage, a total of 610 PSUs (275 towns and 335 villages) were selected. The second stage involved multiple steps; first, a map of the PSUs was obtained and divided into parts of approximately equal population. Next, a count was conducted to estimate the number of households in each part to obtain standard segments of approximately 200 households per segment. Finally, the third stage consisted of selecting the household sample by conducting a systematic random sample of households. The grouping of households that participated in the survey, known as EDHS clusters data points, were geo-referenced using global positioning system receivers, usually during the survey sample process.

A subsample of 4,953 households, were selected for a health issues survey. Women and men were eligible for this survey if they were between 15–59 years of age and were present in the household on the night before the interview. A total of 12,008 individuals were successfully interviewed by the 2008 EDHS health issues survey, a response rate of 94%. The health issues questionnaire collected information on socio-demographic characteristics (age, sex, marital status, type of residence, and education among others), and medical history (dental treatment, blood transfusion, and diabetes among others) of the survey participants. In addition, three types of biomarkers were collected: anthropometric measurements, hepatitis C virus (HCV) serology, and blood pressure measurements.

The number of Copts in each governorate was calculated using the EDHS data for the fraction of Copts in the population of each governorate, supplemented by estimates of the total population size in each governorate published by the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS), based on 2006 census data.[21]

Study variables

All study variables are self-explanatory and were extracted from the responses to the 2008 EDHS household and health issues questionnaires. As Copts constitute the majority of Christians in Egypt (~95%),[8] for the purposes of this article, we choose to make no distinction between Coptic Orthodox Christians and other Egyptian Christians and use the two terms of "Copts" and "Christians" interchangeably. Literacy was calculated as individuals who had attended preparatory school or higher and individuals with no or primary education who can read a newspaper or letter easily or with difficulty. Employment was defined as having done work in the past seven days and individuals who did not work in the past seven days but who are regularly employed and were absent from work for leave, illness, vacation, or any other such reason. Body mass index (BMI) was calculated by dividing weight in kilograms by height in meters squared (kg/m^2), and was categorized into: underweight, normal, overweight, and obese individuals based on the Centers for Disease Control and Prevention (CDC) definitions.[22]

Statistical analysis

We conducted a descriptive statistical analysis using STATA, version 11.0 (StataCorp LP, College Station, Texas) software. Cross-tabulations between religion and the different demographic, socioeconomic, biomarker and health-associated variables were performed in order to describe the characteristics of the study population. The association between religion and the other covariates was assessed using the chi-square test for categorical variables and the t-test for continuous variables. Two-tailed $P < 0.05$ was considered significant.

Copts distribution time series

We examined the proportion of Copts in Egypt over the years for which demographic and health surveys were conducted and information on religious affiliation was collected. In addition to the 2008 EDHS, four EDHS surveys were included for this analysis: 2005, 1995, 1992, and 1988. The chi-square test for trend was used to assess whether the proportion of Copts varied significantly with time.

Spatial cluster analysis

We identified geographic clusters of large numbers of Copts through a Kulldorff spatial scan statistics analysis,[23] implemented within the SaTScan software.[24,25] Briefly, a spatial scan statistics is a cluster detection test able to detect the location of areas with higher numbers of "cases" (here Copts), than expected by spatial randomness. It can then evaluate the clustering statistical significance by gradually scanning a circular window across space. For any given location of the center of the circle, the radius is changed continuously so that it can take any value from 0 up to a pre-specified maximum value. Since we aimed to identify localized clusters, a maximum window of 100 km radius was used for scanning clusters of large numbers of Copts.

Since the circular window varies continuously in both location and size, it creates a large number of distinct potential clusters. Each potential cluster was tested, using a likelihood ratio test, to determine its statistical significance against the null hypothesis of spatial randomness. The *P* value of the statistics was obtained through Monte Carlo simulations for the hypothesis testing, where the null hypothesis was rejected if the *P* value was less than 0.05. The scan statistics adjusted for the uneven geographical density of the population, and the analysis was conditioned on the total number of cases (Copts) observed. All geographic information system (GIS) analyses and cartographic displays were performed with the software ArcGIS version 9.2.[26]

