ORIGINAL RESEARCH ARTICLE

Time series study of the sales of non-subsidised contraceptives in Kenya at times of public sector shortage: implications for future sustainability

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Abstract

This paper describes volume trends of non-subsidised contraceptive commodities (NSCC) in Kenya between 2016-2019. We hypothesise that if non-subsidised contraceptive commodities volumes increased at times of public sector shortage then then we might hope for a similar response should public sector supplies reduce in response to an expected decline in donor funding. We find that non-subsidised contraceptive commodities contribute only 2% of total volume, and that these volumes are dominated by emergency contraceptives (EC) and combined oral contraceptives (COC). EC and COC volumes increased significantly during the 2017 nurses' strike, but not during those periods when the Kenya Medical Supplies Authority (KEMSA) was out of stock. Increases in NSCC volumes were not of sufficient size, however, to compensate for the decline in public sector volumes. In short it appears that the market for NSCC is small and constrained. We recommend that further research is needed to understand why distributors of NSCCs are not able to take advantage of continuing public sector supply shortages. *(Afr J Reprod Health 2021; 25[3]: 14-20).*

Keywords: Kenya; private sector; family planning

Résumé

Cet article décrit les tendances des volumes de consommation des produits contraceptifs non subventionnés (PCNS) au Kenya entre 2016 et 2019. Nous posons l'hypothèse que, si les volumes de produits contraceptifs non subventionnés augmentent en période de pénurie dans le secteur public, on peut s'attendre à une réponse similaire en cas de réduction des approvisionnements du secteur public suite à la baisse attendue du financement des bailleurs. Nous constatons que les produits contraceptifs non subventionnés ne représentent que 2 % du volume total, et que ces volumes sont dominés par les contraceptifs d'urgence (CE) et les contraceptifs oraux en association (COA). Les volumes de CE et de COA ont considérablement augmenté pendant la grève des infirmières de 2017, mais pas pendant les périodes où la Kenya Medical Supplies Authority (KEMSA) était en rupture de stock. La croissance des volumes de PCNS n'a toutefois pas été suffisamment importante pour compenser la baisse des volumes du secteur public. En résumé, il ressort que le marché des PCNS est petit et limité. Nous recommandons que des recherches complémentaires soient menées pour comprendre les raisons pour lesquelles les distributeurs de PCNS ne sont pas en mesure de tirer profit de la pénurie continue d'approvisionnement du secteur public. *(Afr J Reprod Health 2021; 25[3]: 14-20).*

Mots-clés: Kenya; secteur privé; planning familial

Introduction

The modern contraceptive prevalence rate (mCPR) in Kenya is one of the highest in sub-Saharan Africa[1]. Modern contraceptives include both short-term (condoms, oral contraceptives and injectables) and long-term methods (intra-uterine devices, intra-uterine systems and implants). In 2016, the National Family Planning Country Implementation Plan put the mCPR as high as 56.4%, and Kenya targeted a further rise to 58% by the end of 2020[2].

The most recent analysis suggests however that growth in the mCPR in Kenya has stalled[3]. Moreover, whilst the public sector is said to provide contraceptive services to 60% of users[4], a funding gap of $24 million for the public sector was forecast for 2020[2]. For these reasons, government and donors are said to be focused on the need to strengthen the sustainability of the family planning market in Kenya[5].

Expanding the share of non-subsidised (as opposed to subsidised or free) commodities would

strengthen the sustainability of the family planning market. Government and donor spending would also be reduced. This paper therefore looks to understand the extent to which non-subsidised commodities have met contraceptive demand in Kenya in the past, and how historic changes in public sector supply have affected sales. We hypothesise that if non-subsidised product volumes increased at times of public sector shortage then we might hope for a similar response should public sector supplies reduce in response to the expected decline in donor funding. We then consider what these analyses might mean for the future expansion of non-subsidised commodity sales.

Methods

Data on product volumes

Volume sales of non-subsidised contraceptives between 2016-2019 were collected on a monthly basis by IQVIA, a leading global provider of advanced analytics, technology solutions and contract research services to the life sciences industry (www.iqvia.com). IQVIA estimates that their information covers approximately 80% of the total Kenyan non-subsidised pharmaceutical market. Information relating to the supply of free family planning commodities by the Kenya Medical Supplies Authority (KEMSA) were kindly provided by KEMSA. Data relating to the supply of product by social marketing and social enterprise companies (PSI, DKT and MSI) were taken from the annual publication of social marketing statistics[6]. Information on private sector condom sales was not available for the full study period although estimates for 2016-17 were provided by PSI. Volumes were converted to Couple Years of Protection (CYP), as per the CYP conversion factors described by the United States Agency for International Development (USAID)[7].