RESULTS

Demographic, socioeconomic and health-associated indicators

Copts constitute 5.1% (95% confidence interval (CI): 4.6%–5.5%) of the population, while Muslims account for the remaining majority at 94.9%. Given that the current total Egyptian population is estimated to be 83,806,767,[21] the number of Copts in Egypt is then 4,274,145 (95% CI: 3,855,111–4,609,372). Figure 2 shows the proportion and numbers of Copts in the different governorates of Egypt. With 17.0% (95% CI: 14.3%–20.0%) of its population Coptic, Assuit stands as the governorate with the largest proportion of Copts. Cairo, on the other hand, is the governorate with the largest number of

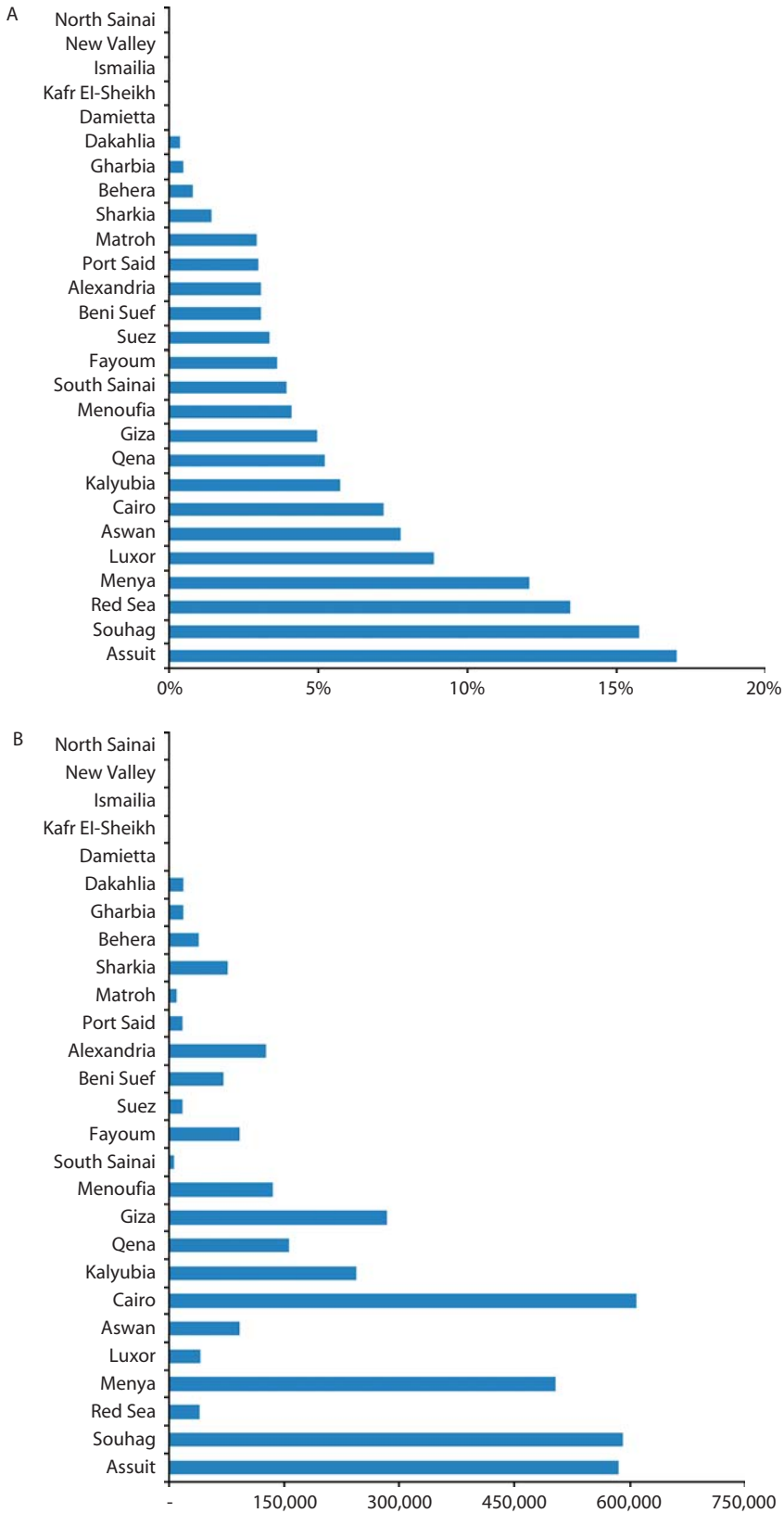

Figure 2. Distribution of Copts by governorate. (A) Proportion of Copts in each governorate. (B) Number of Copts in each governorate.

Table 1. Distribution of demographic, socioeconomic and health-associated indicators amongst the two Egyptian religious affiliations.

	Religion				
	Copts		Muslims		
Characteristics	No.	%	No.	%	*P* value
Demographic factors					
Religion	650	5.1	11,339	94.9	–
Sex					
Male	295	47.1	5,124	47.8	
Female	355	52.9	6,215	52.2	0.750
Mean age (std. dev.)	33.2 (13.0)	32.5 (12.4)	0.212		
Marital status					
Married/signed contract	405	62.7	7,258	63.7	
Widowed/divorced/separated	29	4.8	525	4.6	
Never married	216	32.6	3,556	31.7	0.893
Mean total no. of children (std. dev.)	2.9 (1.9)	3.3 (1.9)	0.022		
Socioeconomic factors					
Place of residence					
Urban	382	62.4	4,679	42.9	
Rural	268	37.6	6,660	57.1	<0.001
Education					
No education	128	20.8	2,602	21.6	
Some primary	40	6.6	1,032	9.2	
Primary + some secondary	126	20.1	2,701	24.6	
Secondary + some higher	356	52.6	5,004	44.7	0.002
Literacy					
No	145	23.8	2,903	24.4	
Yes	505	76.2	8,436	75.6	0.761
Dwelling owned or rented					
Owned	398	56.5	8,543	72.9	
Owned jointly	60	7.9	521	4.4	
Rented	174	31.1	1,638	17.3	
Other	17	4.2	622	5.3	<0.001
Wealth index quintiles					
Poorest	114	15.6	2,211	17.2	
Poorer	120	16.0	2,454	20.6	
Middle	100	17.1	2,342	20.3	
Richer	103	16.4	2,086	20.5	
Richest	213	34.8	2,246	21.4	<0.001
Employment					
No	369	55.8	6,309	53.9	
Yes	281	44.2	5,030	46.1	0.394
Health insurance					
No	476	73.6	8,330	72.4	
Yes	174	26.4	3,007	27.6	0.553
Health-associated indicators					
HCV					
No	518	88.5	9,021	85.2	
Yes	64	11.5	1,506	14.8	0.050
Diabetes					
No	552	96.7	9,980	96.7	
Yes	20	3.4	358	3.3	0.968
Body mass index (BMI)					
Underweight (<18.5)	11	1.7	283	2.3	
Normal (18.5–24.9)	228	34.2	4,112	36.0	
Overweight (25.0–29.9)	217	32.6	3,459	30.6	
Obese (≥ 30.0)	187	31.6	3,348	31.1	0.625
Smoking					
No	550	83.1	9,379	81.2	
Yes	100	16.9	1,949	18.7	0.315
Average blood pressure					
Mean systolic (std. dev.)	123.1 (11.8)	123.3 (18.9)	0.781		
Mean diastolic (std. dev.)	76.7 (8.9)	77.0 (17.4)	0.487		
Female circumcision					
No	82	23.6	518	7.3	
Yes	273	76.4	5,693	92.7	<0.001
Medical procedures					
Surgery					
No	387	60.2	6,719	58.0	
Yes	262	39.8	4,608	42.0	0.331

Table 1 – *continued*

	Religion				
	Copts		Muslims		
Characteristics	**No.**	**%**	**No.**	**%**	***P* value**
Blood transfusion					
No	628	96.7	10,828	95.9	
Yes	22	3.3	486	4.1	0.364
Dental treatment					
No	292	44.0	4,575	38.9	
Yes	358	56.0	6,751	61.1	0.019
Admitted to a hospital					
No	636	98.6	11,006	97.3	
Yes	14	1.5	333	2.7	0.027

Copts: 609,017 (95% CI: 464,258–781,953). There are just over a million Copts in metropolitan Cairo, which span all or parts of the Cairo, Giza and Kalyubia governorates.

Table 1 displays the demographic, socioeconomic and health-associated characteristics of 11,989 individuals, categorized by their religious affiliation. Overall, the two religious groups were comparable in their sex and age distribution as well as in the marital status of their individuals. A difference was observed in the mean total number of children per female in the sample with Muslims having slightly more children on average compared to their Coptic counterparts ($P = 0.02$).