Data on shortages in the public sector

Shortages can result from both a shortage of stock and/or disruptions to service delivery. Service delivery was shown to have been negatively impacted by the nurses' strike of June to early November 2017. During this strike, for example, volumes of oral contraceptives dispensed by public sector facilities (combined and progestogen only) declined to 52% of pre-strike levels, and injectables by 52%[8]. Nurses also went on strike for one month in December 2016[9]. The 100 day doctors' strike starting in December 2016 appears to have had relatively less impact than the nurses' strike. Oral contraceptives volumes dispensed declined to 81% of pre-strike levels, injectables to 91%[8].

Stock shortages were derived from the KEMSA data noted above. Periods where KEMSA issued no stock to any regional depot were identified as potential stock shortages at the central level. These were then confirmed with KEMSA in discussions. KEMSA issued supplies of Emergency Contraceptives to one or more County depots in just 17 of the 48 months of the study, and Combined Oral Contraceptives in just 16 of those months.

Statistical analysis

To understand if sales of non-subsidised products were affected by periods of public sector shortage, we looked first to see if sales of non-subsidised product changed significantly at any time, and if they did, whether or not those changes were temporally associated with periods of service disruption or stock shortage. Significant changes in sales volume were identified using the "R" package "Breakpoint", using a significance level of $p<0.05$. Breakpoint identifies structural changes in (linear) regression models[10] and identifies the dates on which sales start to show a significant change. Breakpoint requires that sales values be normally distributed. Sales values were checked for normal distribution using both the Kolmogorov-Smirnov test and the Shapiro-Wilk test. Where sales values were found not to be normally distributed, logarithmic transformation was applied. The optimum number of breakpoints was determined by minimisation of the Bayesian Information Criteria and Residual Sums of Squares.

Results

Non-subsidised product sales as a proportion of total sales

Total CYP delivered increased by 29% between 2016 and 2019. Non-subsidised products, however, contributed just 2% of total CYP over this period (Table 1). Volumes are dominated by free product from KEMSA. PSI dominates social marketing volumes with an 86% share in 2019[6].

Table 1: Contribution to total couple years of protection (CYP) delivered

% total CYP delivered	2016	2017	2018	2019
Social Marketing	33%	34%	22%	21%
KEMSA	64%	64%	76%	77%
Non-subsidised product	2%†	2%†	2%†	2%†

† Excludes sales of non-subsidised condoms. Information on the sales of non-subsidised condoms was not available for all periods of this study. Estimates from the social marketing sector put sales of non-subsidised condoms at no more than 2% of total condoms delivered for both 2016 and 2017[11]. The inclusion of non-subsidised condom sales would thus make little or no difference to estimates of total non-subsidised product volumes.

Table 2: Total couple years of protection (CYP) delivered by method

% total CYP by method	2016	2017	2018	2019
COC	8%	4%	5%	6%
Condoms (F)	0%	0%	0%	0%
Condoms (M)	23%	37%	27%	20%
EC	2%	2%	2%	1%
Implant	30%	35%	30%	28%
Injectable	27%	17%	19%	23%
IUD	9%	5%	17%	21%
IUS	0%	0%	0%	0%
Patch	0%	0%	0%	0%
POP	0%	0%	0%	1%

COC= Combined Oral Contraceptive; Condoms (F) = Female condom; Condoms (M) = Male condom; EC = Emergency Contraceptive; Implant = Combined total of both 3 and 5 year implants; Injectable = Combined total of both one month, two month and three month injectables; IUD = Intra-Uterine Device: IUS = Intra-Uterine System; POP = Progestogen Only Pill

Table 3: Share of non-subsidised product volume of total method delivered

% non-subsidised product of total method delivered	2016	2017	2018	2019
COC	3%	5%	7%	7%
EC	96%	96%	82%	93%
Implant	0%	0%	0%	0%
Injectable	0%	0%	0%	0%
IUS	100%	100%	100%	100%
Patch	100%	100%	100%	100%
POP	100%	100%	0%	0%

Condoms, implants, injectables and Intra-Uterine Devices (IUDs) dominate total CYP delivered in Kenya (Table 2). These four methods constituted 92% of total CYP delivered in 2019. Non-subsidised products play a negligible role in the delivery of these methods (Table 3). Combined Oral Contraceptives (COC) and Emergency Contraceptives (EC) constitute 94% of non-subsidised product volume. Non-subsidised COC volumes made up 7% of total COC volume delivered in 2019 and 93% of total Emergency Contraceptive volume in the same year. Although used in small quantities, it is also worth noting that non-subsidised products are the only option available for women using the contraceptive patch or the intra-uterine system (IUS) in 2019.

Change in sales of non-subsidised product during times of public sector shortage

Breakpoint analysis of non-subsidised product sales was carried out on COC and EC only, these constituting 94% of total non-subsidised product sales (Table 3).

Figure 1 overlays the results of the Breakpoint analysis of non-subsidised COC volumes on top of those months identified as being periods of public sector shortage. Breakpoint analysis identifies two periods where sales of COC increased significantly (see Figure 1). The first (Breakpoint 1, October 2016) does not appear to be associated temporally with the nurse's strike or a change in the KEMSA supply situation. The second (Breakpoint 2) is identified as most likely occurring in December 2017 (95% confidence intervals June 2017-January 2018), the month immediately following the nurses' strike of June-November 2017. The average monthly increase in COC volumes in this second period was 643 CYP. This compares with a decrease of approximately 200,000 CYP of COC in the public sector across the 5 months of the nurses' strike[8]. No breakpoints were identified that appear to be associated with the resumption or cessation in KEMSA supplies of COC to the County depots.

Figure 2 overlays the results of the Breakpoint analysis on non-subsidised EC volumes on top of those months identified as being periods of public sector shortage. Three breakpoints were identified. Breakpoint 1 shows a significant decline in the month of the first nurse's and the doctors' strike (December 2016). However, it seems unlikely that this decline can be associated with these strikes, given that any service disruption in the public sector would be expected to lead to an increase in non-subsidised product sales. Breakpoint 2 indicates a significant increase in September 2017 (95% confidence interval May 2017 – November 2017).