Marked differences were observed in the socioeconomic characteristics of the two religious groups. Copts were more likely to reside in urban areas and tend to rent their homes, while Muslims more often reside in rural areas and own their dwellings. Copts were also more likely to have completed secondary and some higher education compared to Muslims ($P = 0.002$). Among Copts, wealth index quintiles distribution tends to be more skewed towards the richest category, while Muslims were more evenly distributed across the different quintiles ($P < 0.001$). But, no statistically significant differences were observed between the two religious groups regarding: literacy, employment or health insurance.

Figure 3 depicts the distribution of the different occupation types amongst Coptic and Muslim Egyptians. Copts had a strong representation in white-collar job types (government, engineering, doctors, teachers, and project and general managers). Muslims, on the other hand, had a stronger representation in law enforcement and security agencies (police and army), as well in blue-collar occupation types (farmers, construction, factory workers, drivers and machinery).

The two groups were comparable in their HCV prevalence, diabetes prevalence, smoking prevalence, average blood pressure distribution, as well as BMI distributions. However, female circumcision was more often practiced among Muslims compared to Copts ($P < 0.001$). Furthermore, we examined the prevalence of surgery, blood transfusion, dental treatment and hospital admittance to compare the prevalence of medical procedures between the two religious groups. While the two groups appear to be comparable in the prevalence of surgery and blood transfusion, Copts were less likely to have had dental treatment ($P = 0.02$) and to be admitted to a hospital ($P = 0.03$) in their lifetime.

Religious distribution time series

Figure 4 depicts the proportion of Copts in the Egyptian population over the years. Overall, the proportion of Copts appears to be largely stable over the years since 1988 with an average of about 5.6%. We found no evidence of a statistically significant decline in the proportion of Copts in Egypt since 1988 ($P = 0.11$).

Spatial clustering

We identified three main clusters of large Coptic population densities (Figure 5): Cluster 1 spans Minya and Assuit governorates (17.6% are Coptic in the cluster), Cluster 2 Assuit and Souhag governorates (15.1%), and Cluster 3 metropolitan Cairo (Cairo, Giza and Kalyubia governorates) (9.4%). We also identified a small cluster in the Luxor governorate (30.4%). The three main clusters were also identified in all previous EDHS rounds where both GIS and religion information were reported (1992, 1995, and 2005; not shown). In the 2008 EDHS, a very small cluster was also identified in the Red Sea