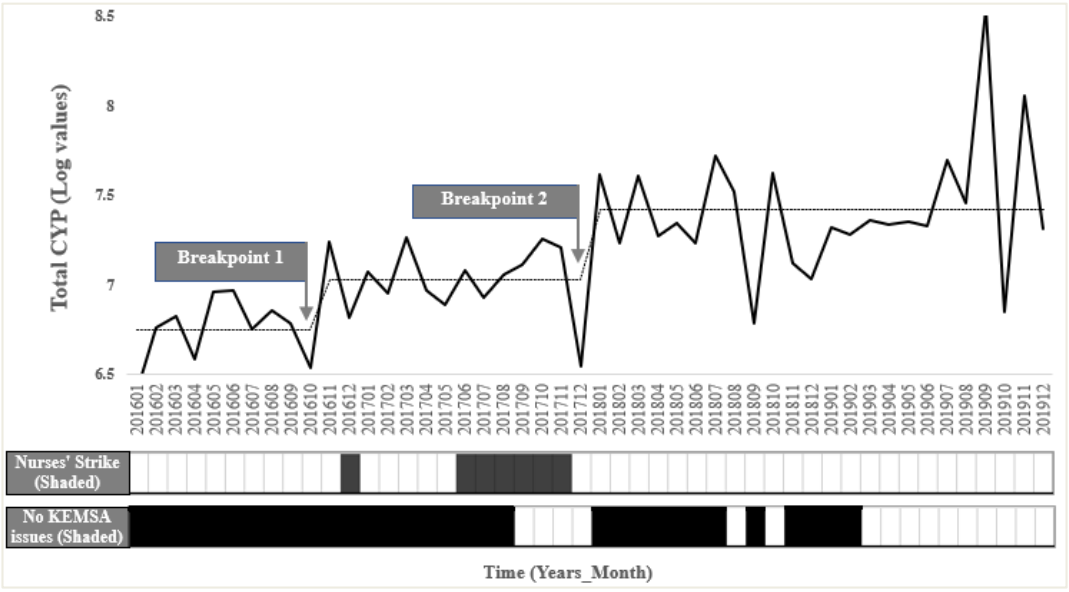

Figure 1: Monthly sales and breakpoint analysis for sales of non-subsidised COC

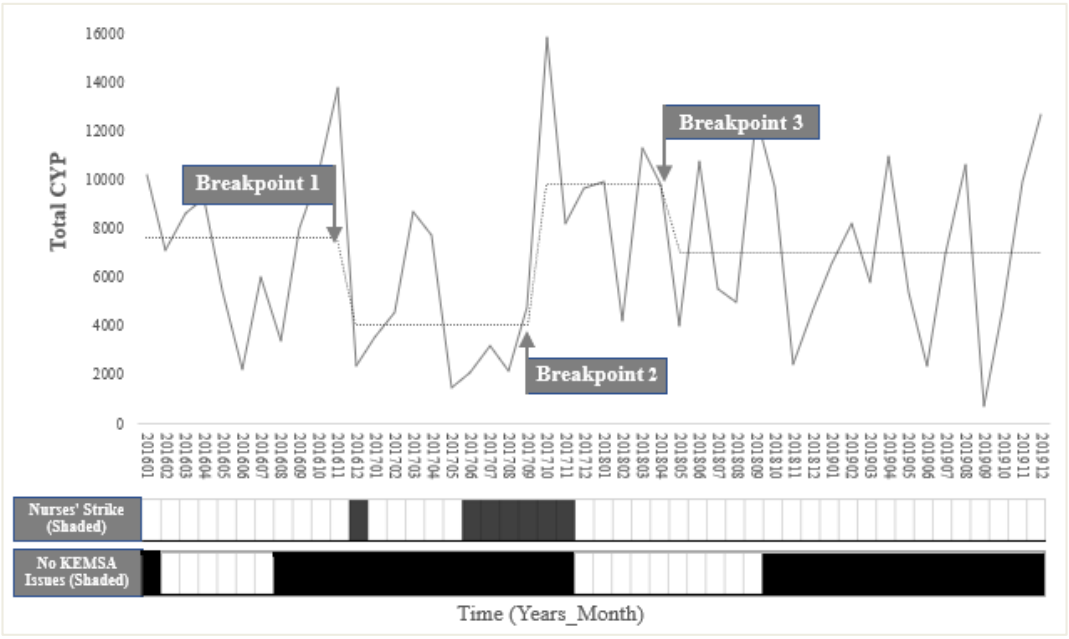

Figure 2: Monthly sales and Breakpoint analysis for sales of non-subsidised EC

This second breakpoint thus coincides with the second nurses' strike. Breakpoint 3 identifies a significant decline in April 2018 but is associated with very wide confidence intervals (December 2016 – June 2019). This wide range makes it impossible to associate Breakpoint 3 with any particular event. These wide confidence intervals reflect the variability in the data seen around this time. None of the breakpoints identified appear to be associated with stockouts at KEMSA or indeed resumption of EC supplies to the regional depots by KEMSA.

Discussion

This analysis finds that non-subsidised products make up no more than 2% of the total volumes of modern contraceptives delivered in any of the four years between 2016-2019, and that non-subsidised

product volumes are dominated by COC and EC. These results are not unexpected, even if stock outs at public sector facilities are a consistent feature[12]. Registered private hospitals and clinics source contraceptive commodities free of charge from the KEMSA and its County Depots[13]. Pharmacies are restricted by regulation from administering injectable contraceptives[14], but avail themselves of substantial volumes of other subsidised products. In other words, non-subsidised products compete with free product in private hospitals and clinics, with subsidised product from social marketing organisations in pharmacies, and pharmacies are restricted in the non-subsidised product methods that they can sell. Little wonder therefore that non-subsidised product volumes are dominated by EC. EC is distributed only in limited quantities by KEMSA, not all by PSI and only recently by DKT (at a price moreover that is equivalent to those non-subsidised product brands already on the market).

This analysis also finds that periods of shortage caused by service disruption do appear to be associated with significant increases in non-subsidised sales of EC and COC. Having said this, however, the increase in non-subsidised COC volumes in no way compensates for the drop in volumes seen in the public sector during the second nurses' strike. Importantly we also note that annual sales of COC from PSI also show no significant increase in 2017 relative to the previous or subsequent years[6]. In other words, volume changes in neither subsidised nor free COC volumes appear to compensate for public sector shortages. In part of course this may be due to the price of both subsidised and non-subsidised product still being too high for many women. Also possible however, is that neither the social marketing organisations nor the distributors of non-subsidised product are able to increase their stock at short notice, nor are they willing to take the risk of purchasing additional stock given the uncertainty around when service disruption would resolve.