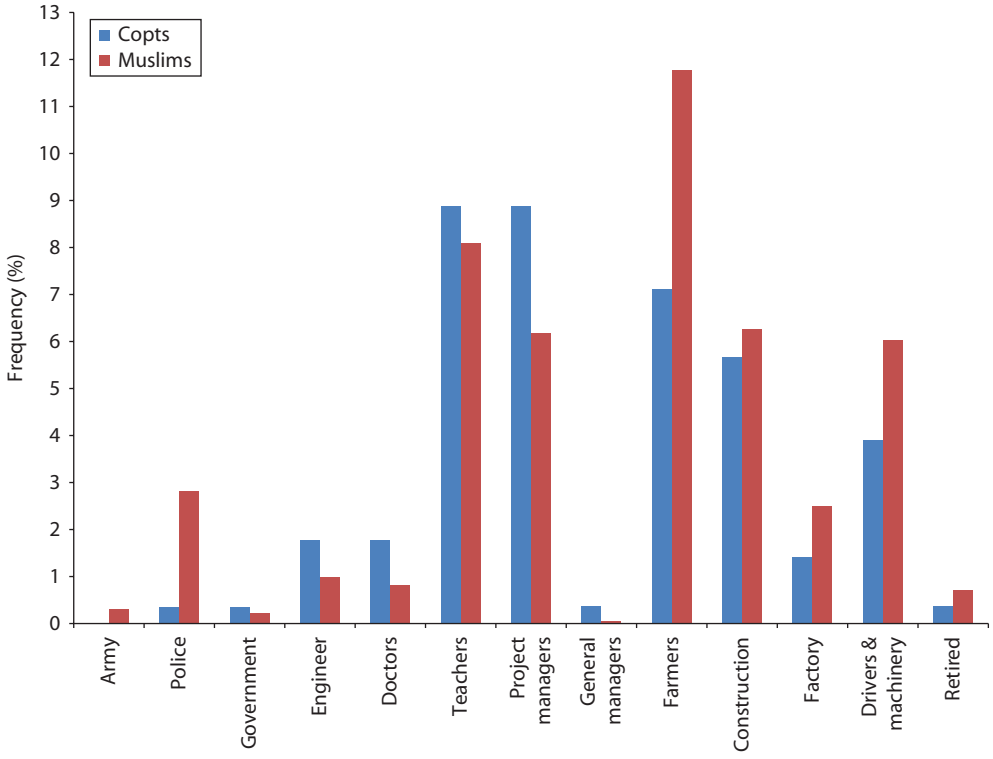

Figure 3. Distribution of occupation types among Copts and Muslims in Egypt.

governorate (54.5%). The cluster however was excluded because it was too small to be a meaningful population cluster and there was no contextual information supporting its presence.

DISCUSSION

To our knowledge our study is the first scientific study to use nationally representative and statistically reliable data to estimate the size of the Coptic community in Egypt and to characterize its demographic, socioeconomic and key health-associated indicators. Hence, we estimate the proportion of Copts in the Egyptian population aged between 15–59 years to be 5.1%. Assuming that this proportion holds for the 0–15 and 60 + years age groups, this translates to 4.3 million Copts, of a total population of approximately 84 million.[21] Our spatial analysis indicates that, as was the case in the past,

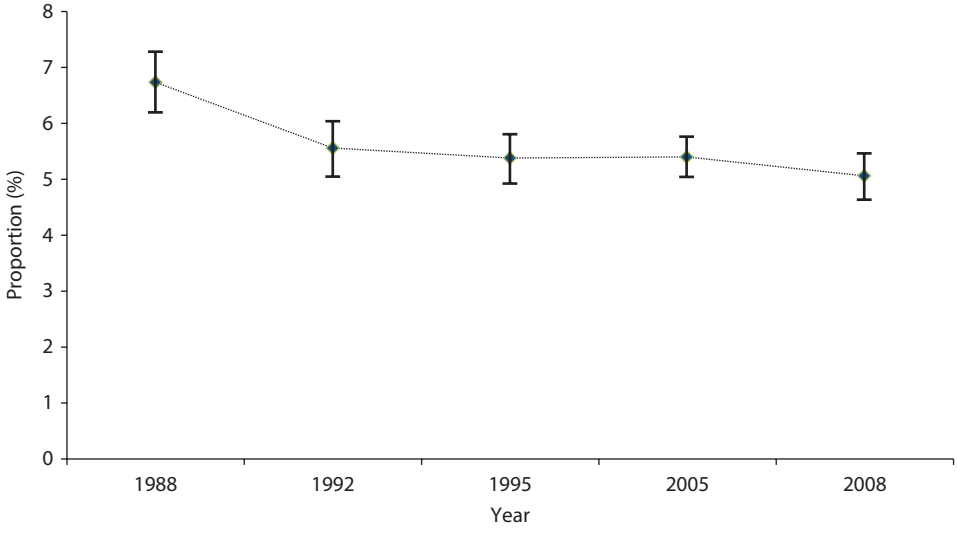

Figure 4. Time-trend of the proportion of Copts in the Egyptian population.

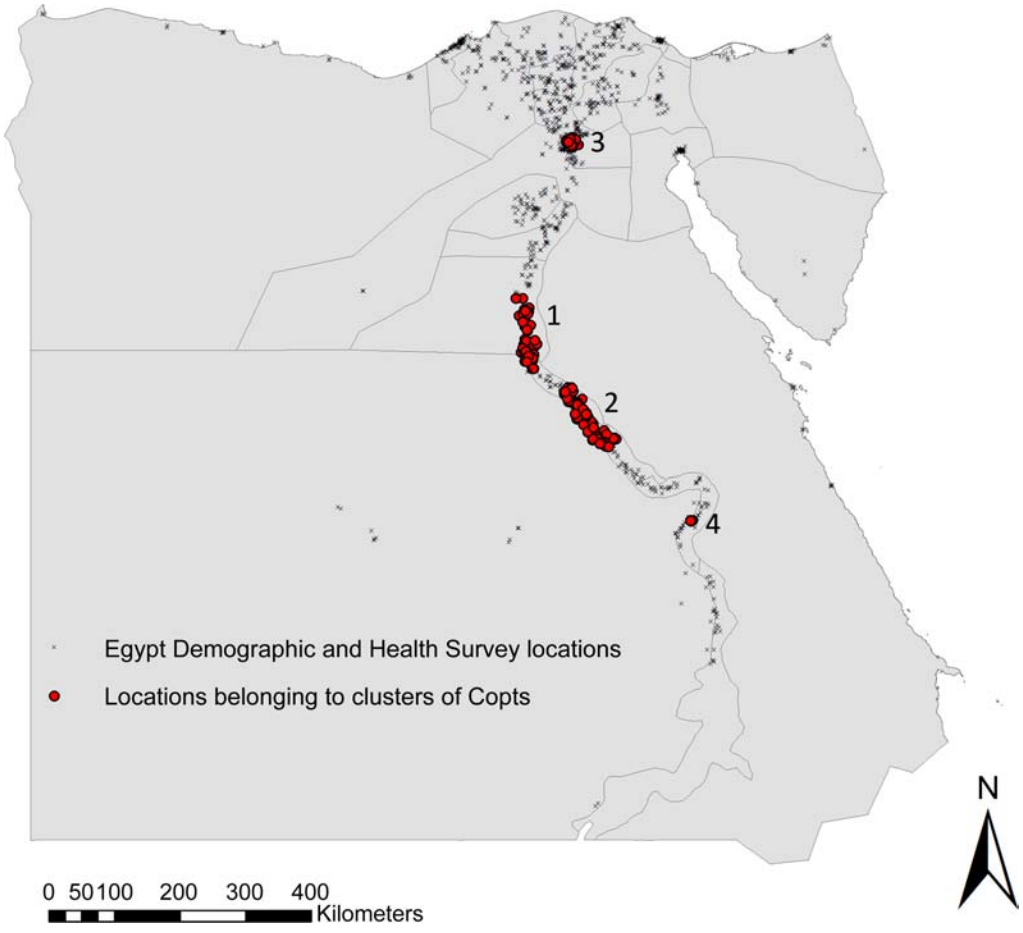

Figure 5. Geographic clusters of Copts in Egypt (Clusters: 1: Minya-Assuit, 2: Assuit-Souhag, 3: Cairo-Giza-Kalyubia, 4: Luxor, 5: Red Sea).

Copts though present in all areas of Egypt, remain concentrated in urban cities, particularly in metropolitan Cairo, in addition to several Coptic-dense clusters in Upper Egypt, such as in Assuit, Minya and Luxor (Figure 5).

It should be noted that our study utilized Demographic and Health Survey (DHS) data implemented using state of the art research methodology for generating nationally representative samples. The data was collected via the Measure DHS project with funding from international donors, mainly the United States Agency for International Development (USAID).[27] The DHS project has collected nationally representative data on health and population in over 90 developing countries, and its thoroughly-tested methodology has been applied in more than 260 surveys.[27] Furthermore, the similar proportion of Copts obtained (with overlapping confidence intervals) across the five consecutive EDHS studies in which religious information was collected, is indicative of the robustness of our estimate.

No data is available on the proportions of Copts in the age groups not included in this analysis (0–15 and 60 + years age groups). Nevertheless, the similarity in mean age and the number of children per woman amongst the two religious affiliations suggests a similar age-structure distribution among them. The marginally larger number of children among Muslims suggests that the proportion of Copts in the 0–15 years age group could be smaller than 5.1%, while that in the 60 + years age group is higher than 5.1%. Considering that the 0–15 age group is larger than the 60 + age group, the results may suggest that the proportion of Copts in Egypt could be slightly overestimated.

Nonetheless, a significant number of Egyptians work or live outside of Egypt, and were not captured in this survey. The International Organization for Migration (IOM) estimates that, as of the year 2000, approximately 2.7 million Egyptians live or work abroad[28]; a majority of which are concentrated in the Arab states of the Arabian Gulf (70.8%).[28] A more recent report by CAPMAS, estimates this number to be 3.9 million.[29] While there are no precise estimates of the proportion of Copts among Egyptians living

abroad, some evidence suggests that Copts are more likely to emigrate than Muslims,[3,8,30] and specifically to Western countries.[4,31] Though the number of emigrants is not large relative to the size of the Egyptian population, this may suggest that the number of Egyptian Copts could be slightly underestimated. On balance, the differences in age groups and emigration rates suggest the consistency of our estimate for the proportion of Copts among the total Egyptian population within and beyond Egypt.