Previous analysis of the Performance, Monitoring, and Accountability 2020 (PMA2020) surveys for Kenya has suggested that in the months immediately following the nurses' strike of 2017, women using injectables, pills, emergency contraception, and male condoms were more likely to report paying for contraceptive commodities. The percentage of users paying for oral contraceptives increased from 68% in November-December 2016 to 89% in November-December 2017, whilst payment for emergency contraceptives increased from 85 to 97% across the same period. Given the dominance of non-subsidised product in the supply of EC in Kenya, and the significant increase in non-subsidised product sales noted at this time, we can perhaps understand how, if public sector supply was disrupted, more women using EC would have to pay. However, the results of these surveys as they relate to COCs do not seem to be compatible with the actual sales trends of either non-subsidised or subsidised COCs. As noted above the decline in monthly COCs dispensed from June through to November averaged approximately 40,000 CYP per month. This compared to an average monthly increase in sales of non-subsidised product of just 643 CYP, and no clear increase in volumes of subsidised product in 2017. It seems difficult to believe therefore that increased sales of non-subsidised or subsidised products are solely responsible for the increase in women being required to pay for COCs. It may be perhaps that more public sector facilities came to charge for COC at this time. Certainly, COCs in the public sector may have been in short supply. KEMSA issued no COC to County Depots in the previous 20 months and we note, of course, that at least one previous survey has found that products are charged for in the public sector, with prices for at least one commodity (implant) appearing to be as high as those found in the private sector[15].

At the same time, however the PMA2020 surveys suggest that the percentage of women obtaining their contraceptives from pharmacy (the main channel for non-subsidised and subsidised product) more than doubled between the PMA2020 survey of November-December 2016 and that done in November-December 2017[8]. However, in this study it was found that total volumes of subsidised and non-subsidised product increased by just one third between 2016 and 2017, this increase being driven by sales from PSI. PSI sales of male condoms increased by 23% between 2016 and 2017, implants by 84%, and IUDs by 39%. Volumes of injectables and COCs actually fell when comparing 2016 and 2017, these levelling off post this period with 2017, 2018 and 2019 volumes being similar[6]. Given these data, the increase in women seeking product from pharmacies appears unlikely to be due to more women seeking injectables and COCs from pharmacy (as these

volumes fell), but may perhaps be due to an increase in women buying longer-term methods from pharmacy, they being unable to access these from the public sector during the strike.

It is surprising that stock outs at KEMSA, or at least resumption in supplies of EC or COC to the County depots, is not associated with changes in sales of non-subsidised product. In part perhaps the lack of non-subsidised product response may reflect the relatively small volumes sold of non-subsidised product. It may also reflect the fact that KEMSA issues COC and EC relatively rarely, and thus ongoing stock outs and stock fluctuations at KEMSA are already built into distributors' forecasts of the quantities required. And of course, stock outs at KEMSA may not be reflected in stock outs at facility level. In the 18 months prior to the nurses' strike KEMSA claims not to have had any stock of COC (and certainly made no issues to County depots). At the same time, in the 6 months prior to the nurse's strike, public sector facilities were dispensing between 120,000 – 150,000 CYP of COC.

It is important to consider whether the volume estimates for subsidised and non-subsidised product are in any way under-estimates. The data on subsidised product come from the companies themselves (i.e. DKT, PSI and MSI). The data on non-subsidised product are derived from data collected from wholesalers, and all major OC and EC brands are represented. IQVIA indicate that these data perhaps represent 80% of the total non-subsidised pharmaceutical market, and if this is indeed the case, then the contribution of non-subsidised private sector sales may be marginally greater than those indicated here. At the same time such under-estimation would not affect the trends in the sales of distributors in the IQVIA data that were noted in the Breakpoint analysis described earlier.

Overall it seems clear that if current market conditions persist, non-subsidised products will be unable to play a major part in building the sustainability of the family planning market. Competition from free or subsidised product appears to have driven non-subsidised products into those areas where competition is weak – EC and novel methods – with the result that total volume of non-subsidised product makes up only 2% of total contraceptive volume. If current market conditions persist therefore, non-subsidised product will continue to compete with free product distributed to both public sector facilities and to registered private clinics and hospitals, and pharmacies will also remain unable to administer the more popular methods of contraception. If indeed these current market conditions do persist, it may be better to focus private sector investments on expanding private sector service delivery than on expanding non-subsidised commodity volumes. Nonetheless if policy makers were to look to expansion of non-subsidised product volumes in the future, it will be important to understand why distributors of non-subsidised product have not taken more advantage of continuing stock outs in the public sector and periods of major service disruption. Further research on the incentives and planning processes that would be required to encourage distributors to sell greater volumes of full-sized product would be beneficial.

Contribution of authors

Study conceptualisation and design: PS; data analysis: SA; manuscript preparation: PS; final write-up, editing and approval: both authors.

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