There are two contradictory sets of widely reported and circulating estimates of the proportion of Copts in the literature and the public sphere. The first set of estimates traces itself to the official Egyptian census. Based on the 2006 census data, the Pew Research Center, for example, estimated the proportion of Copts in Egypt to be 5.3% (4,290,000 of a population of 80 million).[5] The census-based estimates, however, are widely viewed with skepticism in both the scholarly literature and the public sphere.[6,8,32–34] It is argued that the census data in Egypt is manipulated to minimize the proportion of Copts in the population for political reasons.[6,8,30] It is also believed that the Coptic proportion is underestimated additionally by a force of habit in the actual conduct of the census, wherein census officials in the field frequently record Copts as Muslims by default.[8]

The most widely reported and circulating estimates in the scholarly literature and the public sphere put the proportion of Copts at 10–20%.[6,8,35–37] Though this range is ubiquitous in the scholarly literature, we could not trace its source and it appears to reflect largely a consensus for a realistic estimate as suggested by community leaders.[6,8] Our findings support that official Egyptian census data is credible, and in fact have arrived at an estimate that is consistent with our independent and data-driven estimate.

The proportion of Copts does not appear to have been more than 10% of the population for at least a century. According to census data conducted as early as 1937, the proportion of Copts in Egypt at that time was 8.2%.[38] The fraction appears to have declined so that by the 1967 census, the proportion had already dropped to 6.3%.[8] This was not unique to Egypt, the number of Christians in many countries in the Middle East (for example: Lebanon, Iran, and Palestine) have been in a state of decline, both due to a decreased fertility rate and to an increased emigration.[3,4] However, this decline was not evident in Egypt over the last two decades. Our analysis spanning a 20 year period (1988–2008), portrays a slight, but not statistically significant, decline in the fraction of Copts over time. This does not negate the possibility of a modest decrease that is not large enough to be detected by our margin of error. Nevertheless, the totality of the evidence suggests that although the proportion of Copts has been declining over the last century, over the last 20 years the rate of decline has been decelerating possibly towards stability.

Examining the theoretical underpinnings of the trends in fertility among Copts, as well as generally among Arab Christians, is an important question. Our approach in this study is empiric and descriptive rather than theoretical, and we are limited to conjecture novel theoretical insights about this phenomenon. It appears that the main determinants for Coptic fertility have been socioeconomic factors, including educational attainment among others. Thanks to the Coptic renaissance starting in the late 19th century,[8,9,16] Copts in Egypt experienced notable progress in their socioeconomic and educational attainment status well before Muslims in this country. This transition appears to be the main driver of the declining fertility among Copts over the last century. Nonetheless, with the modernization of Egypt and mass education over the last few decades, these socioeconomic and educational attainment differences with Muslims have tapered off,[39] possibly explaining the converging fertility rates among both religious affiliations today. As such, our findings support the 'characteristics' or 'assimilationist' hypothesis[40–42] that differential fertility among Copts is primarily explained by socioeconomic factors, rather than by religious group membership itself. If the status of Copts as a minority is influencing their fertility, this may become evident over the next few decades as the historical drivers of fertility, in terms of socioeconomic factors, become less influential in driving differential fertility among Copts and Muslims.

Our analysis reveals that Copts overall are economically more affluent and have better educational attainment than Muslims. Over half of Copts are in the richest two categories, and over half have a secondary education or higher. In contrast Muslims are more evenly distributed across the wealth strata, with less than half of them having a secondary education or higher. Copts also had a stronger presence among white-collar professions such as engineers, doctors, teachers, and in managerial positions. These contrasts in education, wealth, and career attainment between Copts and Muslims may have been, at least in part, a legacy of the educational reform movement pioneered by Patriarch

Cyril IV in the late 19th century. The educational reforms among Copts revitalized education efforts in the clergy, Coptic youth and Coptic community at large, establishing schools and colleges, sending Copts for studies abroad, and laying the ground base for a future Coptic revival.[6,7,16] The move towards mass education in Egypt did not materialize till decades later. Indeed, the education challenge is one of the most enduring challenges that the new post-dictatorship Egyptian leadership faces today in a country in which 25.2% of the population are still illiterate, and 54.9% have not completed secondary education.[20]

Despite the overall affluence of the Coptic community, our study suggests potential marginalization of Copts in certain sectors, and the existence of impoverished pockets among Copts, for example, in rural areas. Most notably in the large security-related sectors, the Coptic representation is weak. Copts lack any detectable representation in the army, and have a smaller representation in the police force. But, it is unclear whether this lack of representation reflects discrimination or exclusion by the state, lack of interest of Copts in these institutions, or confounding by educational level and socioeconomic differences between the two religious affiliations.

Notwithstanding the differences outlined above, for the vast majority of the studied measures (such as: mean age, marital status, literacy, employment, sex distribution and different health indicators) the two religious affiliations were comparable. These results are consistent with a more integrated society in Egypt than is generally perceived.

The privileged socioeconomic status of Copts in Egypt should not be misunderstood to imply a lack of concrete issues challenging the Coptic community. Our study included specific demographic and socioeconomic characteristics for which information was available in the EDHS. Many of the issues that challenge the Coptic community are not included in the survey, and accordingly beyond the scope of this study. For example, Copts played an influential role in Egyptian politics prior to the 1952 revolution with ample representation in many of the government departments, and multiple Copts have held high administrative positions, including being prime ministers.[9,43] Post-1952 revolution in Egypt, on the other hand, is a time marked by a minimal representation of Copts in positions of political leadership.[8,9,43] Other issues that challenge the community include personal status law, civil service appointments, church building licenses, and Coptic media.[4,8,16]

Given the logistical difficulties in conducting population-based surveys, our results could have been biased due to inherent biases in the data, such as the variability in response rates across the two religious affiliations. Though this is unlikely since the overall response rate to the health issues subsample survey (from which most of the variables were obtained) was high at 94%, and the percentage of individuals with missing data on religion was a mere 0.16%.

Despite the robustness of the methodology for the spatial scan statistics conducted in this study,[23,44] such methodology could, in principle, have led to the identification of false positive or negative Coptic clusters. To validate the identified clusters, we examined Copt clustering not only in the 2008 EDHS round, but also in the other three EDHS rounds, where both GIS and religious information was included. In all these rounds, the three main clusters reported in this article were identified, validating the existence of these clusters in four independent and probability-based national samples. The 4th cluster (Luxor) did not consistently appear in all EDHS rounds, this is possibly due to sampling or sample size limitations in older EDHS rounds. In the 2008 EDHS, we also identified one small cluster in the Red Sea governorate, but this cluster was too small to be a meaningful population cluster and was excluded. It bears notice that the identified clusters in this study also correspond with socio-demographic, historical, and contextual information about the concentration of Copts in Egypt.[8,10] Based on all of the above, it is not likely that the identified clusters are false positive clusters, and it does not seem likely that we have missed any substantial and meaningful population cluster of Copts in Egypt.

CONCLUSION

We estimate that approximately 1 in every 20 Egyptians is a Copt. This fraction is smaller than the proportion commonly reported in scholarly literature and the public sphere. Our study also sheds light on the ongoing debate on the status of Copts in Egypt; establishing the demographic and socioeconomic facts upon which a healthy and informed debate should be conducted and policies drawn. Despite some identified differences between the two religious affiliations, our study highlights an integrated Egyptian society where Copts are contributing, along their Muslim brethren, to a nation with an ancient historical tradition of national unity. Most of the challenges that Copts are faced with seem to be a consequence of faults of omission, rather than commission.[8] Cumulative sentiments of

alienation from the national consciousness following years of exclusion from the political process, may have also contributed to a feeling among Copts that they are alien in their own homeland.[9] These challenges appear to stem from the same origins as other challenges facing this nation as a whole, that is, the ineffective governance of decades of authoritarian and non-participatory political systems. The recent democratic transition in Egypt, may offer a path towards addressing these challenges, though this path may not be free of roadblocks along the way. Empowering the Coptic community with respect to its contribution to society is not only critical for Copts, but for the entire population of Egypt; given their resourcefulness and developed capacity within the Egyptian context. This is also essential to preserve the cultural richness of Egypt, which is one of the most important aspects of life in this country.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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Author contributions

YAM conducted statistical analysis and wrote the first draft of the paper. DFC conducted the spatial clustering analysis. LJA conceived and led the design of the study, analyses, and drafting of the article. All authors contributed to discussion of the results and writing of the manuscript.

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